Part 307 – Update to USDA Handbook 296 (2006) Land Resource Regions and Major Land Resource Areas

307.0 Purpose and Scope

A. This national instruction provides the procedure for updating USDA Handbook 296 (AH 296), which was last published in 2006. The need to update AH 296 is driven by advancements in computer mapping technology, the development of newer and larger datasets, and changing land use, biological resources, soils, climate, geology, water, and physiography in the major land resource areas (MLRAs).

B. This update involves changes to boundaries and definitions of MLRAs and concurrent land resource regions (LRR). It does not, per se, include the smaller land resource units (LRUs) into which MLRAs can be subdivided.

307.1 Background

A. Building on the 1950 map entitled "Problem Areas in Soil Conservation," AH 296 was first published in 1965. It contained a national map of MLRAs and their descriptions and provided a broad synthesis of the soil resources of the United States. It was designed primarily for use by the Soil Conservation Service. This edition presented 156 MLRA map units numbered consecutively beginning with 1 in the Northern Pacific Coast Range and ranging to 156 in the Florida Everglades. Concepts for the MLRA map units were based on the combination of five factors: (1) land use, (2) elevation and topography, (3) climate, (4) water, and (5) soil.

B. The second edition of AH 296 was published 16 years later in 1981. This edition was expanded to include Hawaii, Alaska, and the Caribbean. In addition, new MLRAs were created by subdividing the original 156 MLRAs. The new MLRAs were labeled by adding letters. For example, MLRA 58 was subdivided into four new MLRAs: 58A, 58B, 58C, and 58D. The second edition retained the original five factors comprising MLRAs and added a sixth factor: potential natural vegetation.

C. The third edition of AH 296 was published 25 years later in 2006. New MLRAs were again created by subdividing previous MLRAs and labeling them with letters. This edition contained 278 MLRAs. Two notable developments in this edition were the reordering of the factors comprising MLRAs concepts and the addition of geology as a factor. As an example of the reordering, Land Use, which had been listed first in both the 1965 and 1981 editions, was listed seventh in the 2006 edition (fig. 307-1).

Figure 307-1: Factors Comprising the MLRA Concepts in the Three Editions of AH 296

(The number preceding the factor represents the sequence in which the factor was discussed in the specified edition.)

1965	1981	2006
1. Land use →	1. Land use →	7. Land use
2. Elevation and Topography →	2. Elevation and Topography →	1. Physiography
3. Climate →	3. Climate →	3. Climate
4. Water →	4. Water →	4. Water
5. Soils →	5. Soils →	5. Soils
	6. Potential Natural Vegetation →	6. Biological Resources
		2. Geology

307.2 Procedure and Responsibilities

A. Where current boundaries and MLRA concepts are satisfactory, no action is required.

B. If changes are proposed, the steps below describe the actions and personnel needed for making the changes and updating AH 296.

(1) Step 1
  (i) Soil survey regional directors (RDs) and their staff communicate with neighboring regions and cooperators about the proposed changes to MLRAs.
  (ii) RDs assign one or two points-of-contact (POCs) to work with the National Soil Survey Center (NSSC) staff.

(2) Step 2
  (i) The NSSC staff creates six SharePoint folders for the project. The folders have the following names and content:

- "1.General_Documents"

  This folder contains a Word file of the current AH 296 (2006).

- "2.MLRA_BaseMap_Layers"

  This folder contains the current MLRA polygons. It also contains other useful GIS layers, such as PRISM climate data, freeze-free days, and precipitation effectiveness, and URLs for additional data layers.

- "3.RO_Draft_Proposals"

  This folder contains 12 subfolders—one for each soil survey region (SSR). The subfolders are to store draft GIS layers and supporting documentation that identifies the change and explains the rationale for the boundary change. All documents (PDFs, shapefiles, emails) should be zipped together into a single file for each version. The file naming convention will be as follows: Rnn_DraftProposal_yyyymmdd.zip. As new drafts are created, the older versions should not be deleted.

- "4.RO_Final_Proposals"

  This folder contains the final proposed GIS layer and support documentation after the draft boundaries have been agreed upon by SSRs and cooperators. All documents (PDFs, shapefiles, emails) should be zipped together into a single file for each version. The file naming convention will be as follows: Rnn_FinalProposal_yyyymmdd.zip

- "5.NSSC_DraftMaps"

  This folder contains the assembled national map of MLRAs for the United States, the Caribbean, and the Pacific Basin. The assembled map will be created by the GIS specialists at the NSSC. Multiple versions of the assembled map may be created before the final version is established.

- "6.Narrative"

  This folder contains 12 subfolders—one for each SSR. The updated AH 296 Word files will be uploaded into these folders.

(3) Step 3

(i) Making Draft Boundaries.—SSR-POCs and other staff download existing GIS layers of MLRA polygons and create MLRA draft boundaries. These tentative boundaries are uploaded to the "3.RO_DRAFT_Proposals" folder, which is intended to store multiple versions as SSRs work with collaborators. This folder will hold zip archives that have a time stamp as part of the archive name; for example, Rnn_DraftProposal_yyyymmdd.zip.

(ii) Making Support Documents.—SSR-POCs and other staff designated by RDs write the support documents to accompany the MLRA draft boundary changes. The support documents identify what changes have been made and why. They will be needed for refining MLRA concepts and documenting changes. The support documents are placed in the same zip archive as the associated GIS layer.

