Reno Bottoms LSOHC Project EAW Figures

DEPARTMENT OF NATURAL RESOURCES

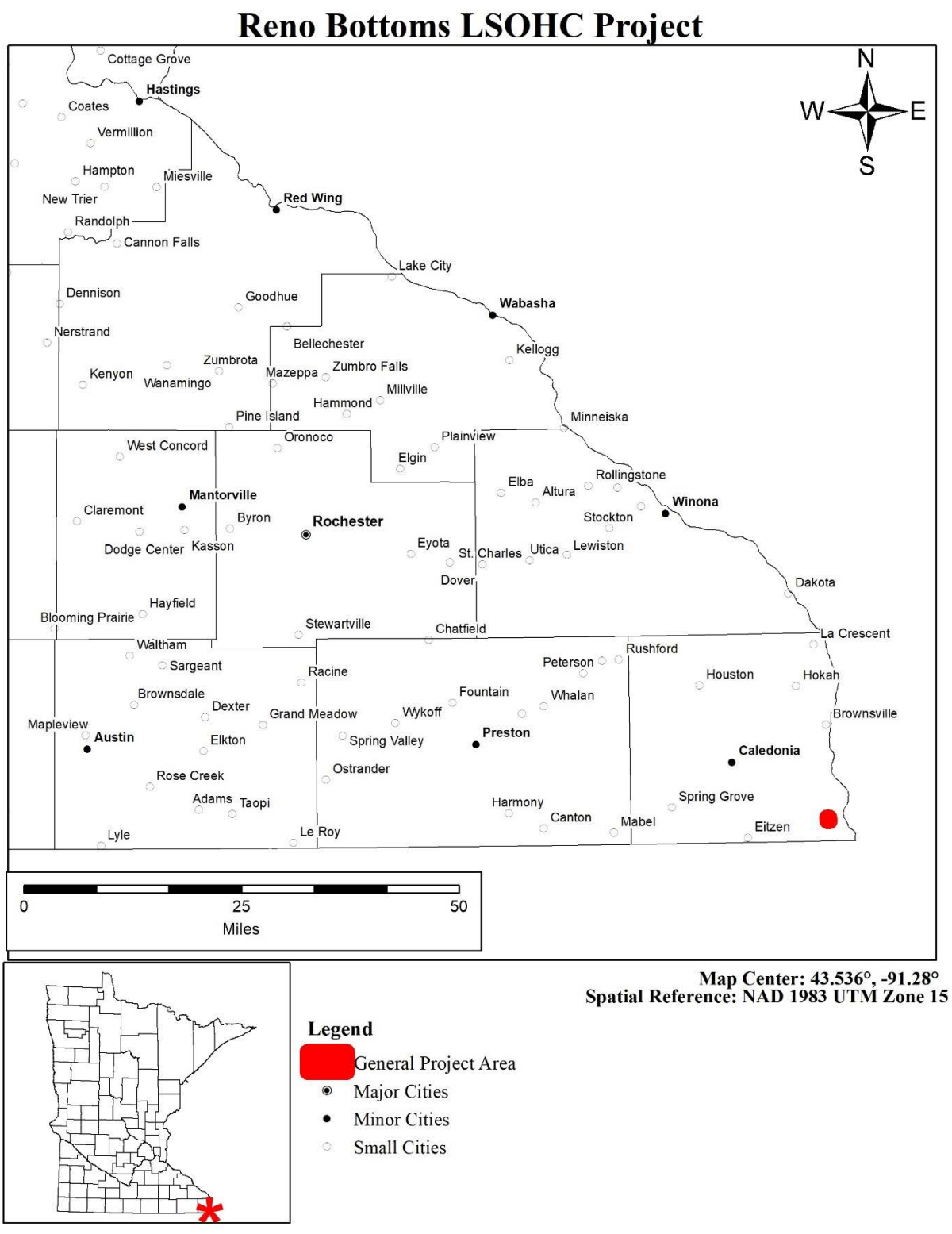

Figure 1. General project area in Southeastern Minnesota, Houston County.

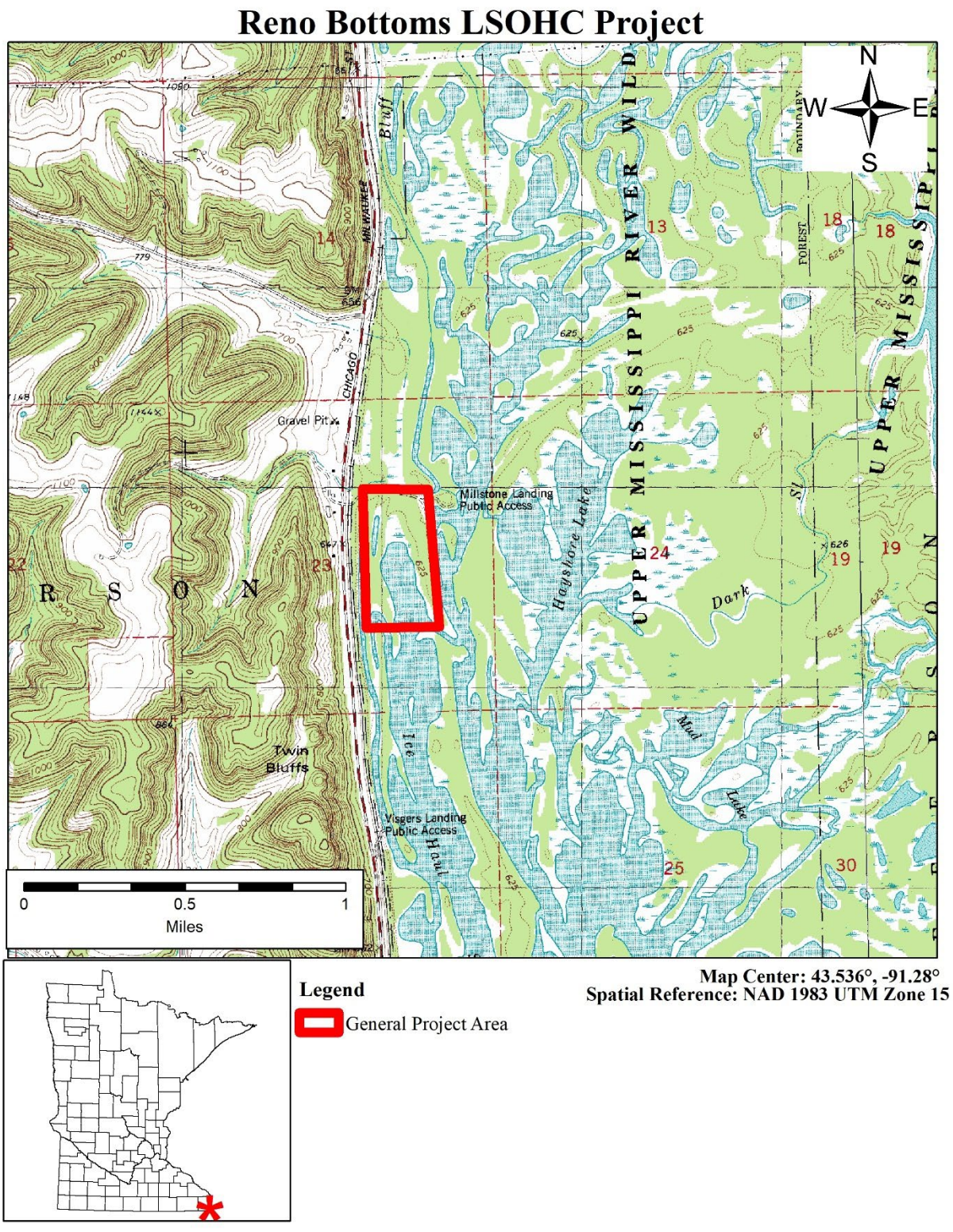

Figure 2. U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries.

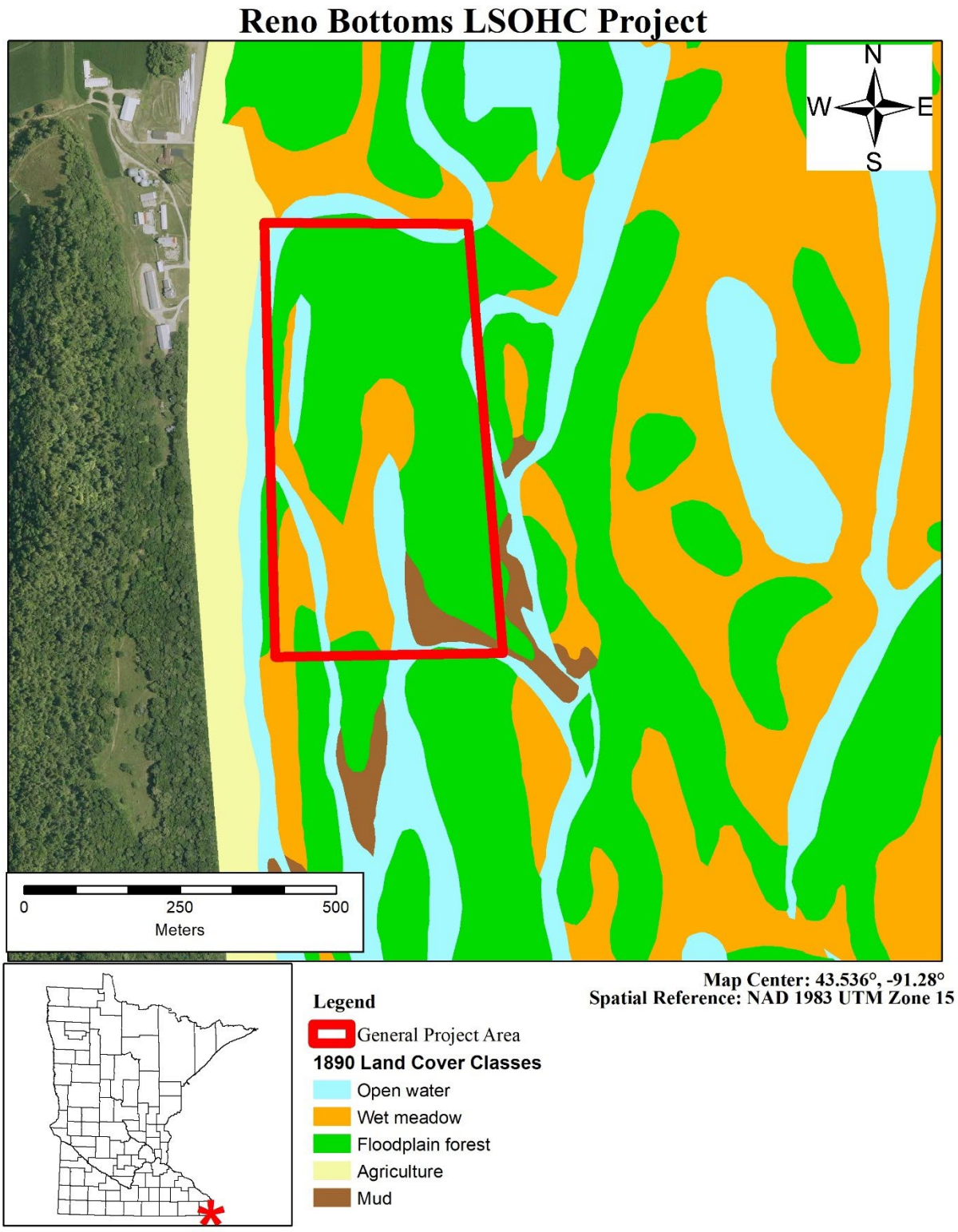

Figure 3. 1890s Mississippi River land cover map of general project area.

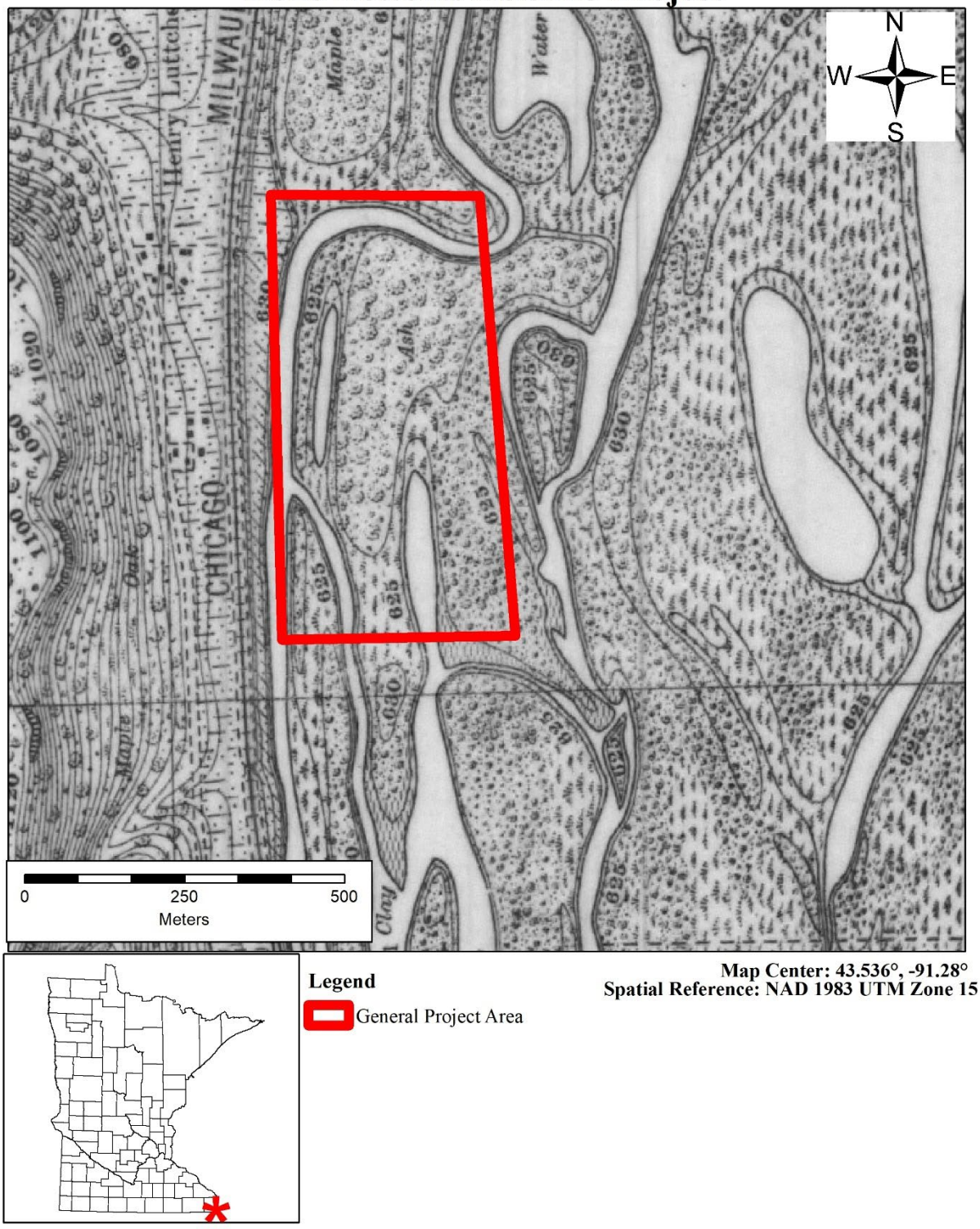

Figure 4. 1890s Mississippi River Commission survey map of the general project area.

