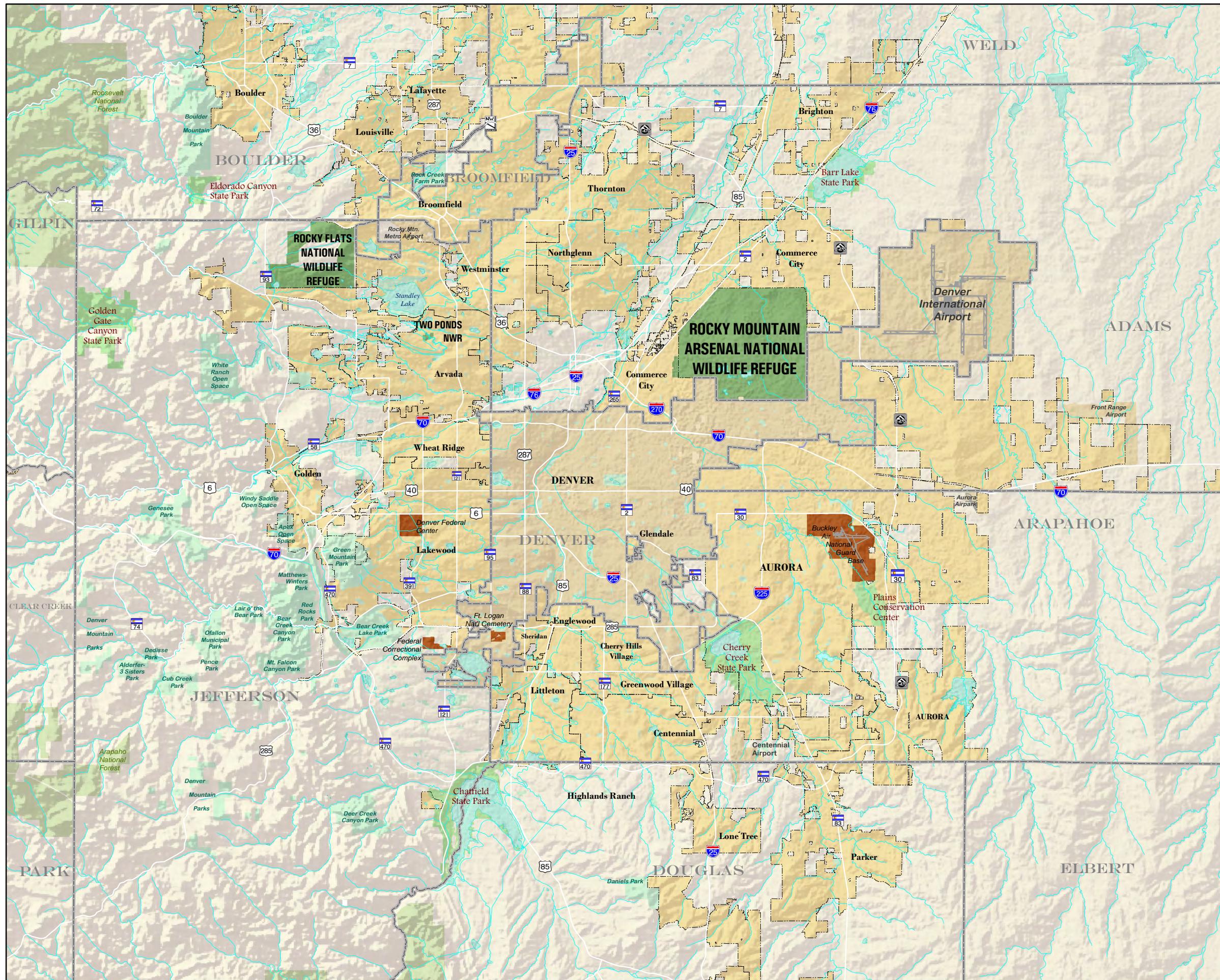
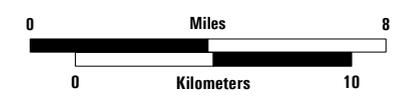


**U.S. Fish & Wildlife Service**  
**Rocky Mountain Arsenal**  
*National Wildlife Refuge*  
*Habitat Management Plan*



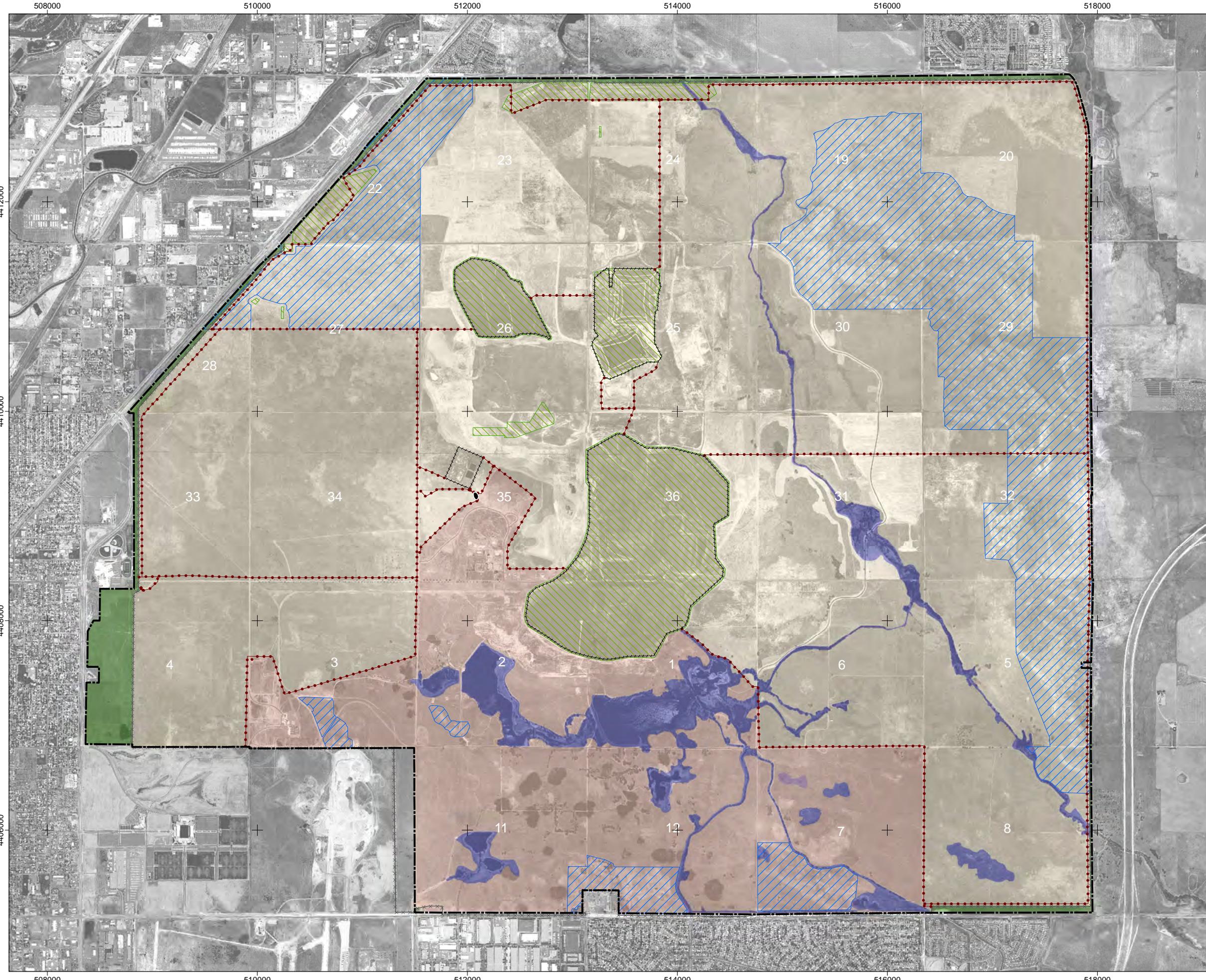
- Regional Location Reference**
- National Wildlife Refuge
  - Other Federal Facility
  - National Forest
  - State Park or Forest
  - Local Park or Recreational Area
  - Denver
  - Other Metro Area City
  - County Boundary
  - Lake
  - Stream



