

DISCUSSION

This DISCUSSION section is organized by the six (6) AUM Regions. As noted earlier, the results from the scoring are not intended to identify actual risks, but are meant to provide a coarse screening of priority AUM sites for further investigation. The GIS approach facilitated a consistent and documented scoring process. The GIS cartographic tools also allowed flexible visualization of the data and analysis results.

NORTH CENTRAL AUM REGION SCREENING ASSESSMENT SCORE RESULTS

Review of the North Central AUM Region Combined Pathway Scores (Table 4) and Figure 61 “North Central AUM Region Combined Pathways - Three Score Ranges” show that three of the four highest scoring AUM sites in the region occur in the Monument Valley mining area on Oljato Mesa in the Oljato Chapter (Charles Keith, Rock Door No. 1, and Norcross). These three (3) AUMs have been reclaimed by NAMLRP. The fourth highest scoring site is located about one (1) mile north of the Mexican Hat bridge on Highway 163 and is off the Navajo Nation. This AUM-related site was a uranium ore transfer location.

Since the primary HRS criteria are counts of structures and wells at specified distances from the AUMs, areas with high occurrences of homes and wells proximal to the AUM sites scored high. The two highest scoring mines in the North Central AUM Region, Charles Keith mine (MAP-ID #NC15) and Rock Door No. 1 mine (MAP-ID #NC24) in the Oljato Chapter are examples of AUM sites that scored high (3,080 and 2,940 respectively) due to proximity of homes and wells. Conversely, remote AUM sites with sparse population and few wells score low. This can be seen in the generally low scores for the AUM sites in the western and southern Oljato, and west central Kayenta Chapters (shown in green on Figure 61).

High scoring AUMs were not necessarily high ore producers. The Rock Door No. 1 mine only had 25 tons of ore mined and produced 331 pounds of uranium and 937 pounds of vanadium (Chenoweth, 1991 - S03100502). Only 59 tons of ore were mined from the Charles Keith mine, which produced 237 pounds of uranium and 179 pounds of vanadium (Chenoweth, 1991 - S03100502). These are significantly smaller production numbers compared to the Bootjack AUM in Oljato Chapter (MAP-ID #NC48) that scored 330 but had 36,236 tons of ore mined with 331,010 pounds of uranium extracted (Chenoweth, 1993 - S10100222). The Monument No. 2 AUM (MAP-ID #NC66) in the Kayenta Chapter scored 980, but produced more uranium than any other mine in Arizona with 773,132 tons of ore mined and 5,276,093 pounds of uranium and 21,915,125 pounds of vanadium extracted (Gregg et al., 1989 - S10020208), and has an associated UMTRA cleanup site.