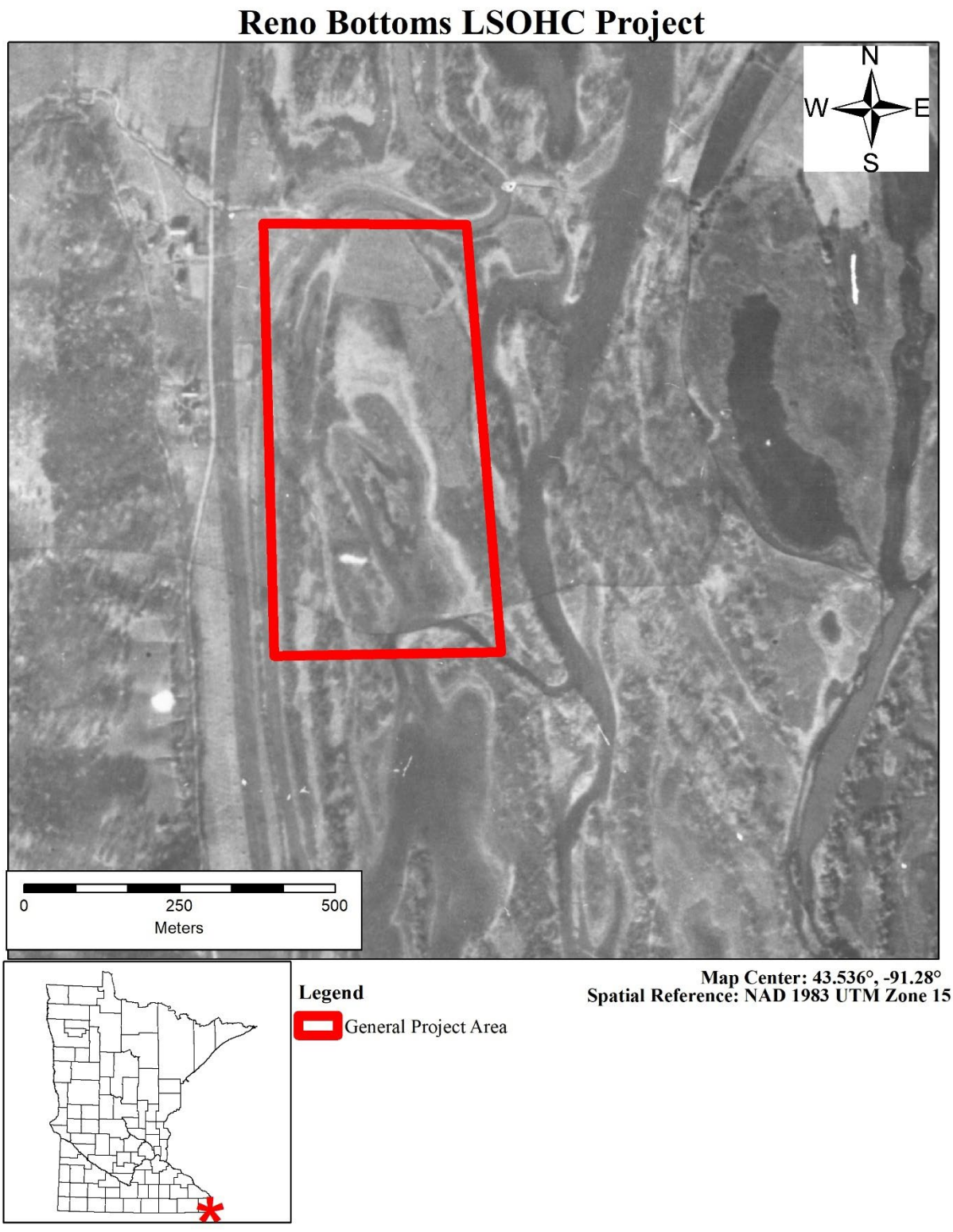

Figure 5. 1929 aerial image of the general project area.

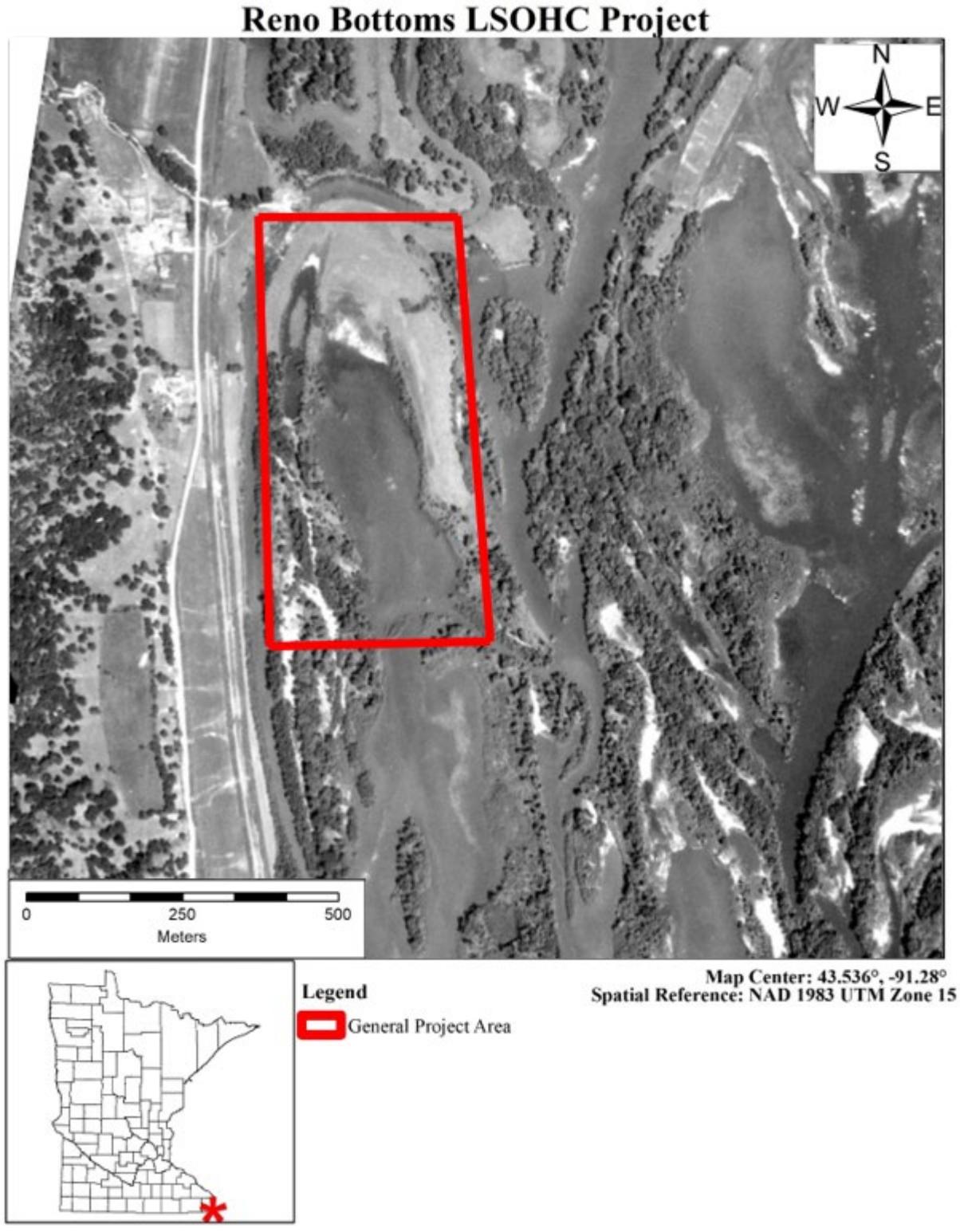

Figure 6. 1938 aerial image of the general project area.

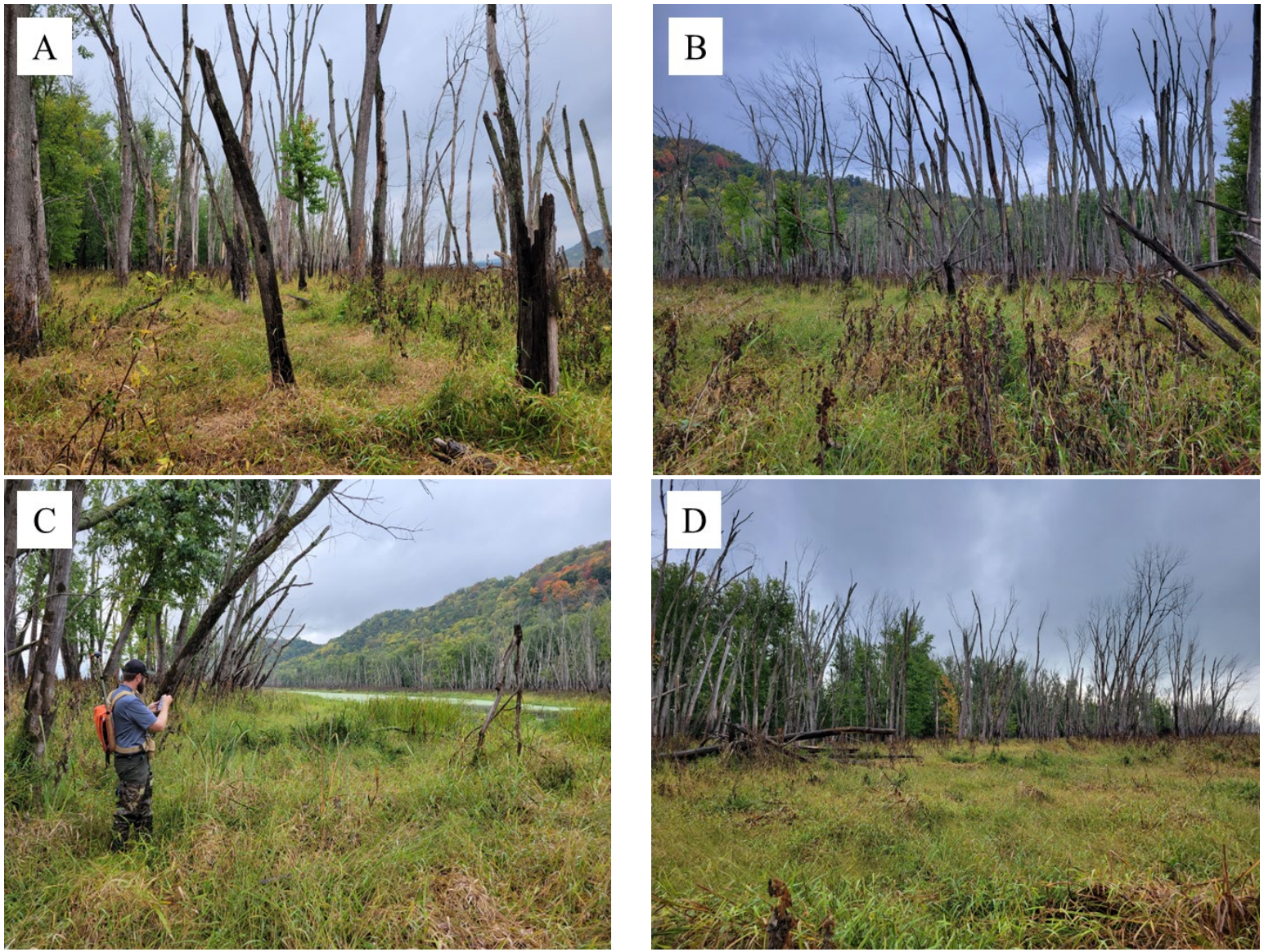

Figure 7. Silver maple mortality within the project area September 2023 at the eastern (A), western (B) northern (C and D) portion of the project area.

