

Inventory & Monitoring Division

National Park Service



Standard Operating Procedure 2.11.8

Creating Custom Areas of Analysis for Use as a Part of the IMD Environmental Settings Protocol

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Summary

This SOP provides guidance to IMD Networks and Cooperators for submitting Custom Areas of Analysis (AOAs) for use in deriving Landscape Dynamics summary statistics.

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Overview

This SOP provides guidance to Networks or cooperators on providing custom Areas of Analysis (AOA) data. This SOP will not provide explicit direction for HOW to prepare custom AOA data. Rather, this SOP will describe what is required 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 in the Post-Processing section. If there are no updates to previously submitted Custom AOAs, no new submission is needed. All AOAs previously submitted will continue to be used.

Custom AOAs are considered relevant spatial areas within which a Network or Cooperator would like Landscape Dynamics summary statistics calculated – they are areas of analysis to be included in addition to the standard AOAs annually created (Park*, 3km*, 30km, HUC12*) for summary statistics. (*select indicators only)

NOTE: Network-provided park boundaries that differ from park boundaries derived from Land Resource Division (LRD) updates are not considered a custom AOA EXCEPT when the Network-provided park boundary is an area to use *in addition* to the standard Park AOA 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.

Network-provided park boundaries are not shared with Land Resources; they are intended for use with IMD and Landscape Dynamics ONLY.

Custom AOAs will be updated annually and all custom AOAs must be submitted to the IMD Central Office for inclusion before **September 30**. Any custom AOA submissions received after that date will not be included until the following year.

Questions or concerns? Contact michelle_kinseth@contractor.nps.gov.

For updating an existing set of Custom AOAs, see section ‘[Updating Existing Custom AOAs](#)’. Updates to custom AOAs can be defined as 1) altering an existing AOA boundary – like adding (or removing) part of a management area; or 2) adding a new boundary to an existing set or list of AOAs – for instance, adding (or removing) a new watershed to an existing set of watersheds for an area.

Requirements

Technical requirements are based on the processing needs of the data and may include, at a minimum:

- ArcGIS
 - Understanding of spatial data file formats (file geodatabase, feature dataset, feature class), spatial references, multipart versus singlepart data, and topology rules

- MS Word
- Other, as needed to accomplish requirements stated herein (*author, 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. *Author: Make sure to keep a copy of this completed document for your records.*

Processing Requirements – Custom Area of Analysis (AOA)

Overview of Custom AOA Requirements:

1. File geodatabase (gdb) with one or more feature datasets containing custom AOA feature classes
 - a. Alternately, multiple file geodatabases with one feature dataset each can also be submitted.
2. Each feature dataset should contain individual feature classes (can be multipart, if desired) for each distinct custom AOA, and one combined feature class (singlepart) that includes all distinct feature classes within that feature dataset.
 - a. All feature datasets/classes must be in required spatial reference, by geography (see below).
 - b. Combined feature class of all distinct AOAs should be named meaningfully and identify the type of AOAs
 - c. All distinct AOA feature classes must follow the described naming convention.
 - d. All required attribute fields must be present and defined as noted, in all feature classes within a feature dataset

Detailed Custom AOA Requirements:

Custom AOA data must be in the following spatial reference, respective of 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 geodatabase(s) (gdb) containing feature dataset(s) containing feature class(es). There are two options for submission, 1) multiple file geodatabases with one feature dataset each, or 2) multiple feature datasets within one file geodatabase.

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

Required For ALL feature classes, Shape “Polygon”. No Z or M values are allowed in any features.

Distinct AOA feature class naming convention:

All distinct AOA feature classes must have “NNNN” (4-letter Network Code) OR “IMD” (if Custom AOA is 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 precisely match the text in required field “UNIT_CODE”, as described below in [Creating New Custom AOAs](#).