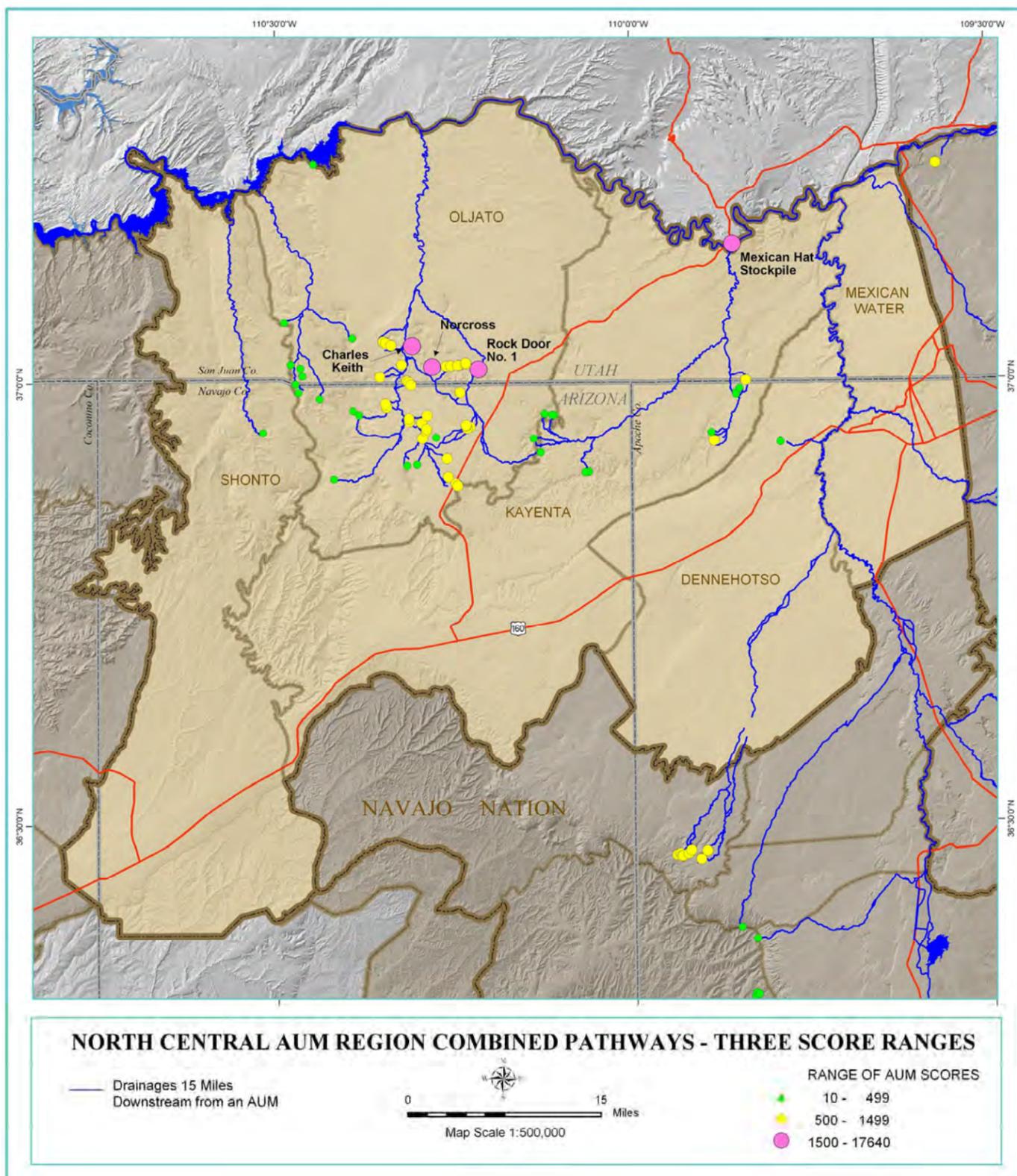


Figure 61. North Central AUM Region Combined Pathways Map with Three Score Ranges.

NORTHERN AUM REGION SCREENING ASSESSMENT SCORE RESULTS

Review of the Northern AUM Region Combined Pathway Scores (Table 5) and Figure 62 “Northern AUM Region Combined Pathway - Three Score Ranges” show that the highest scoring AUM sites occur in the Northeast Carrizo mining area of the Beclabito Chapter (NA-0420 and NA-0424), the Lukachukai mining area of Cove Chapter (Cove Transfer Station), the Climax Transfer Station south of the Shiprock community, the Oak Springs Mine (Gravel Cap) and Oak Springs Mine in the Red Valley Chapter, and the Plot 13 and Johnny McCoy 1 AUMs in the Sweetwater Chapter. NA-0420 and NA-0424 are AUM sites that were reclaimed by the NAMLRP. NA-0420 is identified as a rim strip/pit feature, and NA-0424 is identified as a prospect. Uranium/vanadium production records could not be located for either of these sites. The Cove Transfer Station was not an AUM, but was used as a stockpile site. Uranium ore was trucked from the Kerr-McKee mines in the Lukachukai Mountains and dumped at the stockpile, then loaded onto larger trucks and transported to the Shiprock mill (Dare, 1961 - S10280202). Historical records could not be found for the Climax Transfer Station (MAP-ID #N191). William Chenoweth (2006 - S03010601) identified the site as a stockpile for ore mined at the Frank No. 1 Mine that was then transferred to the Climax Uranium Mill in Grand Junction. The Navajo Nation Environmental Protection Agency Superfund Program has recently conducted field assessments of the site (NNEPA, 2006 - S03030601). The Oak Springs Mine (Gravel Cap), Oak Springs Mine, Plot 13, and Johnny McCoy 1 were all productive mines that have been reclaimed by the NAMLRP.