Transverse Mercator Projection  
 UTM Zone 13 North, Units Meters  
 North American Datum 1927  
 Data Sources: USFWS, U.S. Army, Esri, CDOT



**Figure 1**  
**Regional Location of the RMANWR**



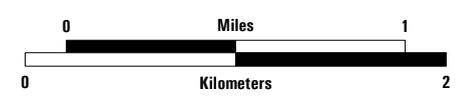
**U.S. Fish & Wildlife Service**  
**Rocky Mountain Arsenal**  
*National Wildlife Refuge*  
**Habitat Management Plan**

- Habitat Management Zones**
- Short- & Mixed-grass Prairie Zone (12379.1 Acres)
  - Environmental Education Zone (3280.0 Acres)
  - Refuge Boundary

- Other Areas**
- Prairie Dog Zones (2585 Acres)
  - Wetland, Riparian, and Lacustrine Zone (673.8 Acres)
  - RMANWR Property Outside Fence (317.3 Acres)
  - Army-Retained Land (1083.9 Acres) \*

- Long Term Fencing Plan**
- Bison Pasture (Existing & Proposed)
  - RMA Facility Fence
  - Perimeter Fence
  - Bison Corral

\* To facilitate long-term planning, the Service will utilize this anticipated acreage retained by the U.S. Army. There are currently 102.5 acres of land listed on the National Priorities List that will not be identified as retained by the U.S. Army and are de-facto maintained by the Service. The Service will work cooperatively on habitat management of all RMANWR lands, including those retained and maintained by the U.S. Army.



Transverse Mercator Projection  
 UTM Zone 13 North, Units Meters  
 North American Datum 1927  
 Data Sources: USFWS, U.S. Army, RVO GIS Dept.



**Figure 2**  
**Location of Habitat Management Zones at the RMANWR**

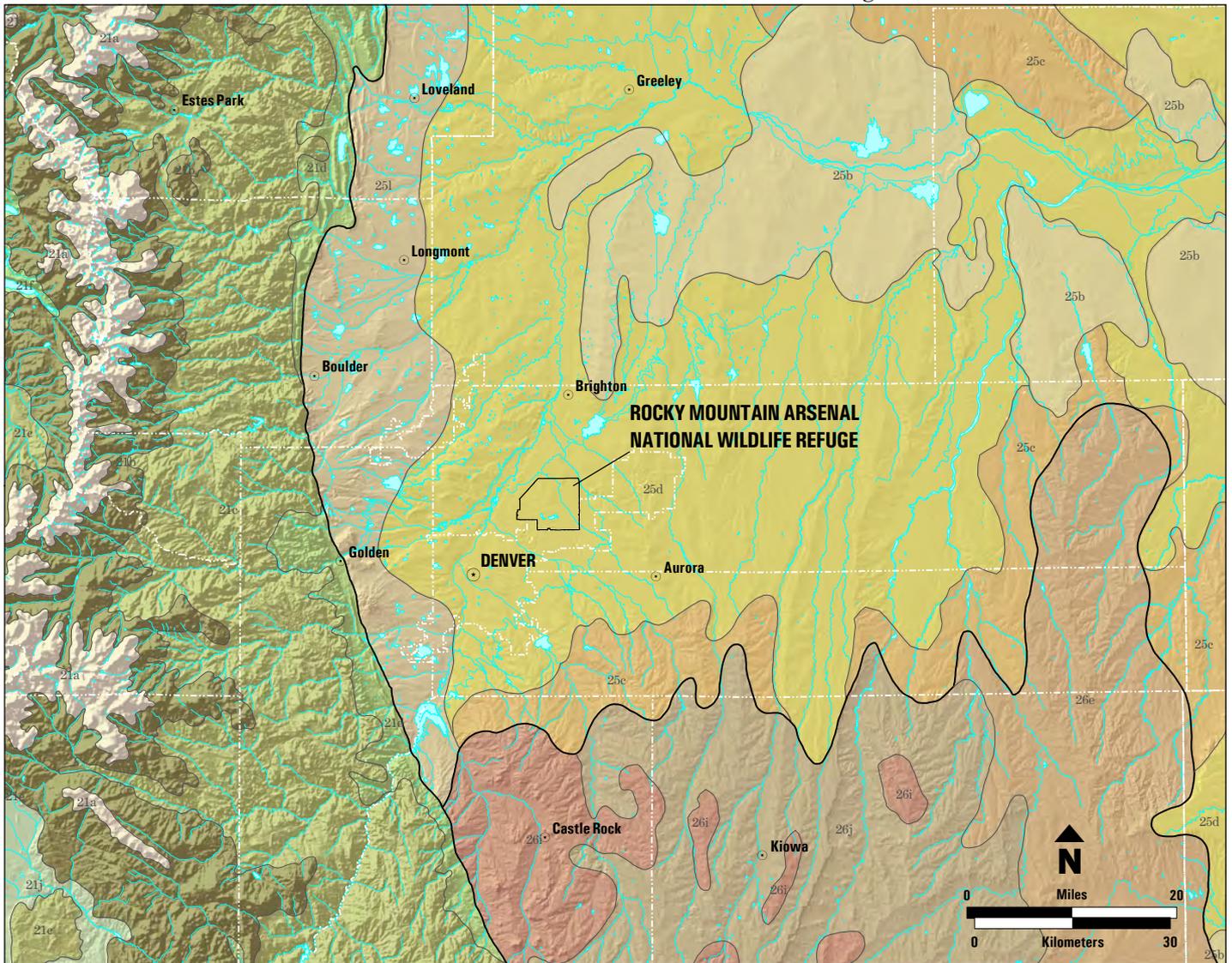
# Figure 3 Ecoregions of the RMANWR, Level IV Classifications