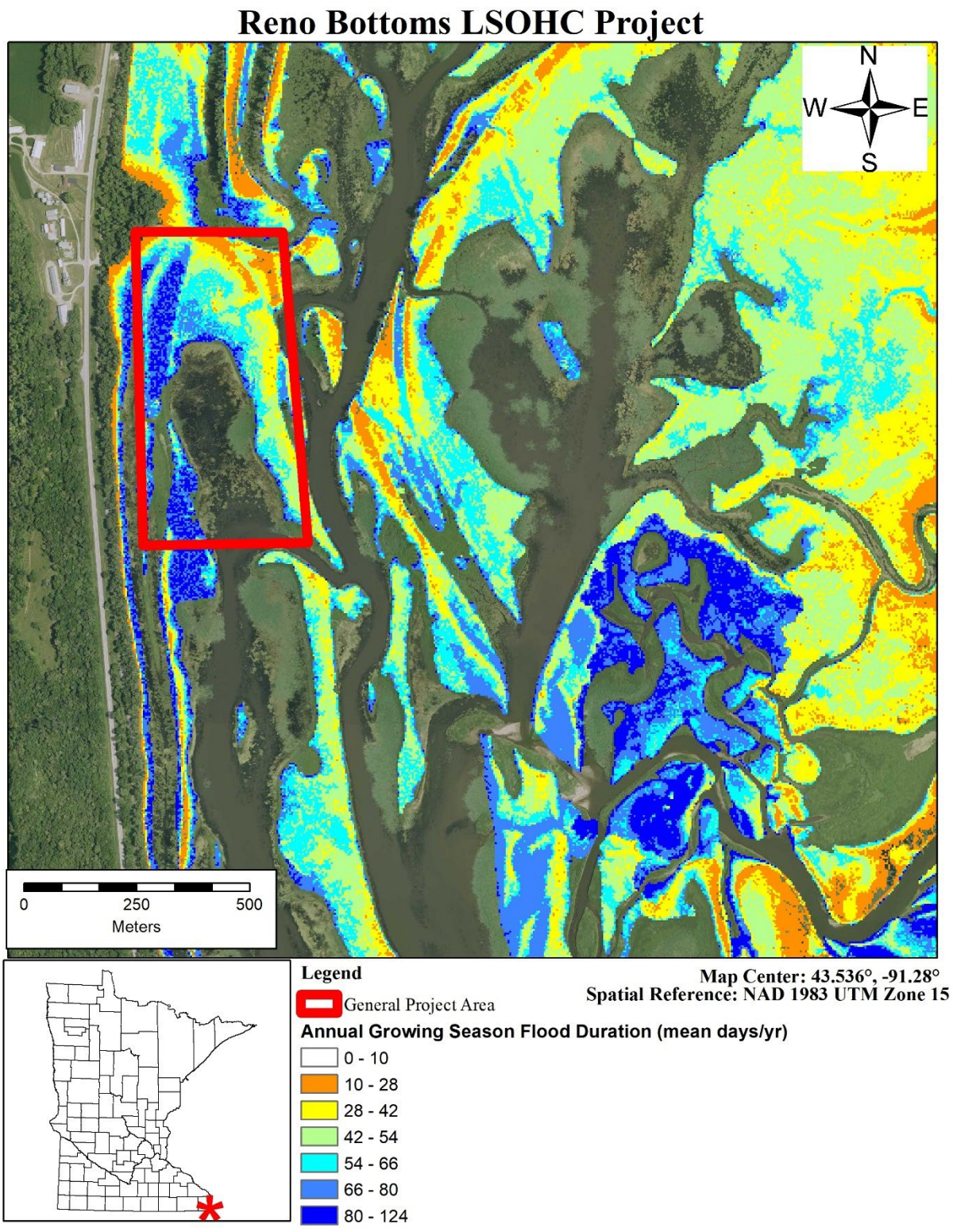

Figure 8. Annual growing season flood duration (mean days per year) in the general project area.

A

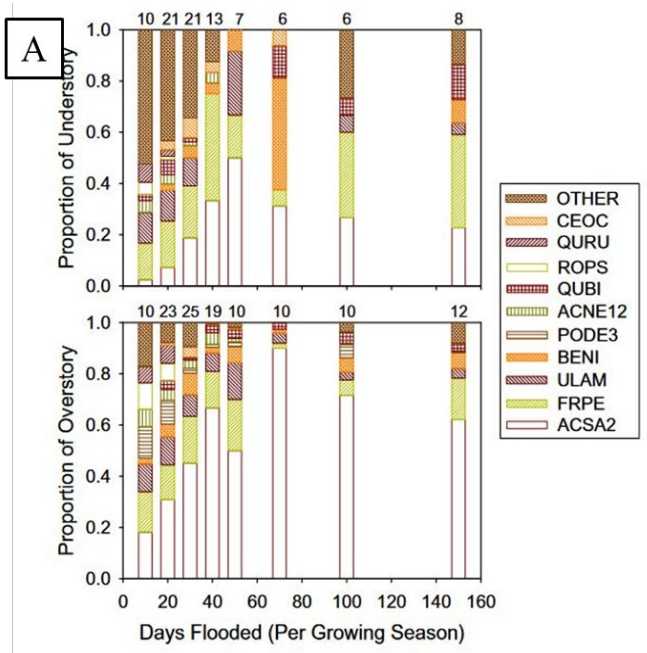

Fig. 5. The proportional abundance of the ten most abundant species (with all other species grouped into a single 'other' category) for sample sites grouped according to flood inundation. Numbers along the top of graphs denote the number of samples within each grouping. Note the strong increase in *A. saccharinum* (ASCA2) with increasing flood inundation in both the understory and overstory. Other abbreviations are defined in Table 3.

B

Table 3
The densities of most common understory and overstory tree species detected in all sample plots, listed in order of the abundance of overstory species.

Scientific Name	Abbreviation	Common name	Overstory density (#/ha)	Understory density (#/ha)	Flood tolerance
Acer saccharinum	ACSA2	Silver maple	218.2	91.5	1,2
Fraxinus pennsylvanica	FRPE	Green ash	61.7	126.1	1,2
Ulmus americana	ULAM	American elm	35.5	52.9	2,3
Betula nigra	BENI	River birch	21.4	32.5	2,3
Populus deltoides	PODE3	Eastern cottonwood	19.4	0.0	2
Acer negundo	ACNE12	Boxelder	13.7	14.2	1,2
Quercus bicolor	QUBI	Swamp white oak	11.0	26.4	3
Robinia pseudoacacia	ROPS	Black locust	10.6	6.1	4
Quercus rubra	QURU	Northern red oak	9.2	10.2	4
Celtis occidentalis	CEOC	Common hackberry	5.1	20.3	4
Fraxinus nigra	FRNI	Black ash	4.1	8.1	4
Quercus velutina	QUVE	Black oak	3.9	4.1	4
Populus tremuloides	POTR5	Quaking aspen	3.5	8.1	4
Salix nigra	SANI	Black willow	2.9	6.1	1
Salix spp.	SALIX	Willow	2.5	4.1	1
Tilia americana	TIAM	American basswood	1.6	2.0	2,3
	UNK	Unknown	1.6	0.0	
Pinus resinosa	PIRE	Red pine	1.2	0.0	4
Quercus spp.	QUERC	Oak	0.4	0.0	3,4
Juglans nigra	JUNI	Black walnut	0.8	0.0	4
Carya cordiformis	CACO15	Bitternut hickory	0.8	6.1	4
Morus rubra	MORU2	Red mulberry	0.8	0.0	4
Prunus serotina	PRSE2	Black cherry	0.8	4.1	2
Gleditsia triacanthos	GLTR	Honey locust	0.8	0.0	1,2
Rhamnus cathartica	RHCA3	Common buckthorn	0.4	16.3	2,3
Morus alba	MOAL	White mulberry	0.4	0.0	4

Flood tolerance values are from Whitlow and Harris (1979). 1 = highly flood tolerant, 2 = moderately flood tolerant, 3 = less flood tolerant species and 4 = species that are not flood tolerant.

Figure 9. Proportional abundance of floodplain forest species grouped according to days flooded per growing season (A) with corresponding species table (B) from De Jager et al. 2012.

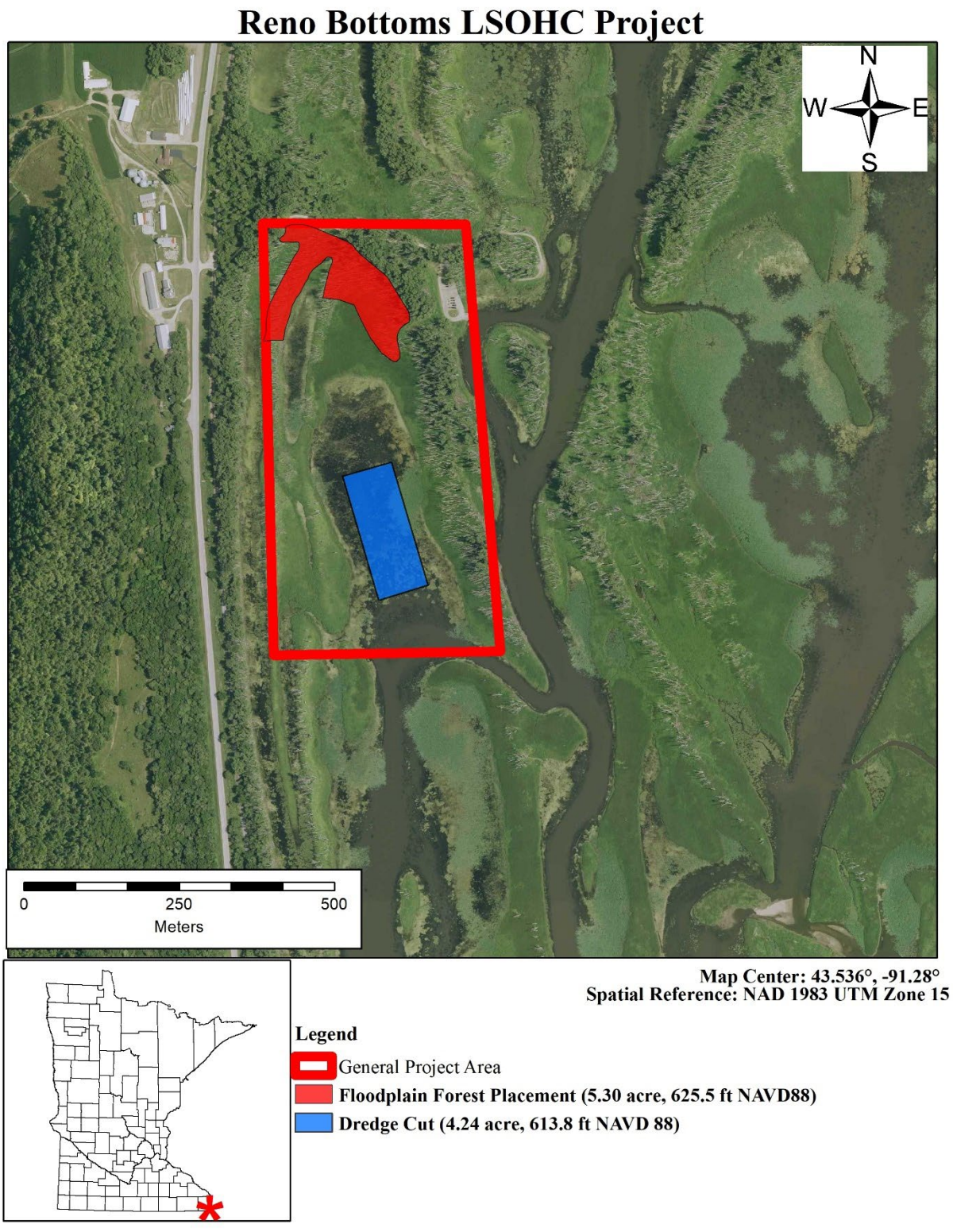

Figure 10. Proposed project concept 1.

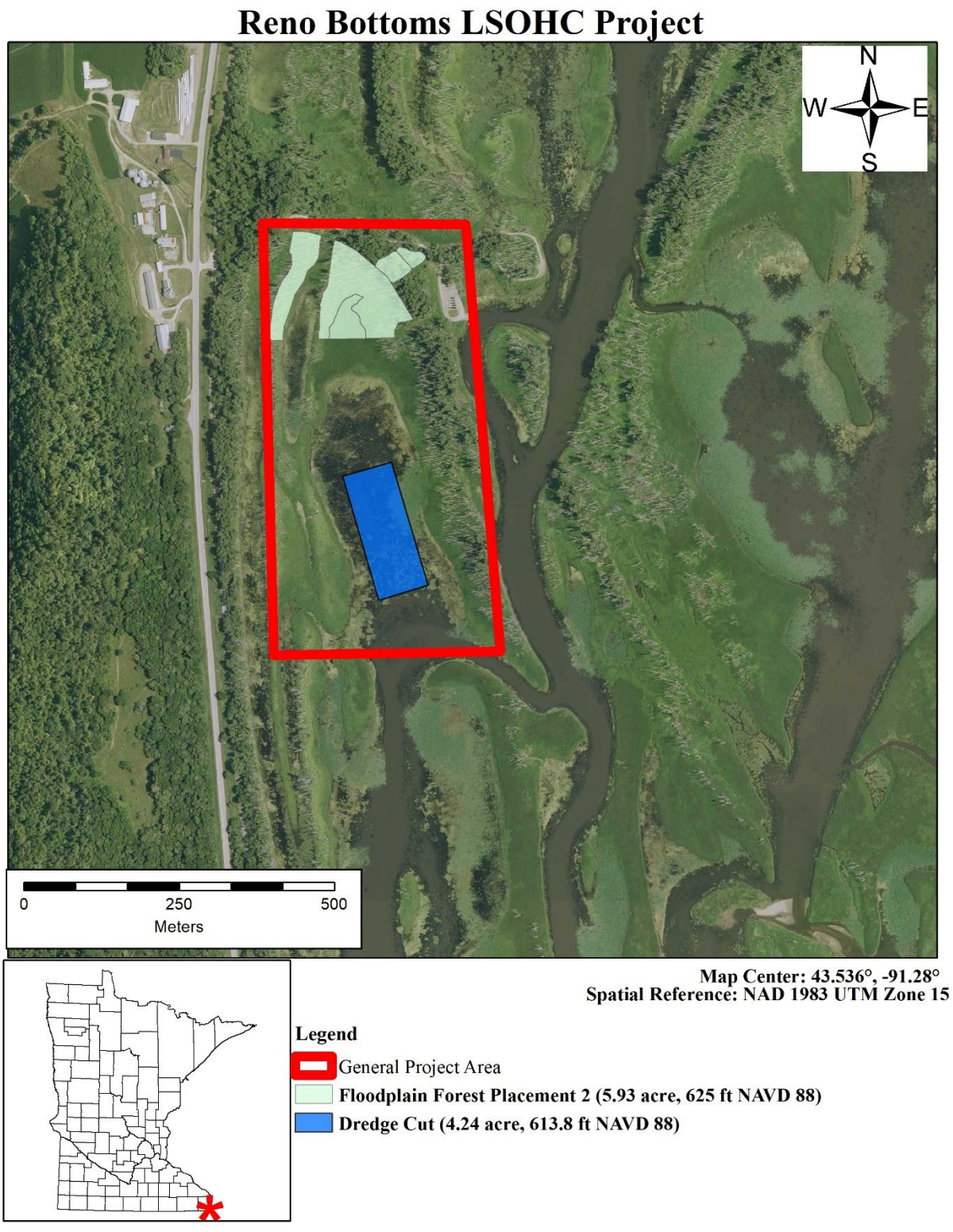

Figure 11. Proposed project concept 2.

Figure 12. Examples of containment berms constructed for hydraulic placement of dredged material in UMR habitat projects using in-situ berms (A) at Pierce County Islands project in upper Pool 4 (Wisconsin), and granular berms (B) at McGregor Lake HREP project in Pool 10 (Wisconsin).