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

<CODE>_<NAME>_AOA_<SUFFIX>

Where:

<CODE> = Network 4-letter code, OR ‘IMD’ if custom AOA is not from a Network

<NAME> = the name of the AOA, can be anything as long as unique and identifiable to end user

<SUFFIX> = identifier for type of AOA, can be anything identifiable to end user (such as Watershed, Ecoregion, Area, etc)

Examples: GLKN_VOYA_AOA_AnalysisArea; ERMN_FONE_1002_AOA_Watershed;
MOJN_BigHornSheep_AOA_Habitat; ROMN_WEI_GRSA_114_AOA_WEI_GRSA

The combined feature class (singlepart) within a feature dataset must include all the unique AOA feature classes contained within the respective feature dataset. If any boundaries are adjacent or coincident they should be topologically corrected* (if possible, or desired).

***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

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 or the number of custom AOAs.

Minimum Required Attribute Fields for all Feature Classes

Please take care that all fields are included **exactly** as noted here.

UNIT_CODE (Text, any length needed) = this field 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 should preface the name in UNIT_CODE. If the source is not a network, ‘IMD’ should preface the name in UNIT_CODE. See examples below.

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. If a custom AOA is multi-park-based, leave this field blank.

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

AREA_SQKM (FLOAT) = Calculate geometry of AOA in km² after ALL editing, processing, repairing of geometry is done, and data is in final spatial reference (as defined 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 AOA polygon – 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.

AOA_DATE (Text, 8) = The date the AOA polygon(s) was finalized for use. Use format ‘YYYYMMDD’. (NOTE: do not use data type ‘Date’ for this field)

DSLink (Text, 250) = for all AOAs, leave this field empty

RedactReason (Text, 20) = for all AOAs, leave this field empty

ChangeReason (Text, 20) = for all AOAs, leave this field empty

CreateDate (Text, 8) = this date should match field AOA_DATE, format YYYYMMDD

All feature classes can have any additional attribute fields, but the fields noted here are the **minimum required** and must be created exactly as shown.

All indicator metrics will be calculated for all submitted Custom AOAs. If all metrics are not desired, complete a matrix for indicator metrics by AOA (Appendix 1) to identify what is specifically desired for a set of AOAs. If no matrix is submitted, all metrics will be calculated for all AOAs (where data available).

Additional requirements, hints, and useful information:

- If the source of a custom AOA geodatabase is not an I&M Network, 'IMD' should replace the 4-letter Network code in all feature class names, and in 'UNIT_CODE' field. (see example below)
- Feature dataset(s) can be named anything meaningful, though it is recommended to maintain the use of the AOA type (the *_*suffix*>), even in the feature dataset (as noted below, Feature dataset = "*_Areas", Combined feature class = "*_CustomAreas", Unique feature classes = "*_Area").
- If custom AOAs span various Geographic Areas (as defined in Processing Requirements, i.e. PACN, SFCN), AOAs for each explicit geographic area must be in unique feature datasets, even if projections (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 michelle_kinseth@contractor.nps.gov

Any custom AOAs that do not fit the required structure outlined here (including any misspellings in field names, incorrect data type in a field, or missing fields) will be sent back to the submitter for correction.

Example Custom AOA geodatabase from I&M Network source:

■ NPS_GRYN_CustomAOAs_forLandscapeDynamics_August2016.gdb

■ GRYN_Areas

- AOA_GRYN_CustomAreas
- GRYN_GRTE_JODR_YELL_Grouped_30km_AOA_Area
- GRYN_GRTE_JODR_YELL_Grouped_AOA_Area
- GRYN_GYA_Boundary_AOA_Area
- GRYN_GYA_Counties_Grouped_AOA_Area

The combined feature class, required for each feature dataset. Combined feature class can be named with or without a prefix/geography*.

Example: <geography*>_AOA_<suffix>

Prefix of each distinct AOA feature class must match field “UNIT_CODE” in the combined feature class attribute table, and its own attribute table (GRYN_GYA_Boundary, see below).