U.S. Fish & Wildlife Service

Rocky Mountain Arsenal

National Wildlife Refuge

Habitat Management Plan



### Southern Rockies (21)

- Alpine Zone (21a)
- Crystalline Subalpine Forests (21b)
- Crystalline Mid-Elevation Forest (21c)
- Foothill Shrublands (21d)
- Sedimentary Subalpine Forests (21e)
- Sedimentary Mid-Elevation Forests (21f)
- Grassland Parks (21j)

### High Plains (25)

- Rolling Sand Plains (25b)
- Moderate Relief Plains (25c)
- Flat to Rolling Plains (25d)
- Front Range Fans (25f)

### Southwestern Tablelands (26)

- Piedmont Plains and Table Lands (26e)
- Pine-Oak Woodlands (26i)
- Foothill Grasslands (26j)

The Rocky Mountain Arsenal National Wildlife Refuge lies completely within the "Flat and Rolling Plains" Level IV Ecoregion in the "High Plains" Level III Ecoregion of eastern Colorado. The physiography consists of flat to rolling plains, intermittent streams, with a few large perennial streams, silty and sandy substrates and small open depressional wetland "playas" scattered throughout the region. The geology is Quaternary loess, alluvial deposits, and some thin residuum. Tertiary gravel, claystone, sandstone, and sand deposits, including the Ogallala Formation in the east. Cretaceous shales, sandstones, claystones, and coal beds in the west. Natural vegetation includes shortgrass prairie: blue grama, buffalograss, with threadleaf sedge, fringed sage, Junegrass, and western wheatgrass. Riparian areas contain cottonwood/shrub/herbaceous species.

NOTE: This map shows the EPA Level IV Ecoregions in the region around the Rocky Mountain Arsenal National Wildlife Refuge. Information on this map is taken from the "Ecoregions of Colorado" Levels III and IV map available from the EPA. It was made by , S.S. Chapman, G.E. Griffith, J.M. Omernik, A.B. Price, J. Freouf and D.L. Schrupp, 2006, Ecoregions of Colorado (color poster map, descriptive text, summary tables and photographs): Reston, VA, US Geological Survey.



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**Rocky Mountain Arsenal**  
*National Wildlife Refuge*  
*Habitat Management Plan*

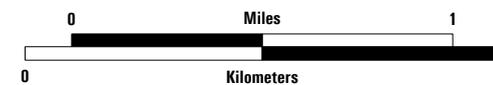
**Soil Classification\***

Note: The first two letters indicate soil classification, the third letter describes slope:  
 A = 0% - 1%    C = 3% - 6%  
 B = 1% - 3%    D = 6% - 10%

- Ascalon Sandy Loam (As)**
- Bresser Sandy Loam (Br)**
- Bresser-Santanta Sandy Loam (Bs)**
- Petrocalcic Paleustolls (Ca)**
- Aquic Haplustolls (Fa)**
- Nunn Clay Loam (Nu)**
- Satanta Loam (Sa)**
- Typic Haplustolls (Th)**
- Truckton Loamy Sand (Tr)**
- Weld Loam (We)**
- Dam/Dike**
- Water/Wetland**

\*Source: "Soil Investigation and Inventory of the Rocky Mountain Arsenal, Adams County, Colorado", by James P. Walsh & Associates, October 1988. This has been modified to reflect elimination of Waste Basins and early Borrow Areas.

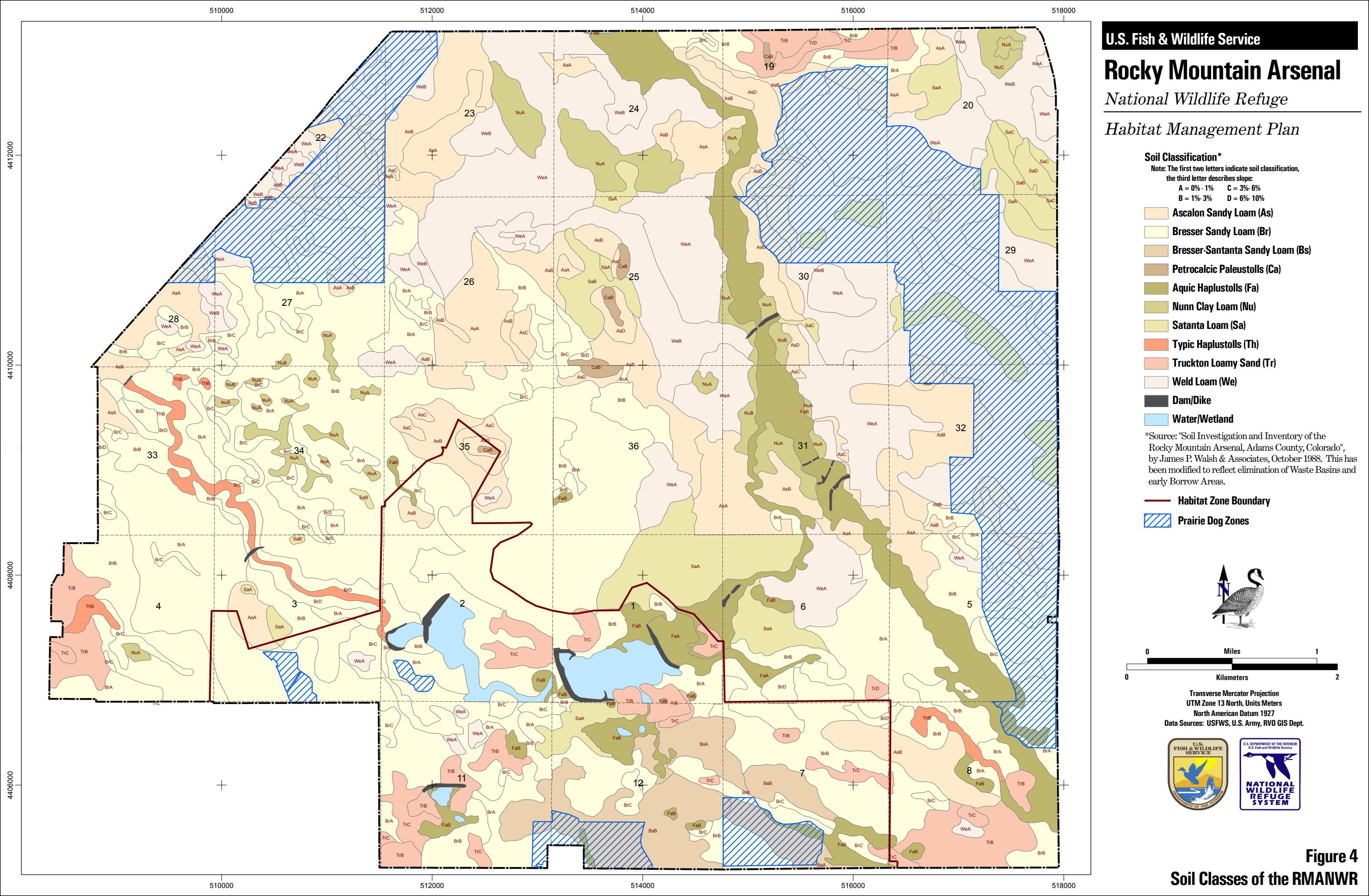
- Habitat Zone Boundary**
- Prairie Dog Zones**