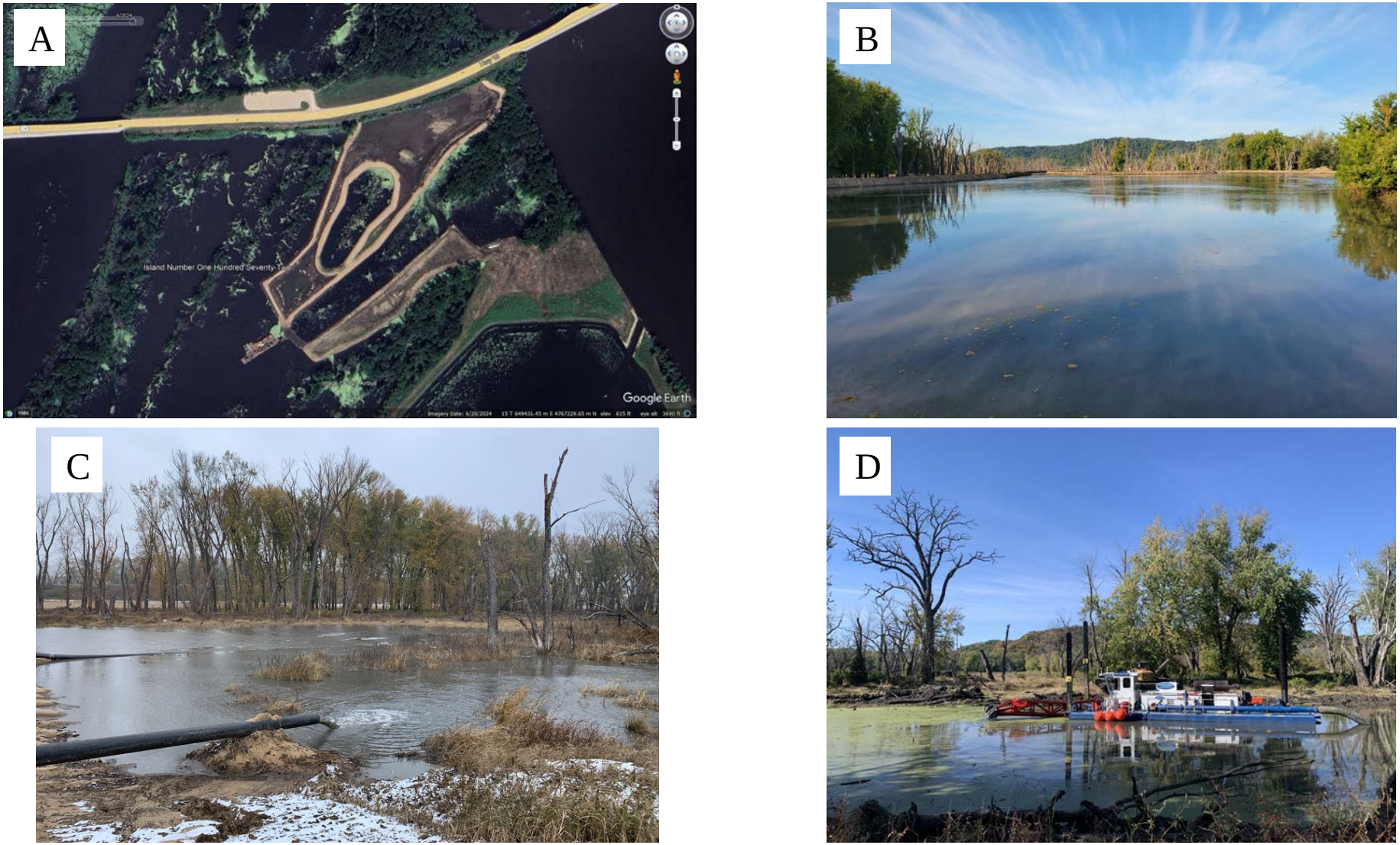

Figure 13. Examples of hydraulic placement with granular containment berms during construction period at the McGregor Lake HREP project in Pool 10 (Wisconsin) from aerial view (A), ground view (B), active hydraulic pumping of dredge material through pipe (C), and hydraulic dredge used for the project (D).

Figure 14. Examples of outflow culverts used in hydraulic placement during construction at the Pierce County Islands project (A) in upper Pool 4 (Wisconsin), and McGregor Lake HREP project (B) in Pool 10 (Wisconsin).

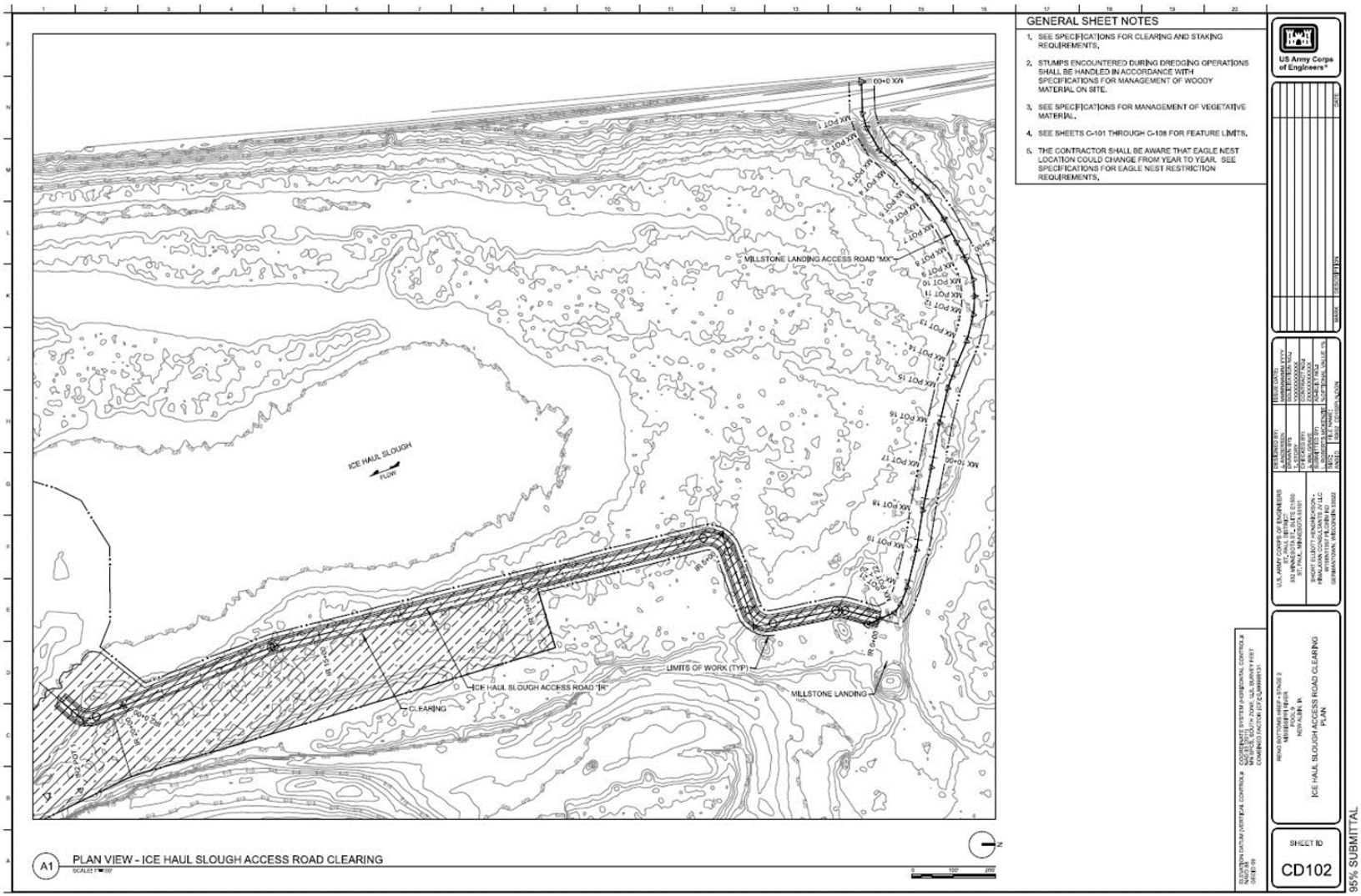

Figure 15. Location and design specifications for the HREP access road. The road connects to the Millstone Landing Access parking lot, and an access pad is found at the end of the road in Ice Haul Slough. General project area is right half of image, and dredging occurs in open water area in Ice Haul Slough.

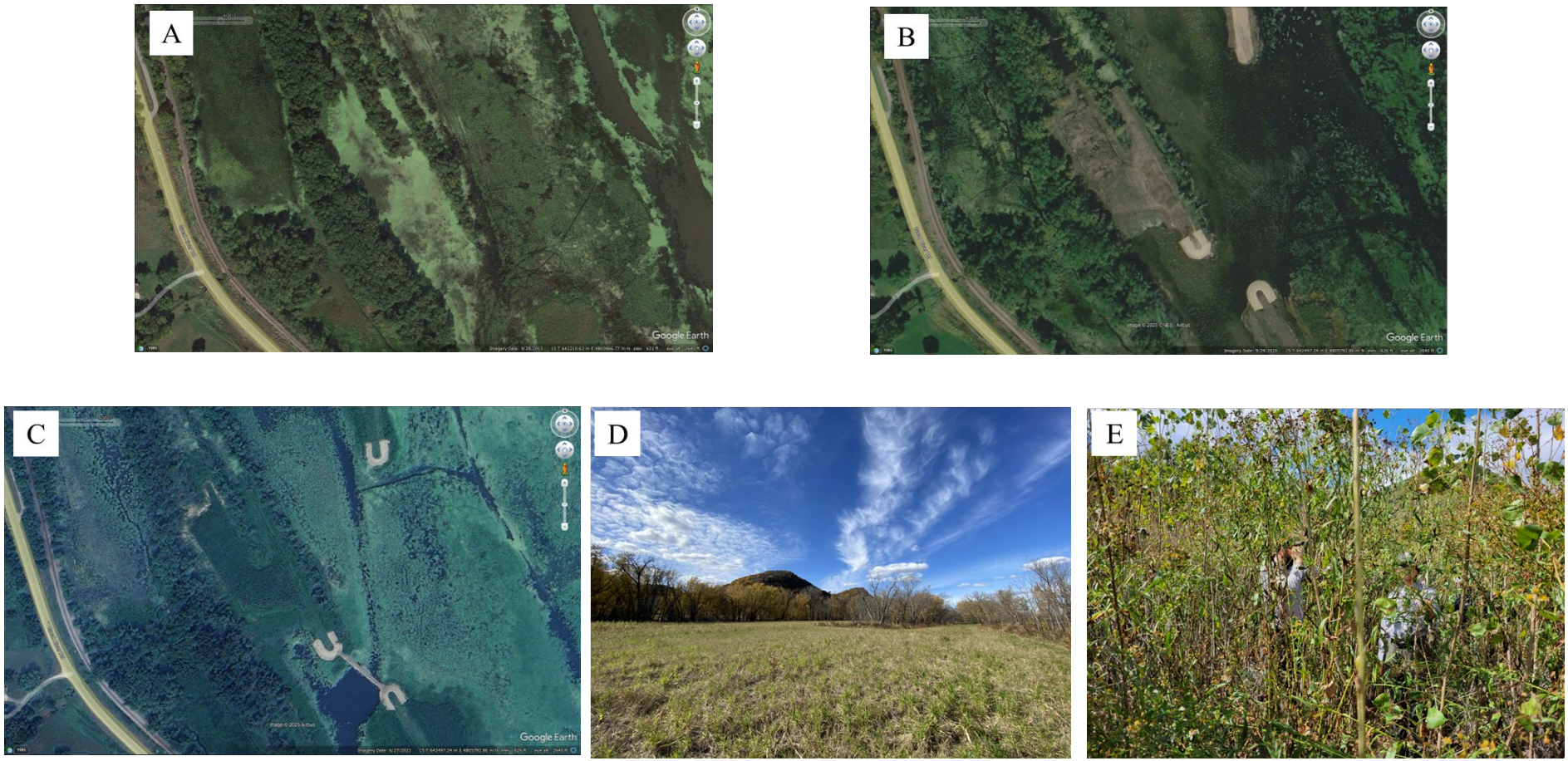

Figure 16. Example of natural regeneration of floodplain forest (cottonwood) following construction in Conway Lake HREP project in Pool 9 (Iowa). Pre-construction (A), during construction (B), post-construction (C), on site ground level (D) and cottonwood natural regeneration on site (E).

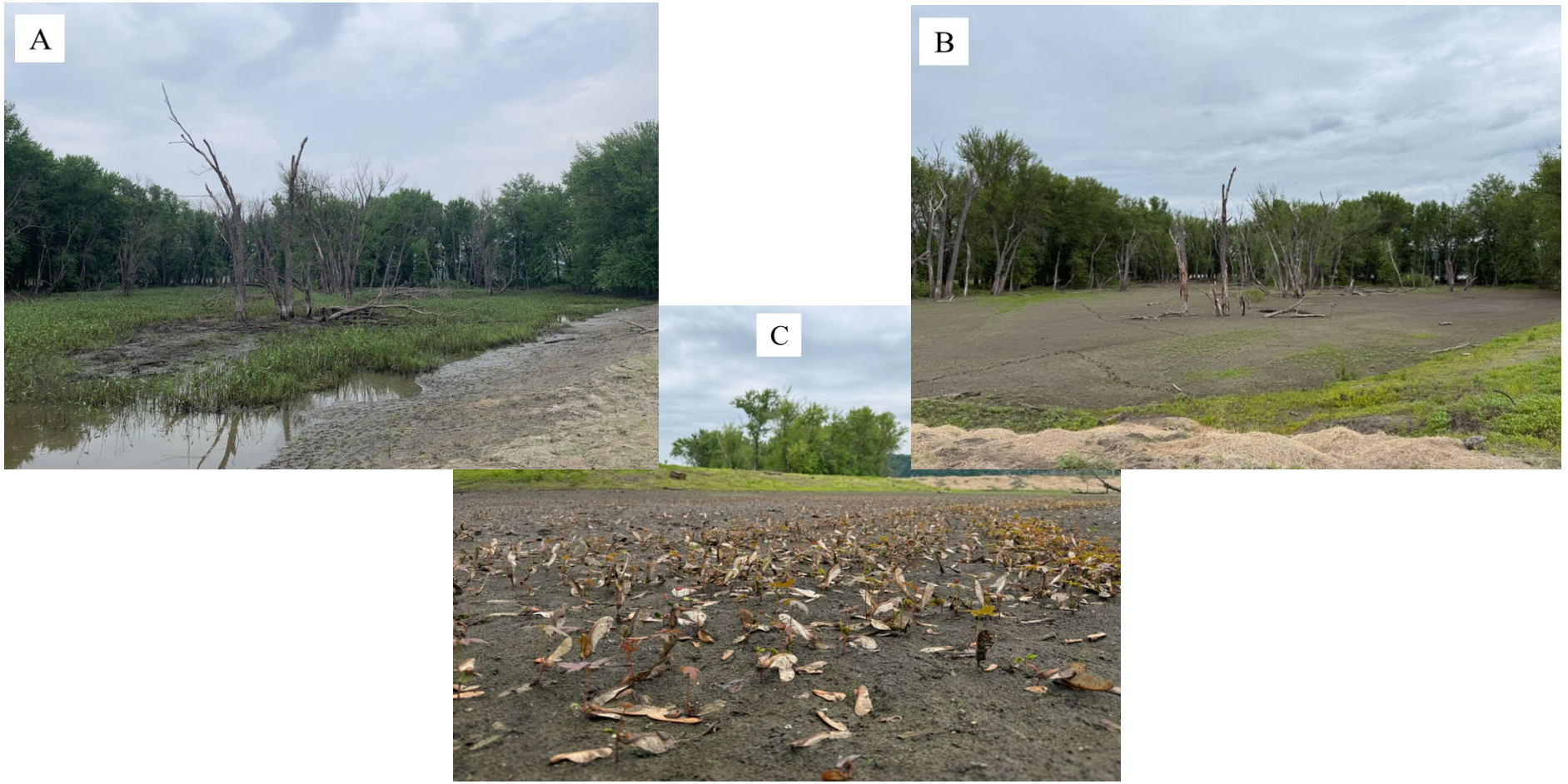

Figure 17. Example of natural regeneration of floodplain forest (silver maple) following construction at the McGregor Lake HREP project (Pool 10, Iowa) using hydraulic placement of up to 3 feet of material (fines and granular). Pre-construction (A), post-construction (B), and natural regeneration of silver maple on fines material bare mineral soil (C).