Remote AUM sites with sparse population and wells scored low. This can be seen in the generally low scores for the AUM sites in the Chuska, Lukachukai, southwest Sweetwater, west Carrizo and portions of the northeast Carrizo mining areas (shown in green on Figure 62).

Rocky Spring Mine in the Chuska mining area (MAP-ID #N264) is an example of an AUM site that scored moderately high (1,070) due to proximity of homes and wells. However, this is an unreclaimed rim strip/pit site with limited production (a total of 11 tons of ore mined), and only 3 pounds of uranium and 62 pounds of vanadium extracted (Chenoweth, 1984 - S03130303). This is an insignificant production number compared to the Mesa II, Mine #1&2, P-21 AUM (MAP-ID #N245) that scored 250 but had 274,128 tons of ore mined with 1,284,853 pounds of uranium and 5,475,210 pounds of vanadium extracted (Chenoweth, 1988 - S10280203).

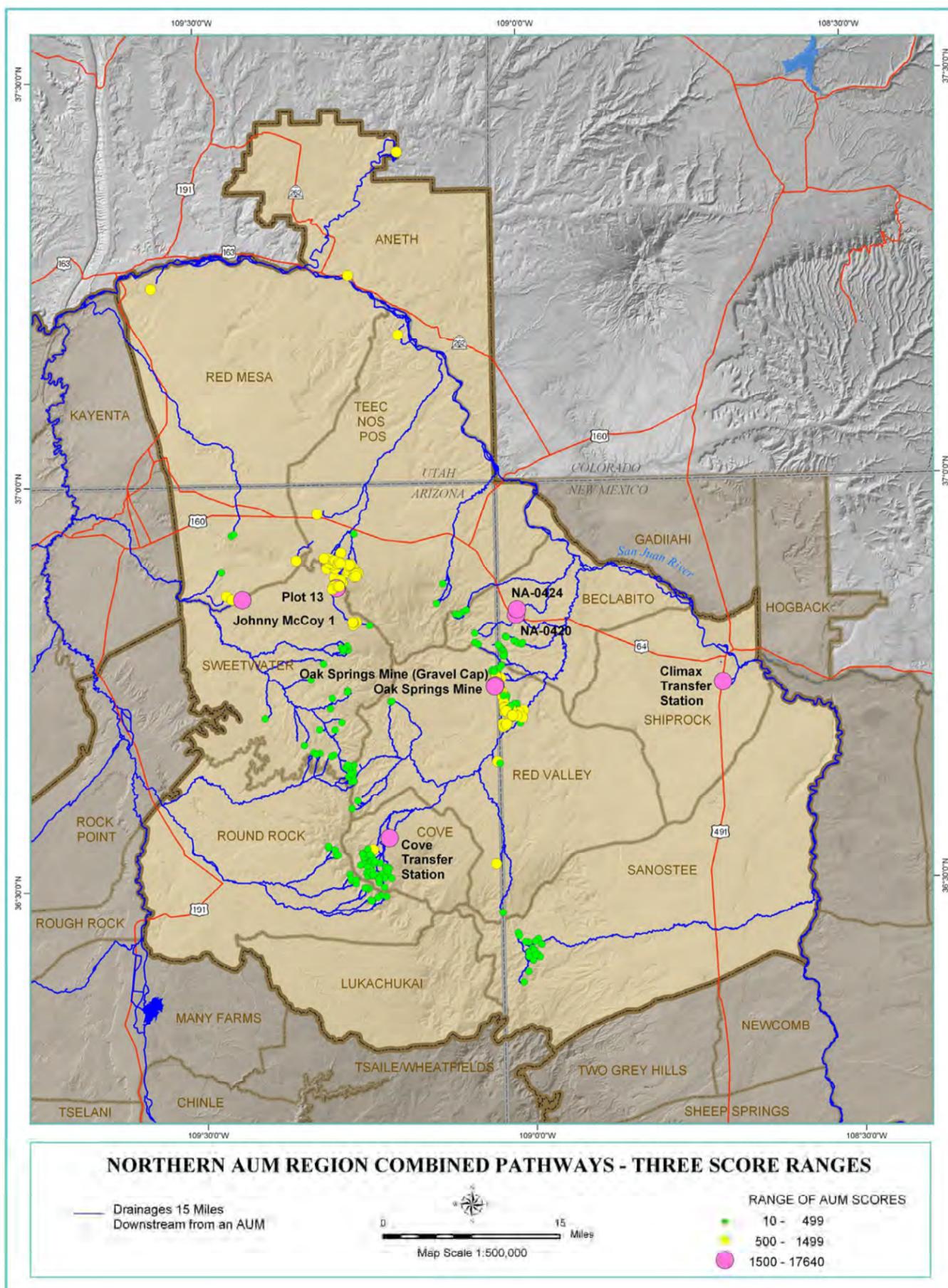


Figure 62. Northern AUM Region Combined Pathways Map with Three Score Ranges.

WESTERN AUM REGION SCREENING ASSESSMENT SCORE RESULTS