Transverse Mercator Projection  
 UTM Zone 13 North, Units Meters  
 North American Datum 1927  
 Data Sources: USFWS, U.S. Army, RVO GIS Dept.



**Figure 4**  
**Soil Classes of the RMANWR**



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*National Wildlife Refuge*  
*Habitat Management Plan*

**Habitat Types\***

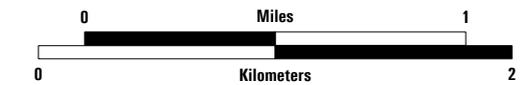
- Shortgrass Prairie (4576 Acres)**
- Mixed-grass Prairie (8104 Acres)**
- Shrubland (1373 Acres)**
- New Mexico Locust Thicket (89 Acres)**
- Woodland (79 Acres)**
- Wetland, Riparian, and Lacustrine (674 Acres)**
- Dam/Dike (16 Acres)**
- Army-Retained Land (1084 Acres)**

\*Source: "Soil Investigation and Inventory of the Rocky Mountain Arsenal, Adams County, Colorado," by James P. Walsh & Associates, April, 1991.

This map shows a reclassification of the Walsh soil classes into these composite categories. Additionally, it has been modified to reflect elimination of Waste Basins and early Borrow Areas.

**Other Features**

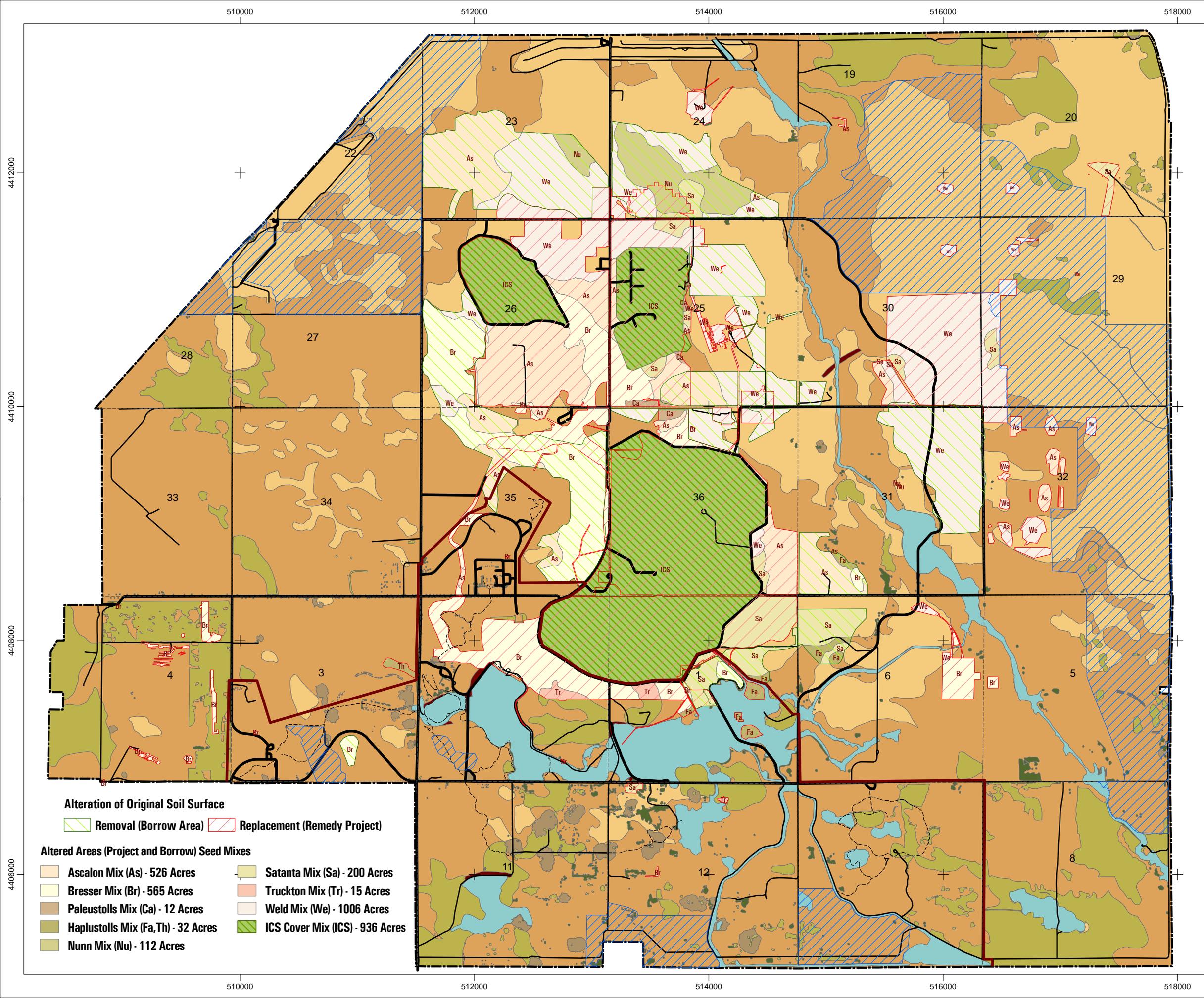
- Refuge Boundary
- Paved Road
- Prairie Dog Zones
- Unpaved Road
- Habitat Zone Boundary
- Hiking Trail



Transverse Mercator Projection  
 UTM Zone 13 North, Units Meters  
 North American Datum 1927  
 Data Sources: USFWS, U.S. Army, RVO GIS Dept.