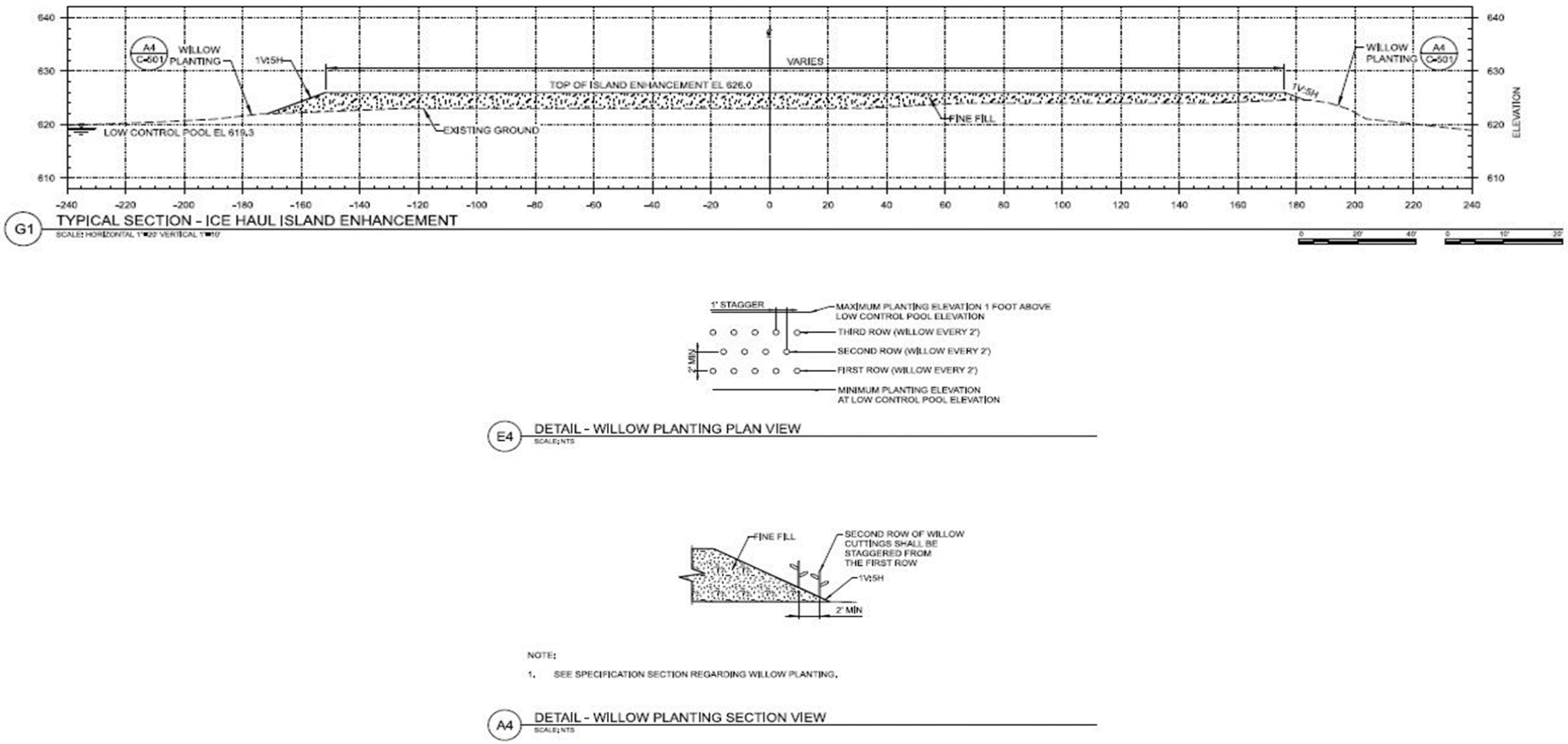

Figure 18. Example of willow stakes/spikes used for erosion control and long-term stabilization of elevation enhancement features from the Reno Bottoms HREP design specifications which will be used in the proposed project, if needed. Top is typical island cross section. Bottom is detailed willow stake/spike plan.

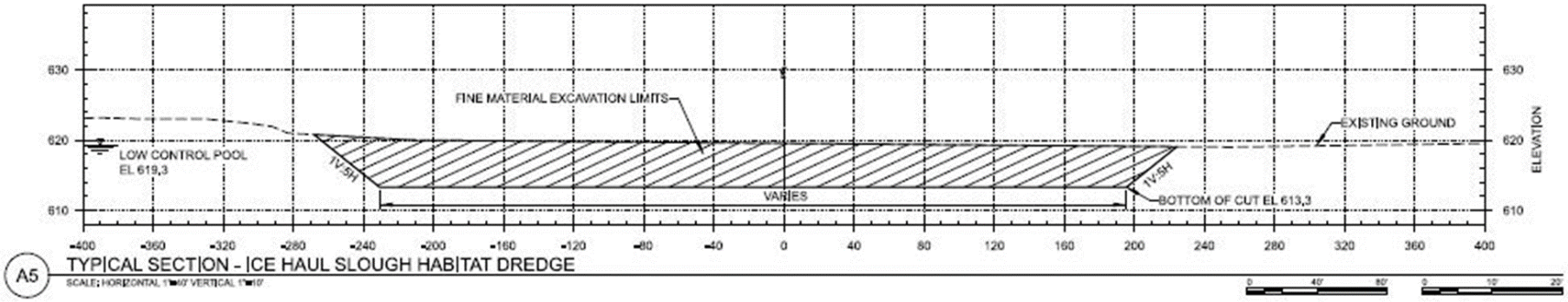

Figure 19. Typical cross section design specifications for the dredged area derived from the Reno Bottoms HREP project specifications. Note that dredge depths are planned for 613.8ft (NAVD 88).

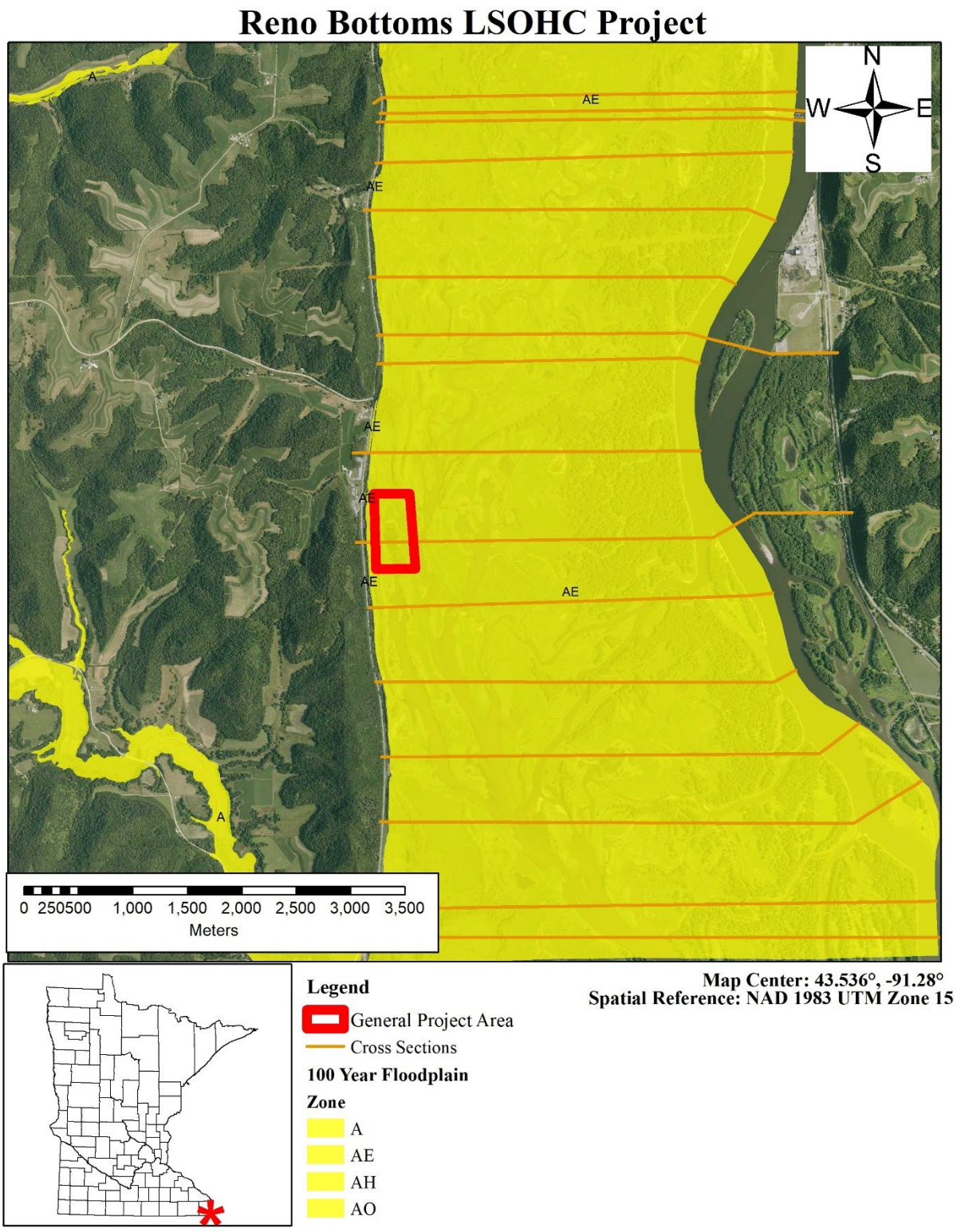

Figure 20. FEMA 100 year floodplain zone map for the general project area.

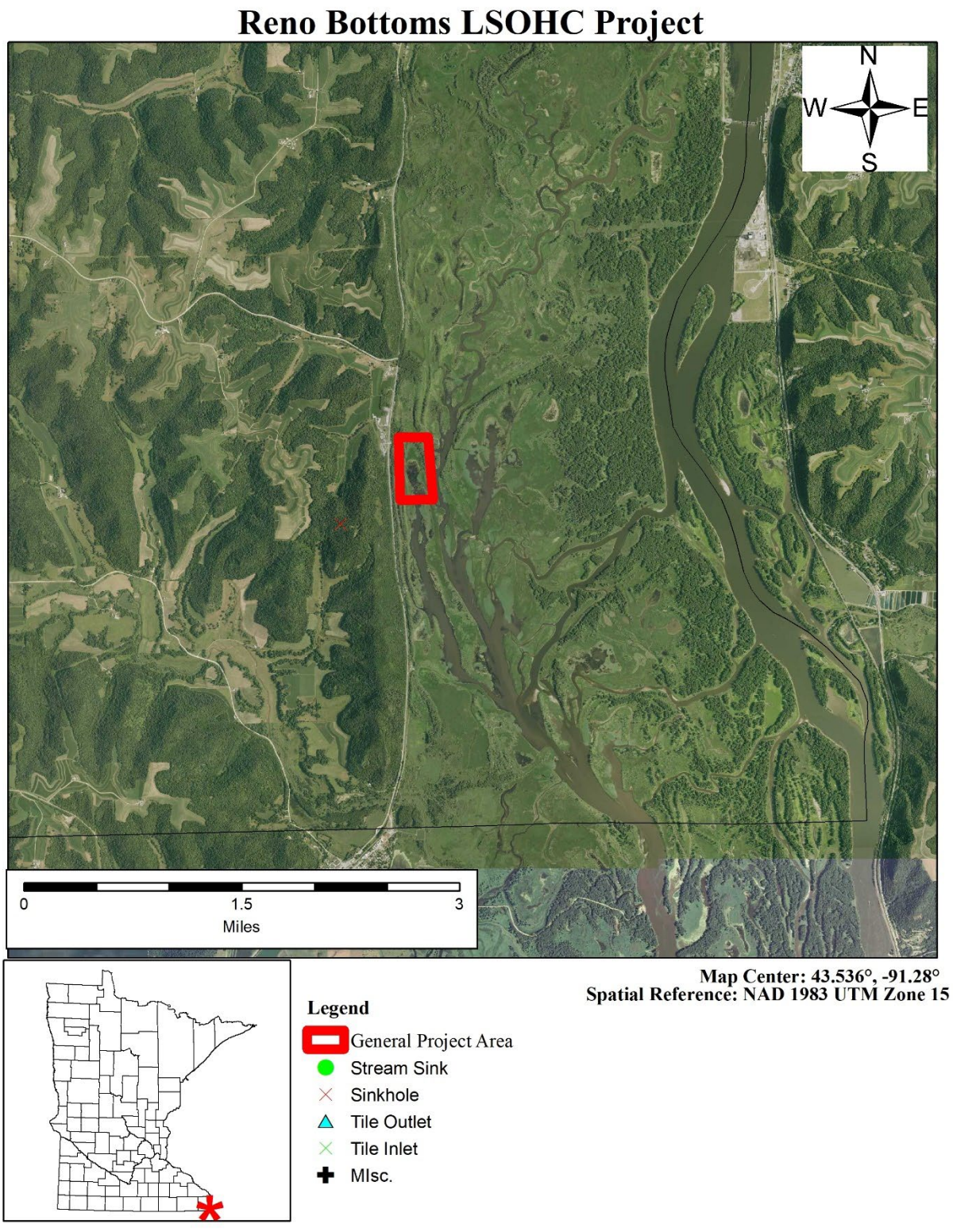

Figure 21. Karst features in the general project area.