(iii) Getting Collaborator Feedback.—SSR-POCs submit the MLRA draft boundaries to neighboring SSRs for comment. Draft boundaries are also submitted for comment to State soil scientists, State conservationists, and cooperators in the National Cooperative Soil Survey that have a stake in a potential change to boundary and concept.

(4) Step 4

(i) Making Final Proposals.—SSR-POCs upload proposed boundary changes and supporting documentation to the "4.RO_Final_Proposals" folder after agreement has been reached among SSRs and cooperators.

(ii) Storing Metadata.—SSR staffs begin writing narrative that refines and updates the MLRA concepts. They also combine metadata into files that will be stored as a record of the rationale for making boundary changes.

(5) Step 5

Ensuring Cartographic Standards.—NSSC GIS specialists work with SSR-POCs through a series of iterations to resolve discrepancies and apply cartographic quality standards, such as line smoothing, if needed.

(6) Step 6

(i) Creating Draft National MLRA Map.—NSSC GIS specialists move approved "Final Proposals" GIS layers to the "5.NSSC_DraftMaps" folder and assemble a national map.

(ii) Creating Draft National LRR Map.—NSSC GIS specialists aggregate MLRAs to create land resource region polygons.

(iii) Obtaining Approvals.—NSSC GIS specialists submit the national MLRA and LRR maps to the SSR-POCs for distribution and comment. Multiple iterations may be needed to reach the final national map version that will be submitted to State conservationists for review and approval.

(7) Step 7

(i) Writing the Narrative.—SSR-POCs and other SSR staff work with the NSSC Standards staff to modify the existing AH 296 to accurately describe all updated MLRAs. Documents are submitted to "6.Narrative" folder. This update includes the description of the physiography, geology, climate, water, soils, biological resources, and land use. NSSC staff add percentages of forest, grassland, crops, urban land, climate summaries, water usage, and similar data within each MLRA. They also add index maps, table of contents, illustrations, and updated Preface and Introduction.

(ii) Updating NASIS.—NSSC national database manager coordinates update to NASIS incorporating changes made to MLRAs.

(8) Step 8

Publishing.—NSSC staff publishes updated AH 296 as hardcopy and as online publications in which MLRA and LRR maps are available as both images and GIS layers.

307.3 Timeline

A. March 29, 2019

Final proposals created by the SSRs are due. *Completion before this date is encouraged.*

B. June 28, 2019

National MLRA and LRR maps created by the NSSC GIS specialists are due.

C. June 28, 2019

Narratives written by SSRs are due.

D. February 2020

Publication of the updated version of AH 296 (maps and narrative) is due.

307.4 Map Unit Specifications

A. Land Resource Regions

LRRs are delineated on national maps at small scales—1:7,500,000 for the conterminous United States and 1:10,000,000 for Alaska. For maps at a scale of 1:7,500,000, the minimum delineation is approximately 1 cm by 1 cm (0.4 inch by 0.4 inch), or about 560,000 hectares (1,400,000 acres).

B. Major Land Resource Areas

MLRAs are delineated on national maps at small scales—1:5,000,000 for the conterminous United States and the Pacific and Caribbean Islands and 1:7,500,000 for Alaska. The minimum delineation is approximately 1 cm by 1 cm (0.4 inch by 0.4 inch), or about 250,000 hectares (620,000 acres). Minimum linear delineations are at least 0.3 cm (0.1 inch) in width and 2.5 cm (1 inch) in length.

Note: The Pacific and Caribbean Islands, which have land masses that are less than 600,000 hectares, are excluded from the minimum delineation rule due to the sizes and distribution of the individual islands.

C. Land Resource Units

LRUs are not included in AH 296 but are discussed here for completeness. LRUs may occur as single delineations but commonly occur as several separate delineations. LRUs are delineated on national maps at small scales—1:1,000,000 for the United States and the Pacific and Caribbean Islands and 1:5,000,000 for Alaska. LRU maps commonly depict areas that are cartographically too small to be delineated at an MLRA map scale (that is, 1:5,000,000). The minimum delineation is approximately 1 cm by 1 cm (0.4 inch by 0.4 inch), or about 10,000 hectares (25,000 acres). Minimum linear delineations are at least 0.3 cm (0.1 inch) in width and 2.5 cm (1 inch) in length.

Note: The Pacific and Caribbean Islands are excluded from the minimum delineation rule due to the sizes and distribution of the individual islands.

307.5 LRR and MLRA Labeling Conventions and Symbols

A. Land Resource Regions

The symbols for LRRs are capital letters, and the names are combinations identifying broad physiographic provinces and predominant land use. An example is M—Central Feed Grains and Livestock Region. LRRs may also be represented by a capital letter followed by an additional character.

B. Major Land Resource Areas

The symbols for MLRAs are Arabic numbers or number-letter combinations. If an existing MLRA is subdivided into new MLRAs, the numbers are followed by an alphabetical character, beginning with "A." Examples include 55A, 55B, and 55C. The names commonly consist of associated physiographic areas, landforms, and natural geographic areas, such as 108—Illinois and Iowa Deep Loess and Drift; 7—Columbia Basin; 4A—Sitka Spruce Belt; and 161A—Lava Flow and Rock Outcrops.

C. Land Resource Units

LRUs are not included in AH 296 but are discussed here for completeness. See Title 430, National Soil Survey Handbook, Part 649, Subpart A, Section 649.6, for further discussion. LRUs are represented by two numeric characters following the MLRA symbol; for example, 70A02—Canadian River Plains and Valleys – Volcanic Plateaus.