**Figure 5**  
**Habitat Types at the RMANWR**

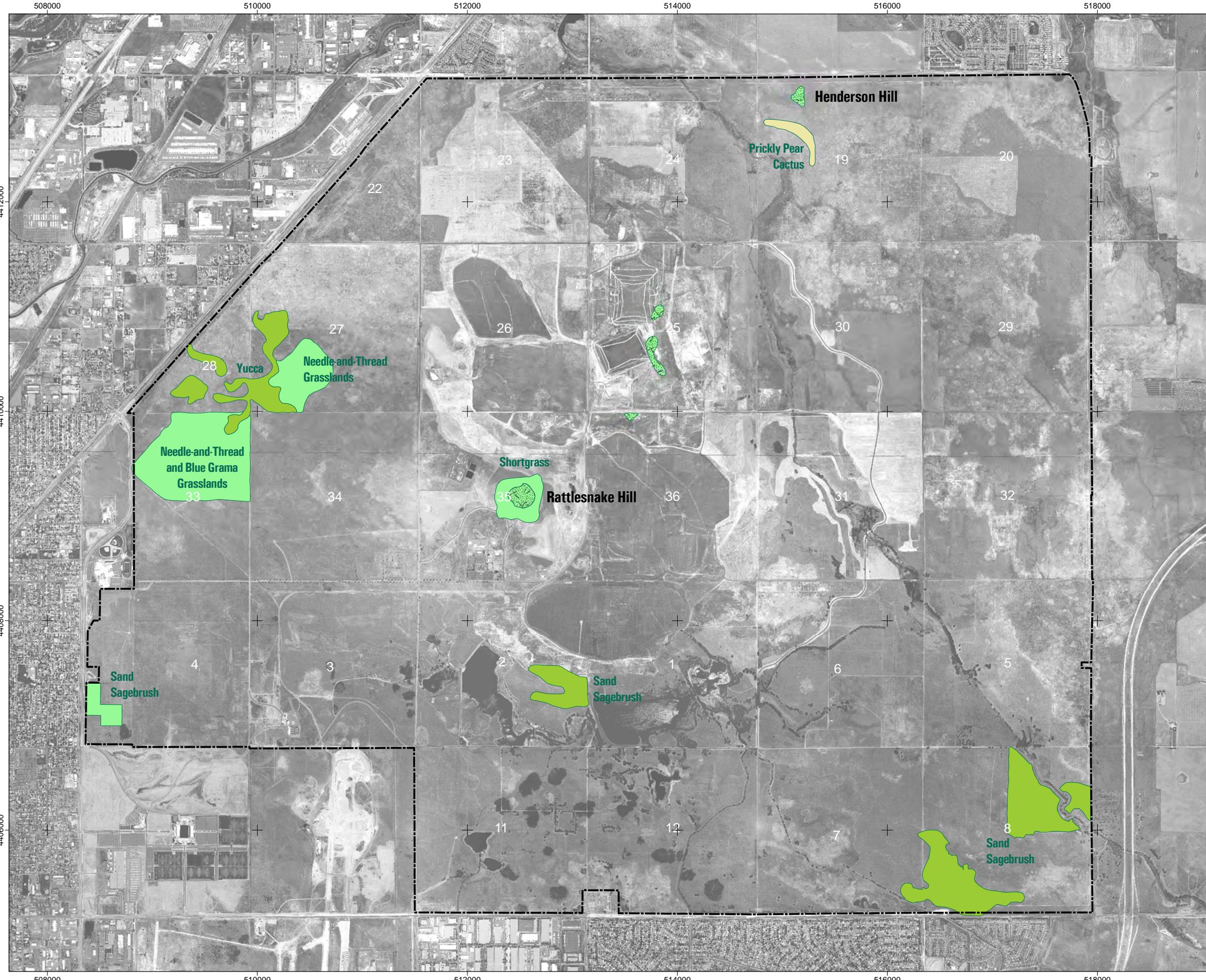


**Alteration of Original Soil Surface**

- Removal (Borrow Area)**
- Replacement (Remedy Project)**

**Altered Areas (Project and Borrow) Seed Mixes**

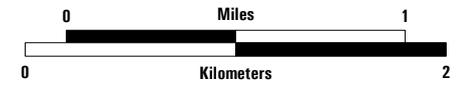
- Ascalon Mix (As) - 526 Acres**
- Satanta Mix (Sa) - 200 Acres**
- Bresser Mix (Br) - 565 Acres**
- Truckton Mix (Tr) - 15 Acres**
- Paleustolls Mix (Ca) - 12 Acres**
- Weld Mix (We) - 1006 Acres**
- Haplustolls Mix (Fa,Th) - 32 Acres**
- ICS Cover Mix (ICS) - 936 Acres**
- Nunn Mix (Nu) - 112 Acres**



**U.S. Fish & Wildlife Service**  
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- Natural Resource Areas of Special Interest\***
- Remnant Native Perennial Grasses
  - Remnant Succulents
  - Remnant Shrublands
  - Gravel Breaks/Cobble Vegetation

\*From:  
 Vegetation Resources of  
 Rocky Mountain Arsenal  
 Adams County, CO  
 Prepared by: Morrison-Knudson  
 Environmental Services, Inc.  
 Denver, CO  
 Date: October 1989  
 Prepared for: Shell Oil Company