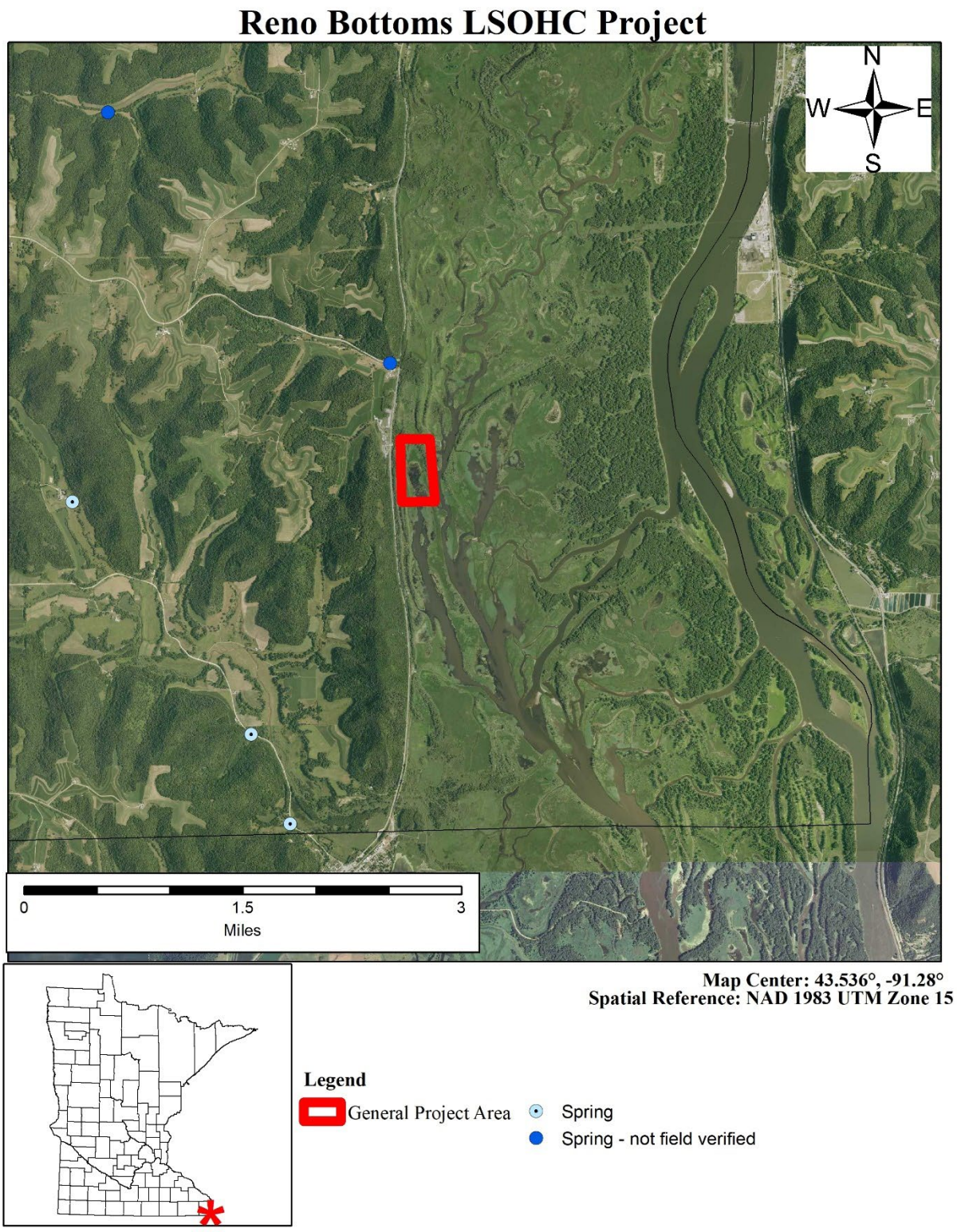

Figure 22. Springs found in the general project area.

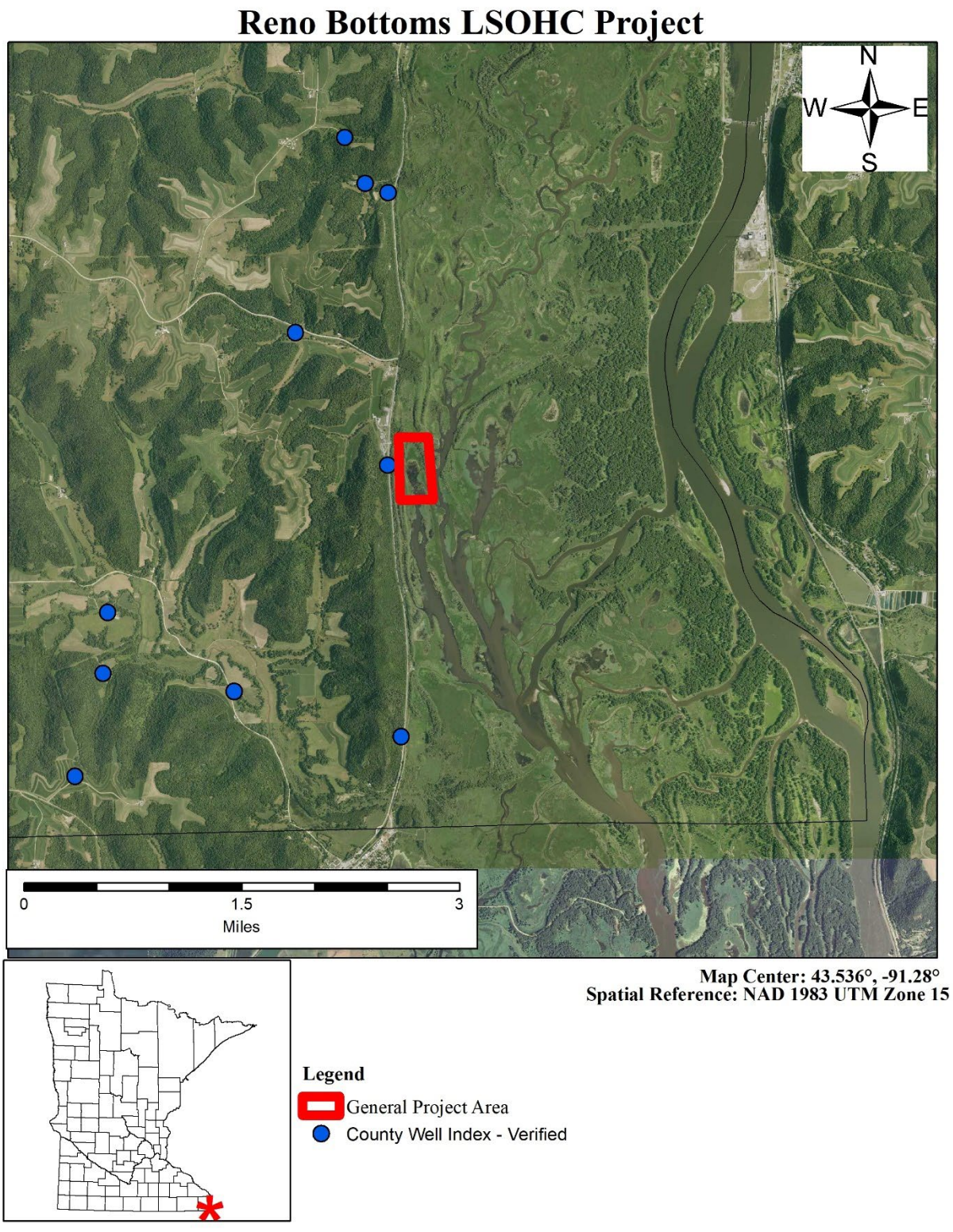

Figure 23. Wells found in the general project area.

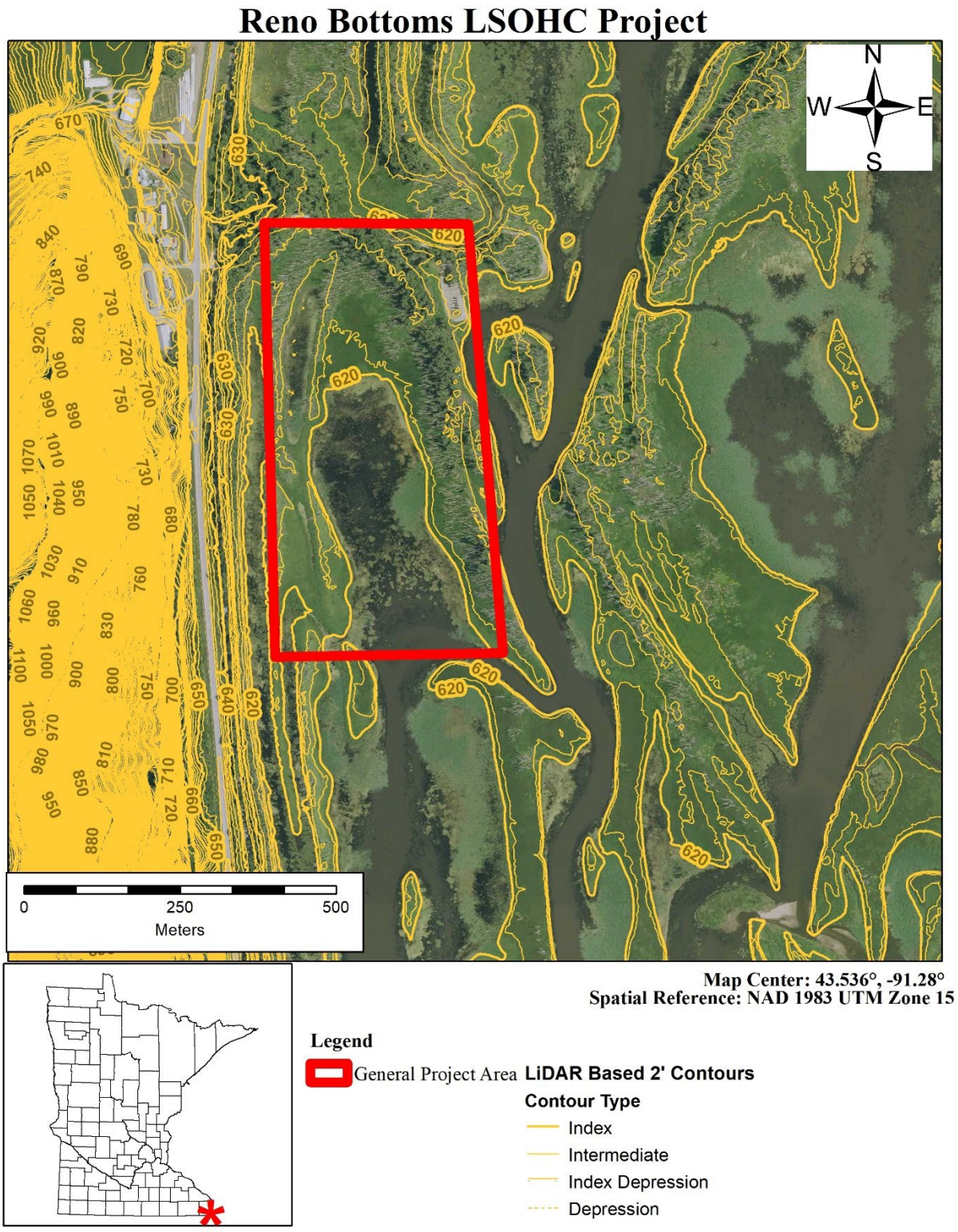

Figure 24. Elevation contours (feet, NAVD 88) in the general project area based on 2 foot LiDAR surveys.

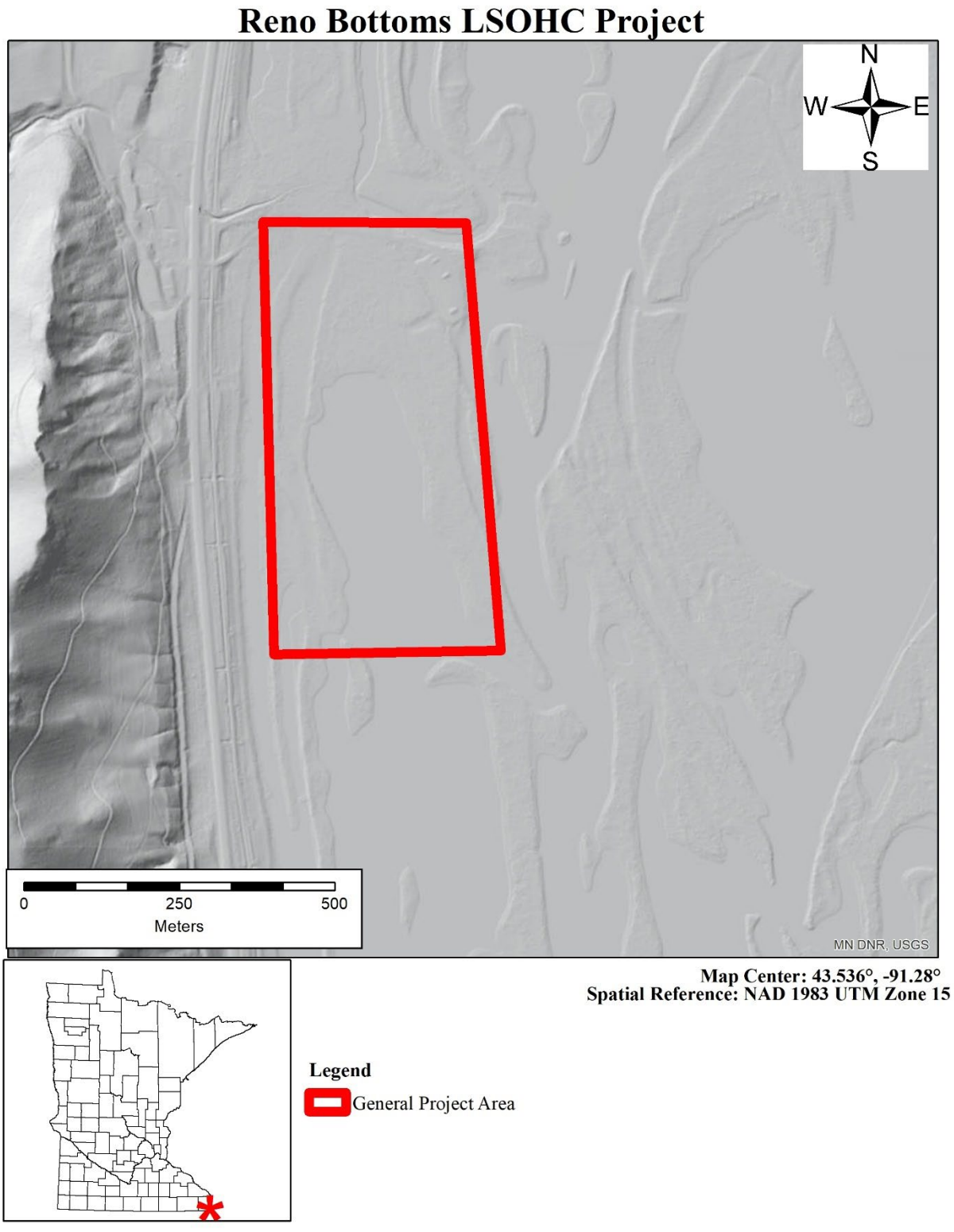

Figure 25. Hillshade (LiDAR) elevation of the general project area.