Review of the Western AUM Region Combined Pathway Scores (Table 6) and Figure 63 “Western AUM Region Combined Pathway - Three Score Ranges” show that the highest scoring AUM sites occur in the Little Colorado River mining area of the Cameron Chapter (A&B No. 2 and A&B No. 3) and Coalmine Canyon Chapter (Charles Huskon No. 1 and No. 12, and Jack Daniels Nos. 1, 4, and 5). All of these sites have been reclaimed by the NAMLRP.

AUM sites in the southwestern Coalmine Canyon, and southeastern and northern Bodaway/Gap Chapters generally scored low (shown in green on Figure 63). This is due to the remoteness of the AUMs with sparse populations and few wells.

Martin Johnson No. 4 mine in the Bodaway/Gap Chapter (MAP-ID #W5) is an example of an AUM site that scored moderately high (1,250) due to proximity of homes and wells. However, this AUM only had 38 tons of ore mined and produced 120 pounds of uranium and 23 pounds of vanadium. The A & B No. 3 mine (MAP-ID #W39) has the highest score (5,880) in the Western AUM Region. This was a producing mine, with 586 tons of ore mined and 1,458 pounds of uranium and 515 pounds of vanadium extracted. This is a significantly smaller production number compared to the Ramco No. 20 AUM (MAP-ID #W94) that scored 270 but had 22,642 tons of ore mined with 99,226 pounds of uranium and 19,259 pounds of vanadium extracted. Production numbers are from Chenoweth (1993 - S10100239).