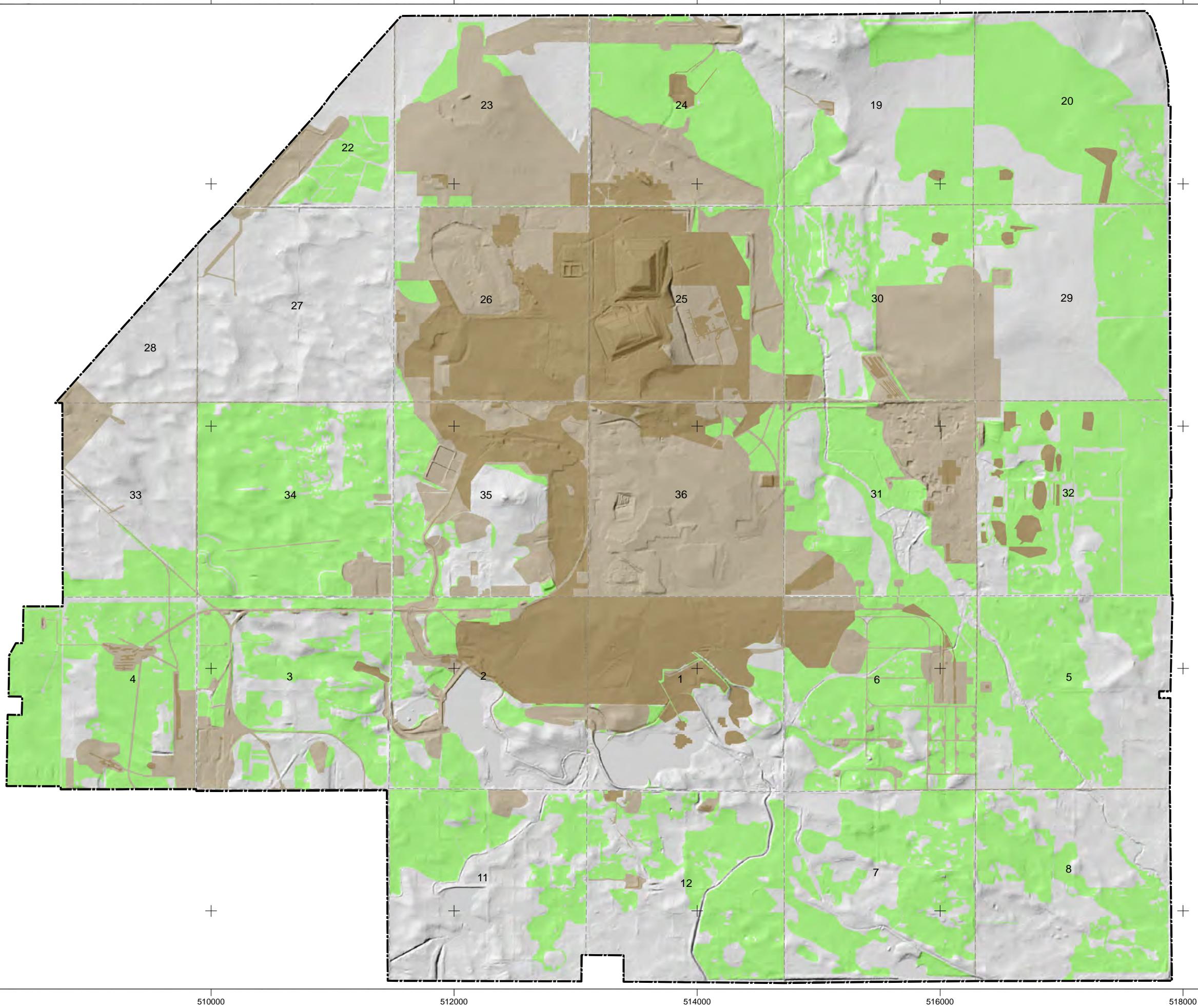


Transverse Mercator Projection  
 UTM Zone 13 North, Units Meters  
 North American Datum 1927  
 Data Sources: USFWS, U.S. Army, RVO GIS Dept.



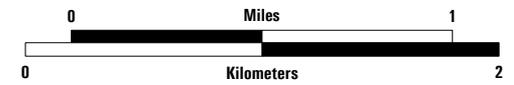
**Figure 6**  
**Natural Resource Areas of**  
**Special Interest at the RMANWR**

**U.S. Fish & Wildlife Service**  
**Rocky Mountain Arsenal**  
*National Wildlife Refuge*  
*Habitat Management Plan*



- Restoration Sites**
-  Mitigation Seeding
  -  Soil Removed, Disturbed or Covered
  -  Soil Removed and Replaced