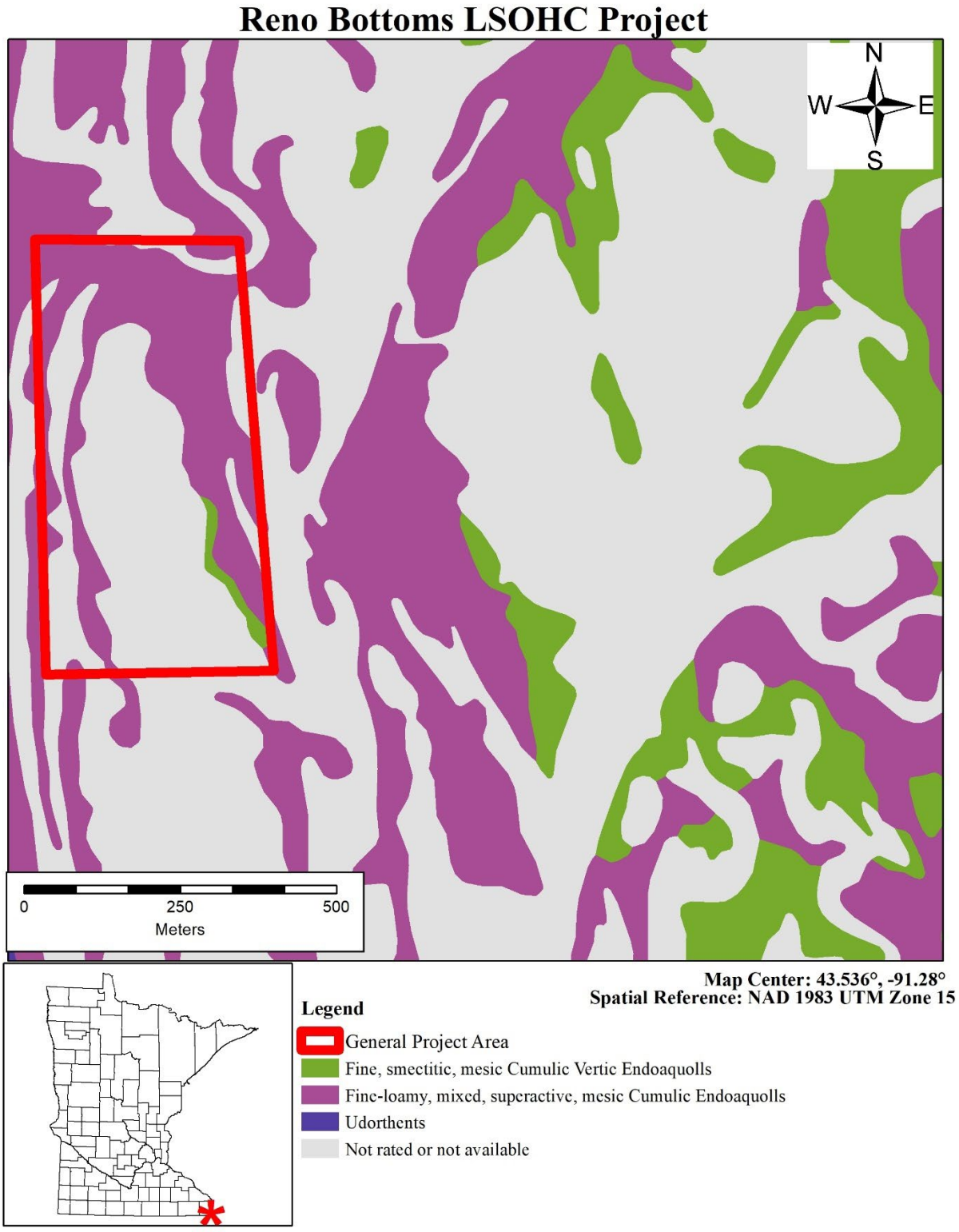

Figure 26. SSURGO soil unit map of the general project area.

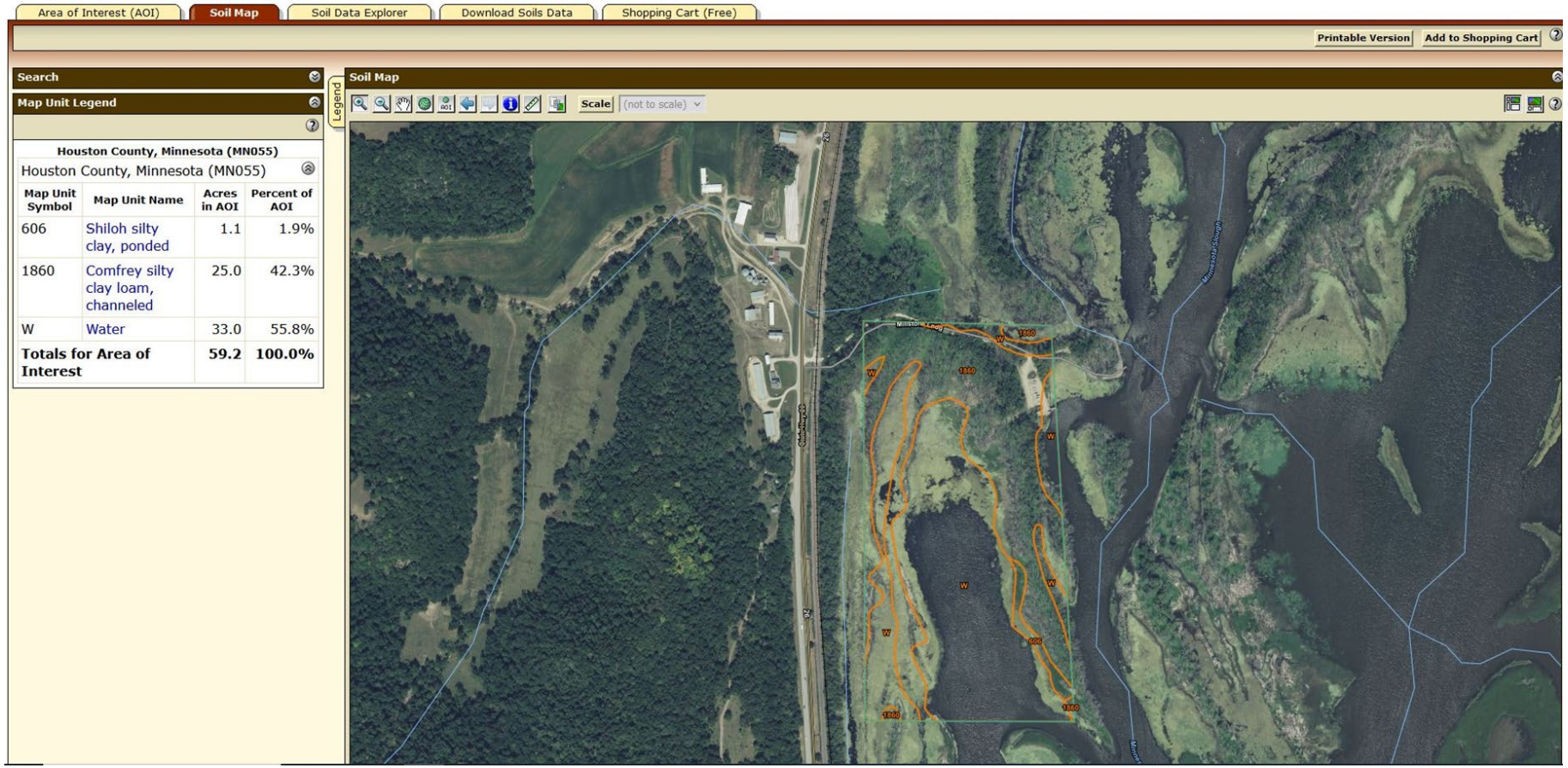

Figure 27. Results of USDA Web Soil Survey for the project area.

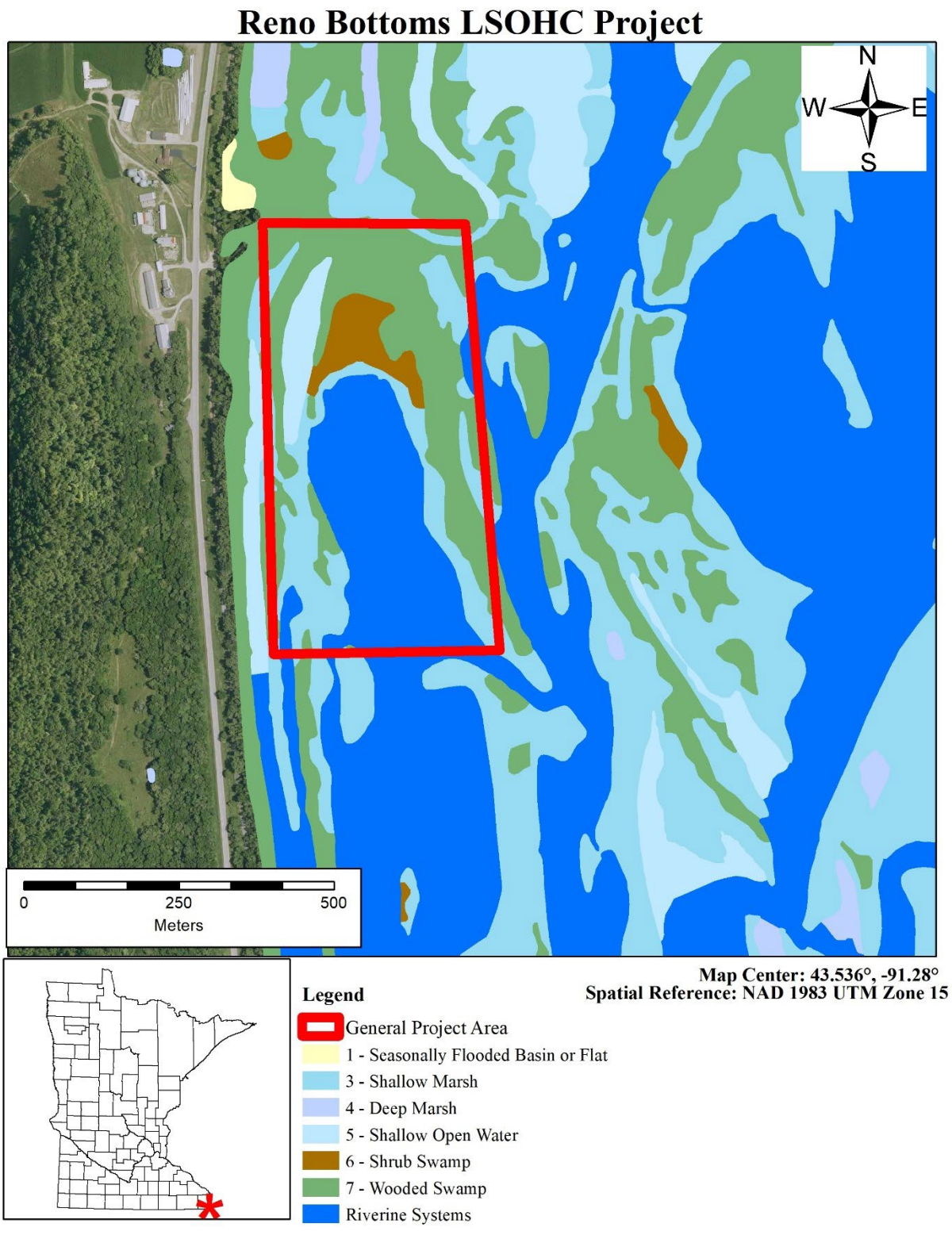

Figure 28. National Wetland Inventory Circular 39 map of the general project area.