“_AOA_<suffix>” **must** be included in the name of each distinct AOA feature class in a feature dataset

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

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

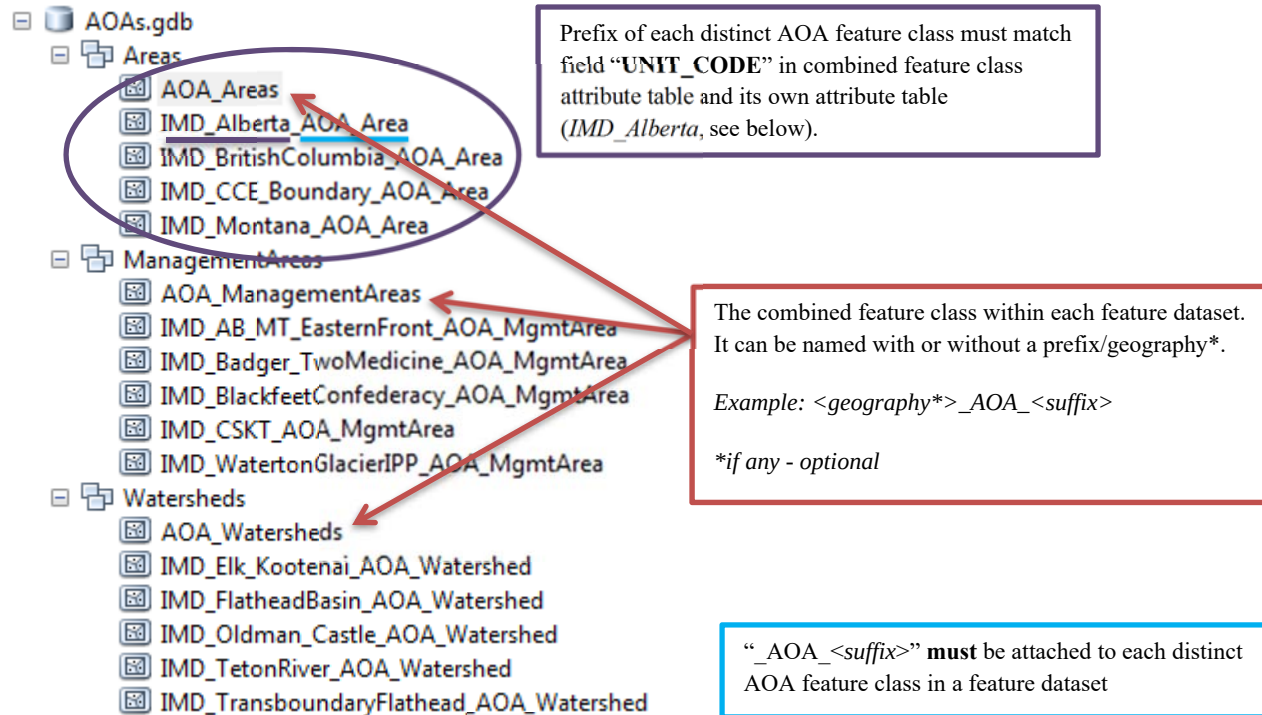
AOA_GRYN_CustomAreas							
OBJECTID *	Shape *	UNIT_CODE	PARK_CODE	FULL_NAME	AREA_SQKM	SOURCE	
1	Polygon	GRYN_GRTE_JODR_YELL_Grouped_30km	<Null>	30km buffer around GRTE, JODR, and YELL (grouped)	29330.03	NPS Land Resources Division	
2	Polygon	GRYN_GRTE_JODR_YELL_Grouped	Null	GRTE, JODR, and YELL (grouped)	10251.06	NPS Land Resources Division	
3	Polygon	GRYN_GYA_Boundary	<Null>	Greater Yellowstone Area Boundary (GYCC)	91719.14	Greater Yellowstone Coordin	
4	Polygon	GRYN_GYA_Counties_Grouped	<Null>	34 GYA counties for human population and agriculture metrics	234410	United States Census Bureau	

GRYN_GYA_Boundary_AOA_Area							
OBJECTID *	Shape *	Shape_Length	Shape_Area	UNIT_CODE	PARK_CODE	FULL_NAME	AREA_SQKM
1	Polygon	1833956.938084	91719143866.64550	GRYN_GYA_Boundary	Null	Greater Yellowstone Area Boundary (GYCC)	91719.14

Questions? Contact michelle_kinseth@contractor.nps.gov.