- Other**
-  RMA Boundary
  -  SectionLines

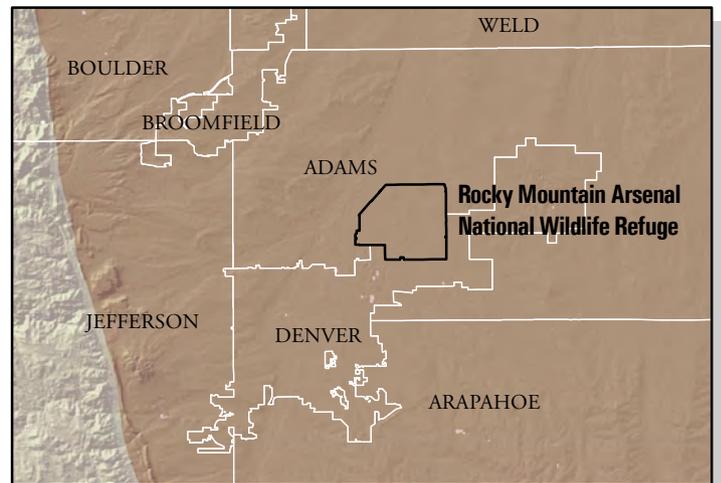
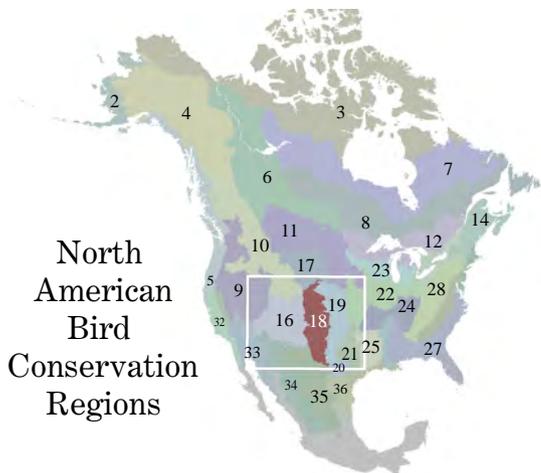
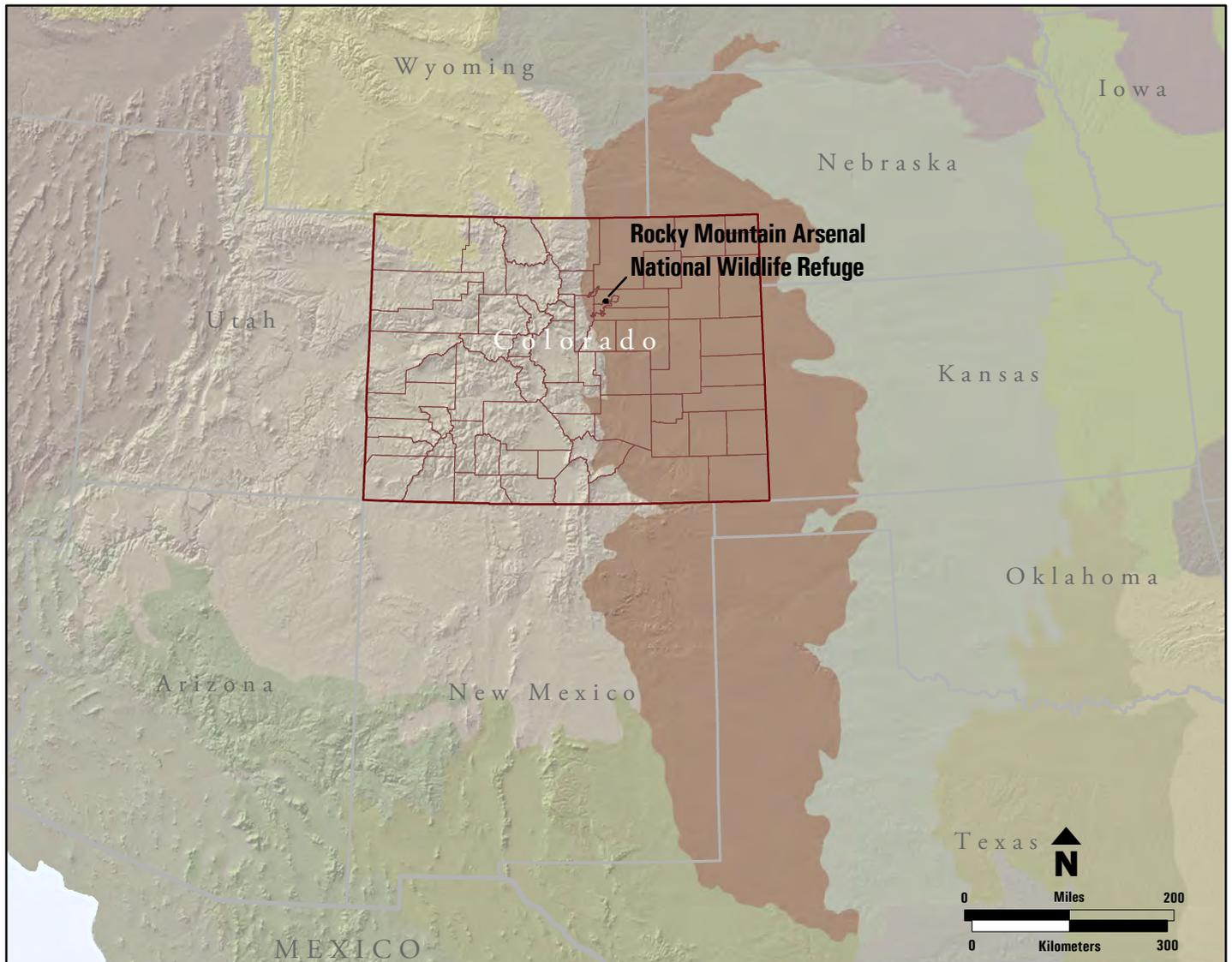


Transverse Mercator Projection  
 UTM Zone 13 North, Units Meters  
 North American Datum 1927  
 Data Sources: USFWS, U.S. Army, RVO GIS Dept.



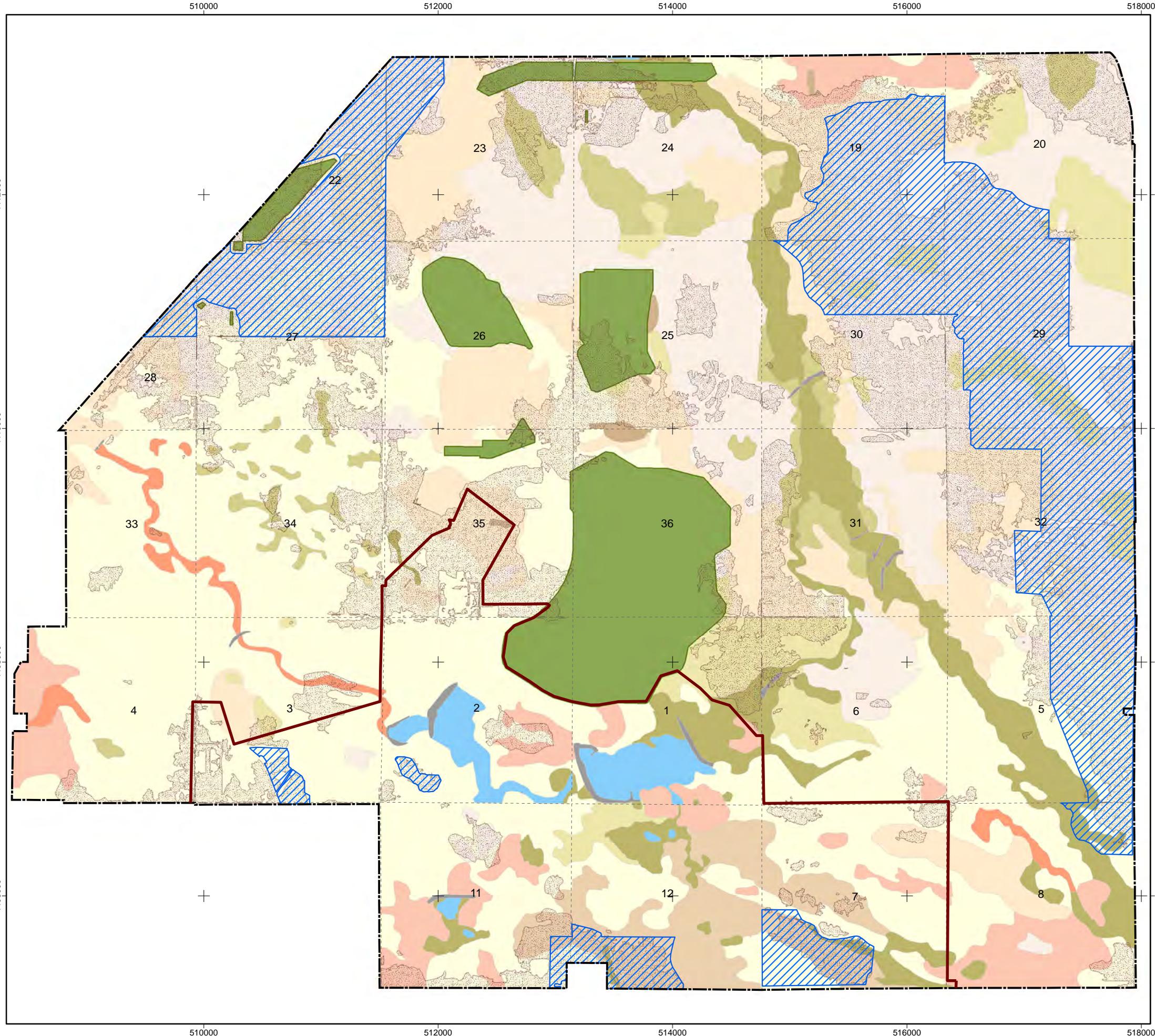
**Figure 7**  
**Topographic Alteration Associated**  
**with Cleanup at the RMANWR**