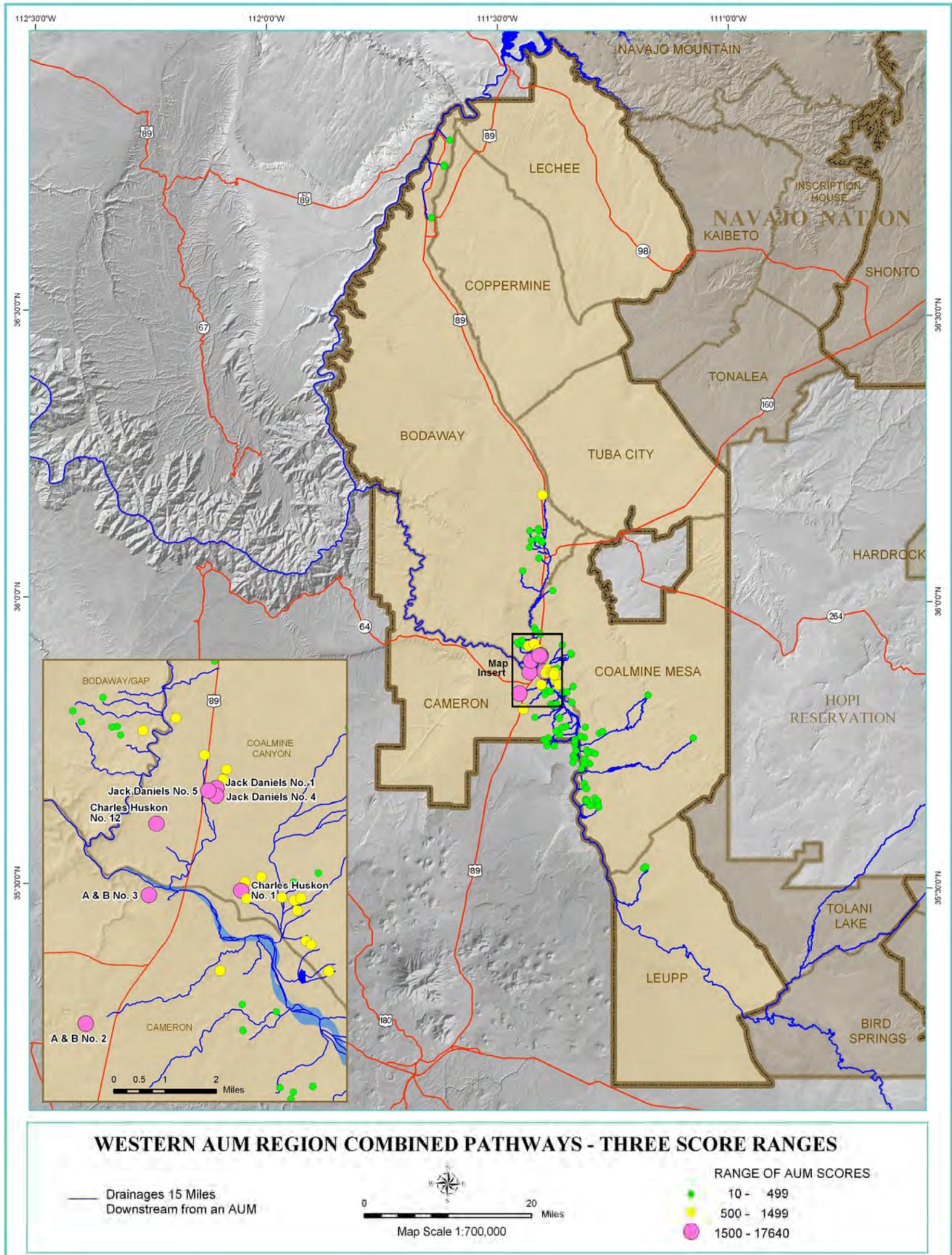


Figure 63. Western AUM Region Combined Pathways Map with Three Score Ranges.

CENTRAL AUM REGION SCREENING ASSESSMENT SCORE RESULTS

Review of the Central AUM Region Combined Pathway Scores (Table 7) and Figure 64 “Central AUM Region Combined Pathways - Three Score Ranges” shows that the Occurrence B AUM in the Chinle Chapter is the highest scoring AUM site. This AUM is an example of an AUM site that scored high (4,170) due to proximity of homes and wells. This AUM site is also proximal to the Canyon de Chelly National Monument, shown in orange in Figure 64.

Remote AUM sites with sparse population and few wells score low. This can be seen in the generally low scores for the AUM sites in the eastern Black Mesa, northeastern Tachee/Blue Gap, and northwestern Tselani/Cottonwood Chapters (shown in green on Figure 64).

High scoring AUMs did not necessarily produce large amounts of uranium. The Occurrence B AUM (MAP-ID #C34) did not have any reported production of uranium or vanadium. This occurrence was described as a stripped area (borrow pit) 500 feet by 700 feet across and 10 feet deep with radioactive rocks (up to 4 times background) (Chenoweth, 1990 - S10020207).

Conversely, one of the more significant uranium producing mines in the Central AUM Region was Claim 7 in Tselani/Cottonwood Chapter (MAP-ID #C24). The combined score for Claim 7 was 260, but it was one of the largest uranium producers in the region with 5,614 tons of ore mined and 14,594 pounds of uranium extracted (Chenoweth, 1990 - S10100236).