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

Example Custom AOA geodatabase from non-I&M 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****

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

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

Questions? Contact michelle_kinseth@contractor.nps.gov.

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

Updating Existing Custom AOAs

If a previously submitted custom AOA geodatabase has changed, either because of addition/subtraction of area to an existing AOA or because new AOA polygons were added to the list, a complete, updated geodatabase must be submitted.

1. Incorporate updates/changes and/or new AOA(s) to the existing AOA gdb
 - a. Make sure the Date fields (AOA_DATE, CreateDate) are properly populated for any new and/or updated AOAs.

FULL_NAME	AREA_SQKM	AOA_DATE	CREATED_BY
ter around GRTE, JODR, and YELL (grouped)	29330.03	20160903	NPS Greater Yellowstone I&M Netwo
DR, and YELL (grouped)	10251.06	20160903	NPS Greater Yellowstone I&M Netwo
Yellowstone Area Boundary (GYCC)	91719.14	20160903	NPS Greater Yellowstone I&M Netwo
counties for human population and agriculture metrics	234410	20160903	NPS Greater Yellowstone I&M Netwo
ter around GRTE and JODR (grouped)	9750.85	20170801	NPS Greater Yellowstone I&M Netwo
JODR (grouped)	1350.17	20170801	NPS Greater Yellowstone I&M Netwo

2. Resubmit the complete and updated custom AOA geodatabase, including any AOAs that did not change. Only AOAs present in the resubmitted geodatabase will be used.
3. Include with resubmission a list of what AOAs were changed/updated/added/removed.
 - a. If needed, include an updated matrix indicating what indicators are desired for the new AOAs (Appendix 1)
4. As with brand new Custom AOAs, there is a deadline of **September 30**, annually.

If there are any questions about updating a custom AOA gdb, contact michelle_kinseth@contractor.nps.gov.

Removing Existing Custom AOAs

If a set of custom AOAs is no longer in use, the IMD Central Office should be notified. All submitted Custom AOAs will continue to be used, in perpetuity, until notification is given to discontinue their use.

If one or more AOAs within a set of AOAs is no longer in use, a corrected set should be submitted as updated custom AOAs, with the desired AOA(s) removed from the full set list. Include with this submission what AOA(s) were removed from the set.

If there are any questions about removing AOAs from a custom AOA gdb, contact 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 a description/definition of the AOA (AOA type and where it came from), and contact information to the source/creator of AOA (can be Park/Network level office information). Additionally, if the AOA was updated/alterd from a previous version, it may be advantageous to include details on why the change was made.

Post-Processing

1. If needed, complete a matrix of AOA and landscape dynamics indicators, as shown in Appendix 1.
2. Attach/save all custom AOA processing steps as Appendix 2. Be sure to keep this for your records as well.
3. Add custom AOA author(s) name(s) to this SOP and use as citation/source for any reports related to these AOAs.
4. Email SOP (Appendix 2, indicator matrix (if needed) at a minimum) and final custom AOA file geodatabase(s) 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 30**, annually.

Networks are expected to maintain a copy of the custom AOAs, this SOP, and all custom AOA processes locally; this SOP is your source for citations within reports that use any Custom AOAs or Custom AOA summary statistics.

All Networks will be responsible for maintaining record of their respective Custom AOA processing steps. IMD-CO is not 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 summary statistics on the most recent set of Custom AOAs submitted, regardless of the date they were submitted.