**Figure 8**  
**Location of the RMANWR in Relation**  
**to Bird Conservation Region 18**



**Rocky Mountain Arsenal NWR falls within BCR 18,**  
**classified as the Shortgrass Prairie Bird Conservation Region.**





U.S. Fish & Wildlife Service

# Rocky Mountain Arsenal

National Wildlife Refuge

## Habitat Management Plan

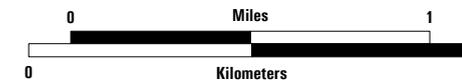
- Army-Retained Land (1084 Acres)
- Composite Prairie Dog Colonies (1994 to 2009)
- Prairie Dog Zones
- Habitat Zone Boundary

### Historical Distribution of Prairie Dog Colonies in Soil Types

Soil Classification	Prairie Dog Acreage	Soil Class Acreage	Ratio	Probability
Ascalon Sandy Loam (As)	799.1	2333.9	0.342	<b>1.27</b>
Bresser Sandy Loam (Br)	939.9	5922	0.159	<b>0.59</b>
Bresser-Satanta Sandy Loam (Bs)	123.2	507.6	0.243	<b>0.90</b>
Petrocalcic Paleustolls (Ca)	4.6	37.2	0.124	<b>0.46</b>
Aquic Haplustolls (Fa)	54.0	967.5	0.056	<b>0.21</b>
Nunn Clay Loam (Nu)	97.6	416.8	0.234	<b>0.87</b>
Satanta Loam (Sa)	287.3	848.6	0.339	<b>1.26</b>
Typic Haplustolls (Th)	4.6	131.3	0.035	<b>0.13</b>
Truckton Loamy Sand (Tr)	41.9	703.1	0.060	<b>0.22</b>
Weld Loam (We)	1942.1	3877	0.501	<b>1.86</b>
Open Water	0.0	201.2	0.000	<b>0.00</b>
Dam/Dike	17.9	41.9	0.427	<b>1.59</b>
	4312.2	15988.1	0.270	<b>1.00</b>

This table shows the distribution of prairie dogs within the various soil types as mapped in the "Soil Investigation and Inventory of the Rocky Mountain Arsenal, Adams County, Colorado," by James P. Walsh & Associates, Inc., October 1988. The distribution of prairie dogs shown is the overall composite of prairie dog colonies from 1994 to 2009.

If prairie dog colonization was unrelated to soil classification, it would be expected that the proportional areas within each soil class would be equal to the overall ratio of .270. This table compares the actual acreages of colonies within each soil class with the tabulated ratio shown. The statistical probability that a particular soil class is preferred by prairie dogs is shown in the last column; the result of dividing the ratio of actual distribution by overall ratio of .270. For example, this indicates that prairie dogs are nearly twice as likely to establish colonies in Weld Loam soils over the random chance that they would colonize equally in any soil class.



Transverse Mercator Projection  
 UTM Zone 13 North, Units Meters  
 North American Datum 1927  
 Data Sources: USFWS, U.S. Army, RVO GIS Dept.



**Figure 9**  
**Current Distribution of Black-tailed**  
**Prairie Dogs at the RMANWR**

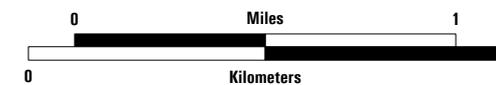
# Rocky Mountain Arsenal

National Wildlife Refuge

Habitat Management Plan

-  Prairie Dog Zones (2585 Acres)
-  Historic Burrowing Owl Nest Locations\*
-  Composite Prairie Dog Colonies (1994 to 2009)
-  Habitat Zone Boundary
-  Army-Retained Land
-  RMANWR Boundary
- White lines show (visitor) Bus and Auto Tour Routes

\*The Historic Burrowing Owl Nest Locations shown on this map represent nest locations recorded in years 1995-1998, 2000-2002 and 2004-2008.



Transverse Mercator Projection  
UTM Zone 13 North, Units Meters  
North American Datum 1927  
Data Sources: USFWS, U.S. Army, RVO GIS Dept.



**Figure 10**  
**Proposed Zones for Black-tailed**  
**Prairie Dog Occupation at the RMANWR**

#### Hydrants

- Fire Hydrant (Non-potable)
- Fire Hydrant (Potable)

#### Other Water Supply

- Irrigation Supply Well
- Livestock/Wildlife Water Supply Well
- Wildlife Guzzler
- Water Tank (Supplied)
- Surface Water Tank (Trucked in)

#### Buried Water Line

- Potable
- Non-Potable

Dams & Dikes

#### Jurisdictional Wetland Classification

(Non-jurisdictional shown with red outline)

- Cattail Ribbons/Marshes
- Bottomland Meadows
- Weedy Bottomlands
- Channel Vegetation
- Coyote Willow Thickets
- Waters of the US
- Additional Wetland

#### Streams and Ditches

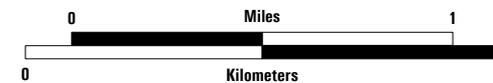
- First Creek (Intermittent)
- Drainage Ditch
- Spillway

#### Roads

- Paved or RAP
- Gravel or Dirt
- Concrete Ford (Texas Crossing)
- Hiking Trail

#### Land

- Habitat Zone Boundary
- Refuge Boundary
- Army-Retained Land



Transverse Mercator Projection  
UTM Zone 13 North, Units Meters  
North American Datum 1927  
Data Sources: USFWS, U.S. Army, RVO GIS Dept.



**Figure 11**  
**Irrigation & Water Infrastructure**  
**at the RMANWR**