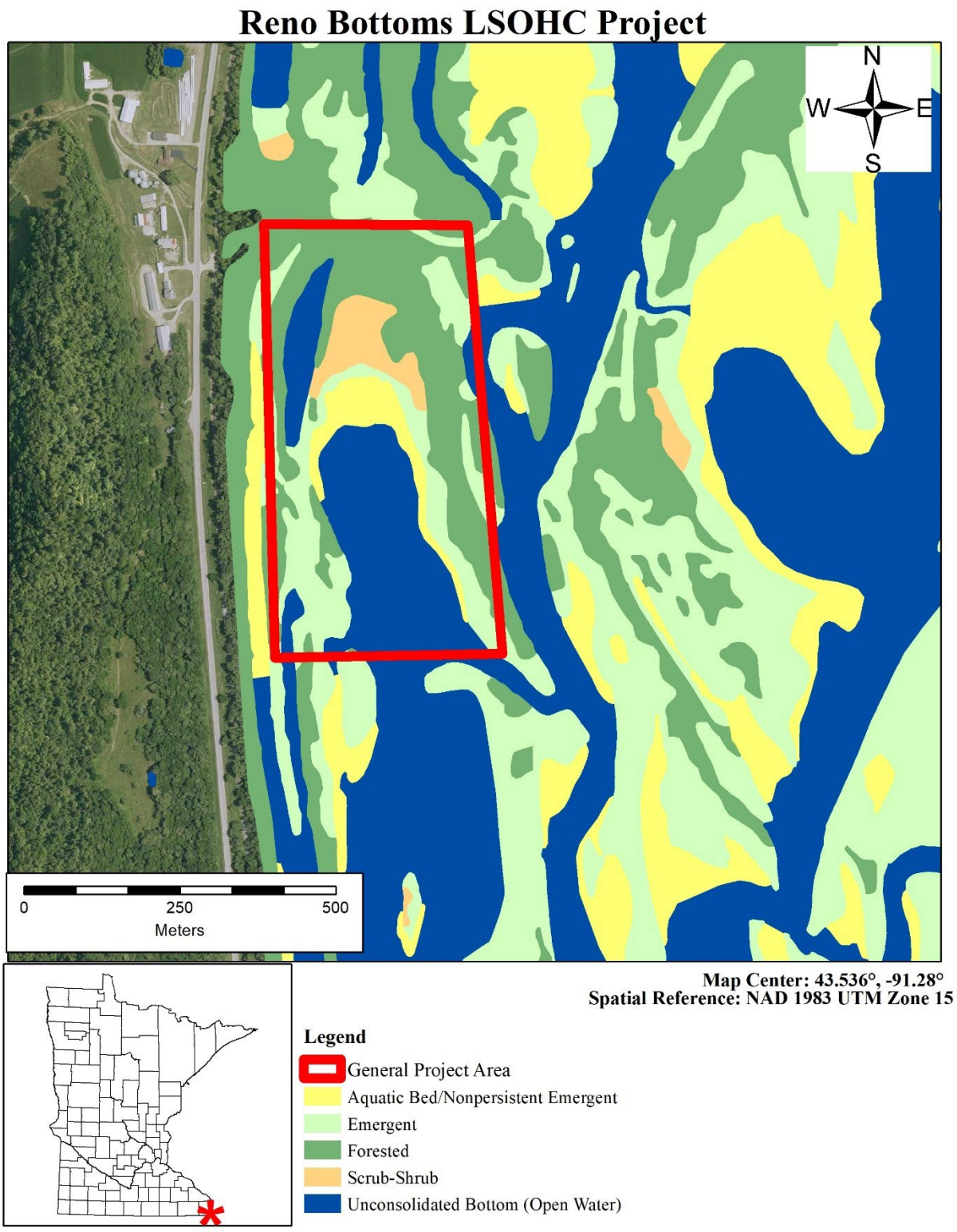

Figure 29. Cowardin classification of wetlands in the general project area.

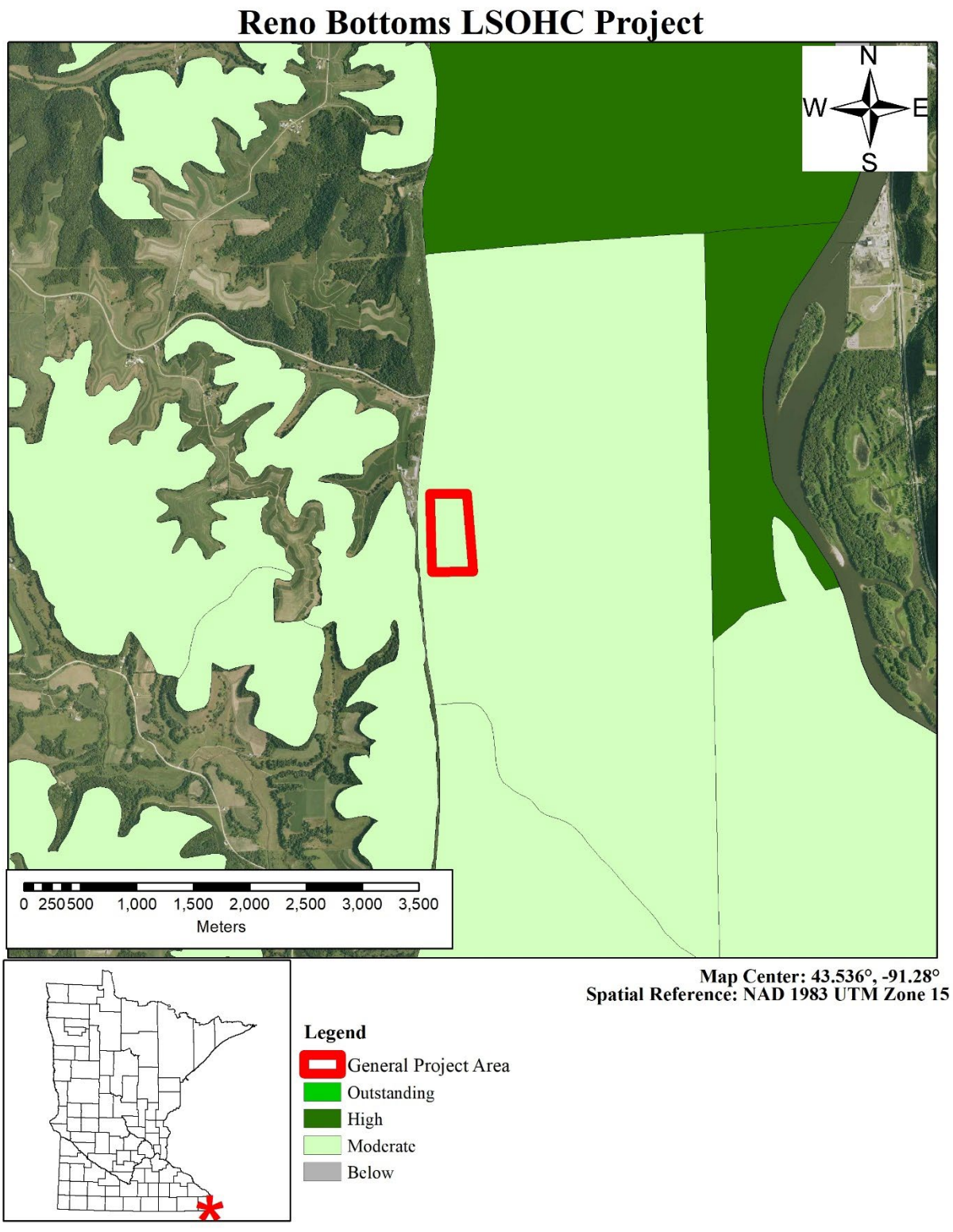

Figure 30. Minnesota Biological Survey sites of biodiversity in the general project area.

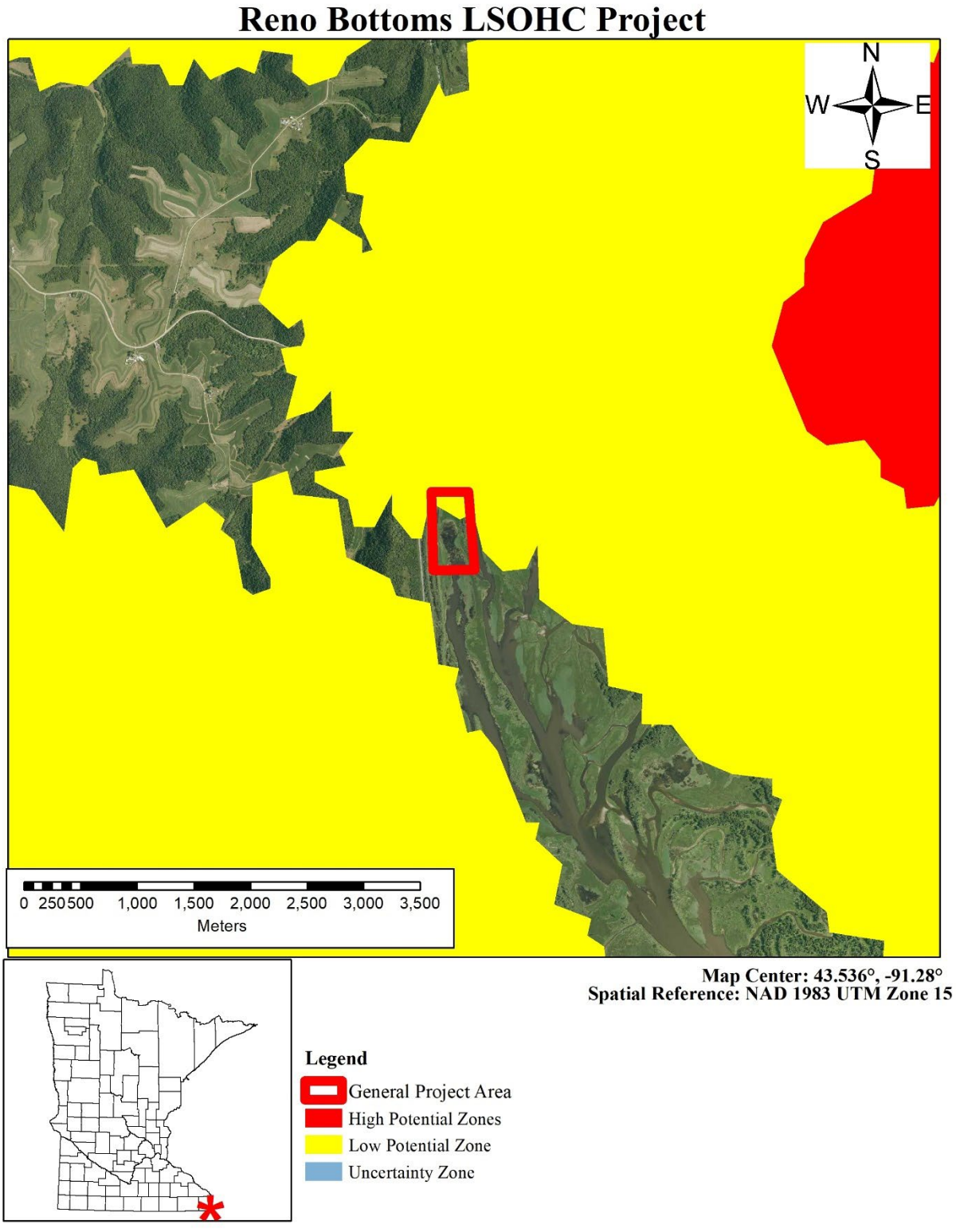

Figure 31. Rusty Patch Bumble Bee (*Bombus affinis*) High Potential Zones in the general project area.

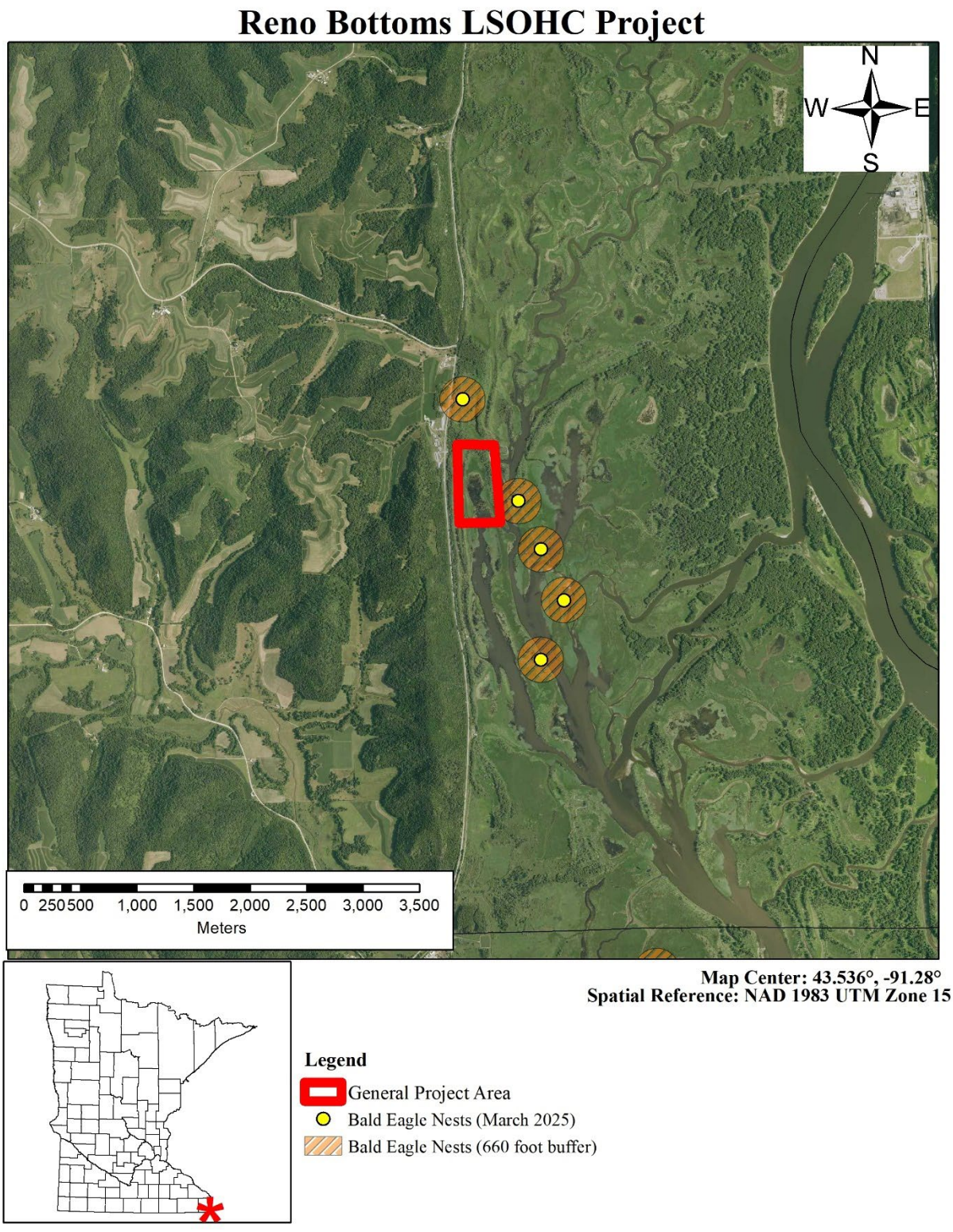

Figure 32. Bald Eagle nests in the general project area (March 2025) and 660 foot buffer zone around each nest.