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

Unless otherwise indicated, all indicators for all AOAs will be calculated. If there is a specific set of indicators desired for one or more AOAs, complete a matrix similar to as shown below, by AOA. Text file, excel spreadsheet, or word doc are all acceptable formats. Again, if all indicators are desired for all AOAs there is no need to complete this matrix.

	Custom AOA*	Notes
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. Custom AOAs can be grouped into one column (as shown), or listed individually across the top if there are explicit differences in indicators desired, by feature dataset or by feature class. Please provide explicit notes if there are caveats for specific indicators or specific custom AOAs.

Land Cover Area per Category NLCD and CCAP based; includes Anderson Level 1 and Level 2, for NLCD years 2001 (CONUS only), 2006 (CONUS only), 2011 (CONUS, Alaska), and 2016 (CONUS only). CCAP is available for Island geographies only, and Level 2 only (Hawaii-Oahu (2011); Hawaii-Hawai'i, Molokai, Maui (2010); CN Mariana Islands-Saipan (2005); American Samoa (2010); Guam (2011); USVI (2007, 2012)). Unless otherwise specified, Level 1 (where available) and Level 2 for all available years will be calculated.

Land Cover Natural vs Converted NLCD and CCAP based; for NLCD, years 2001 (CONUS only), 2006 (CONUS only), 2011 (CONUS, Alaska), and 2016 (CONUS only). CCAP is only available for Island extents (Hawaii-Oahu (2011); Hawaii-Hawai'i, Molokai, Maui (2010); CN Mariana Islands-Saipan (2005); American Samoa (2010); Guam (2011); USVI (2007, 2012)). Unless otherwise specified, all available years will be calculated.

Land Cover Impervious Surface NLCD only, CONUS extent only; for NLCD years 2001, 2006, 2011, and 2016. Unless otherwise specified, all available years will be calculated.

Pattern Density/Pattern Morphology includes four cover types: Grassland, Forest, Shrubland, and Wetland, for years 2001, 2006, 2011, and 2016. Density and Morphology are available for CONUS extent only. Unless otherwise specified, all cover-types for all available years will be calculated.

Population Total/Density (area-weighted) available for 1990, 2000, and 2010 (CONUS, Alaska, Hawaii, Puerto Rico only). USVI and Pacific Island territories are available for 2010 only.

Population total/density is calculated using Census Block Groups except American Samoa and CN

Mariana Islands where Census Places are used, and Guam where Census Subdivisions are used. Unless otherwise specified, all available years will be calculated.

Road Density/Area without Roads are available for 2010, 2015, 2016, 2017, and 2018, for all extents. Unless otherwise specified in Notes, all years will be calculated.

Appendix 2: Custom Area(s) Of Analysis (AOA) Processing Steps (for Network Use Only)

Please attach custom AOA processing details here

Appendix 3: I&M Central Office Use Only

Post-Processing (Central Office Only)

Upon receipt of Custom AOA file:

1. If needed, create new folder for Network (NNNN)
X:\ProjectData\LandscapeDynamics\SourceData\Boundary\Network_CustomAOAs. Create new folder for year (YYYY) within NNNN folder
(X:\ProjectData\LandscapeDynamics\SourceData\Boundary\Network_CustomAOAs\NNNN)
 - a. Within YYYY folder copy .zip folder. Extract contents.
2. In ArcMap/Catalog, check custom AOA geodatabase for requirements.
 - a. Feature Dataset
 - i. Containing combined feature class, properly attributed
 - ii. UNIT_CODE field correlates to feature class name for each individual feature
 - b. Containing unique/distinct feature classes that comprise the combined feature class
 - i. Naming convention of feature classes is correct (“_AOA_<suffix>”)
 - c. All attribute fields are present and formatted correctly in all feature classes, as required in this doc
 - i. UNIT_CODE, AOA_DATE specifically
 - ii. No M or Z values
 - d. Spatial Reference correct
3. Attach custom AOA information to tracking sheet (internal use only),
https://docs.google.com/spreadsheets/d/1Zi7hECdWSzsVFTjreOYXGuZ_sy2NDyIciQVCA_dGgmX/edit#gid=1535063090
4. Create temp feature classes for any updated custom AOAs, by Network.
5. For any new submissions, prep for statistics
6. Prep all custom AOAs for statistics if any new source data.

Once all Custom AOAs have been submitted

1. Incorporate any changes to custom AOAs to the Custom AOA geodatabase for the map service
(X:\ProjectData\LandscapeDynamics\SourceData\Boundary\CustomAOAs_ForServices.gdb)
 - a. In ArcMap, integrate new and updated AOAs to the feature dataset (CustomAOAs)
2. Open LandscapeDynamics_AOA_Custom.mxd -
X:\ProjectData\Data_Processing\Bounds_Processing\MapServices\LandscapeDynamics_AOA_Custom.mxd
 - a. Edit Map Document description to reflect update date
 - b. Edit Layer Properties/Descriptions to reflect update date
 - c. Edit each Feature Class description with the update date (where needed). (Example: “Landscape Dynamics custom AOAs for use with Landscape Dynamics protocol. Submitted by HTLN; updated September 2016.”)
3. Connect to the ArcGIS server as admin.
 - a. Delete existing “LandscapeDynamics_AOA_Custom” map service.
 - b. Publish updated service. File → Share As → Service
 - i. Publish a service
 - ii. Connection: ArcGIS Server; Service Name: default mxd name
 - iii. Use existing folder: LandscapeDynamics
 - iv. In Service Editor → Parameters → Output Directory change Directory to “proxy output”
 - c. Open ArcGIS Online, IMDGISTeam account
<https://nps.maps.arcgis.com/home/index.html>
 - i. Add Custom AOAs service to Viewer Map (SOP 2.11.18; Kinseth 2018)
 - d. Check the Viewer link
(<https://nps.maps.arcgis.com/apps/webappviewer/index.html?id=2ec2585fa978404fbc316ec280645518>). Make sure Map Viewer is working and updated AOAs are visible in the app.

Add new/updated Custom AOA geodatabases to Data Store.

4. Go to the existing data store reference:
<https://irma.nps.gov/DataStore/Reference/Profile/2246124?Inv=True>

- a. **Actions → Edit.**
 - b. From **Version History** tab, click **Add**
 - i. click “Yes”
 - ii. “Clone this Reference to Create a New Version”
 - iii. Add ***Notes** to identify the update as based on a new/updated submitted Custom AOAs.
 - c. Update Date of Issue/Publication to Sept 30 YYYY (current year).
 - d. Make sure **Permissions** are marked “Public” for Reference Access, “Internal” for File Access.
 - e. Under Files and Links, upload
 - i. .zip of all Custom AOA geodatabases adding new and replacing any that were updated.
 - 1. Description for each upload should be “NNNN submitted YYYYMMDD” OR “NNNN updated YYYYMMDD”
 - ii. Add any new/updated Custom AOA SOPs to the existing SOP folder and upload
 - iii. Add Landscape Dynamics Viewer link
 - f. **Activate** the reference when all files and links have been uploaded.
5. Update Product link to Custom AOAs in Project
(<https://irma.nps.gov/DataStore/Reference/Profile/2246159>)
6. Upload new/altered Custom SOP (this one) (if needed) – cross reference instructional SOP reference to AOA reference.
- a. <https://irma.nps.gov/DataStore/Reference/Profile/2242764?lnv=True>
 - b. Under Cross-References of the AOA reference, make sure link to Custom AOA SOP is updated.

Literature Cited

Kinseth, M. 2018. Maintenance and management of the landscape dynamics data viewer for use as part of the IMD Environmental Settings Protocol. Inventory & Monitoring Division Standard Operating Procedure NPS/IMD/SOP—2.11.18. National Park Service, Fort Collins, Colorado.