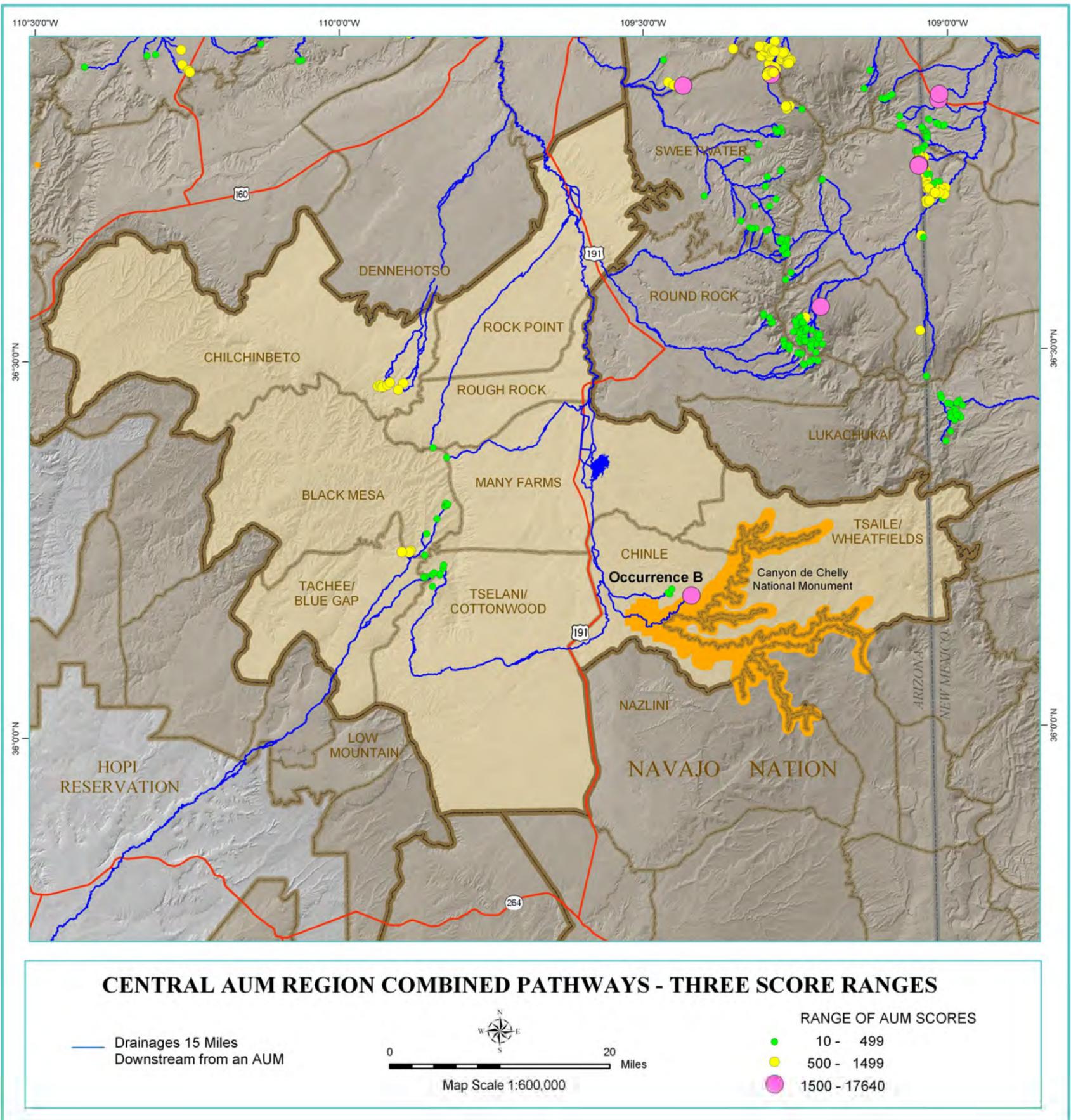


Figure 64. Central AUM Region Combined Pathways Map with Three Score Ranges.

SOUTHERN AUM REGION SCREENING ASSESSMENT SCORE RESULTS

Review of the Southern AUM Region Combined Pathway Scores (Table 8) and Figure 65 “Southern AUM Region Combined Pathways - Three Score Ranges” show the highest scoring AUM site occurs in the Indian Wells Chapter at the Mail Box Claim (MAP-ID #S2) with a score of 1,130.

There were no AUMs in the Southern AUM Region that scored above 1,500. The Mail Box Claim did not have any reported production of uranium or vanadium. The Morale Mine (shown in green) has the lowest combined pathway score at 450 (MAP-ID #S3). It was the only producing uranium mine in the Southern AUM Region, with 192 tons of ore mined, and 580 pounds of uranium and 162 pounds of vanadium produced (Chenoweth, 1990 - S10020205).

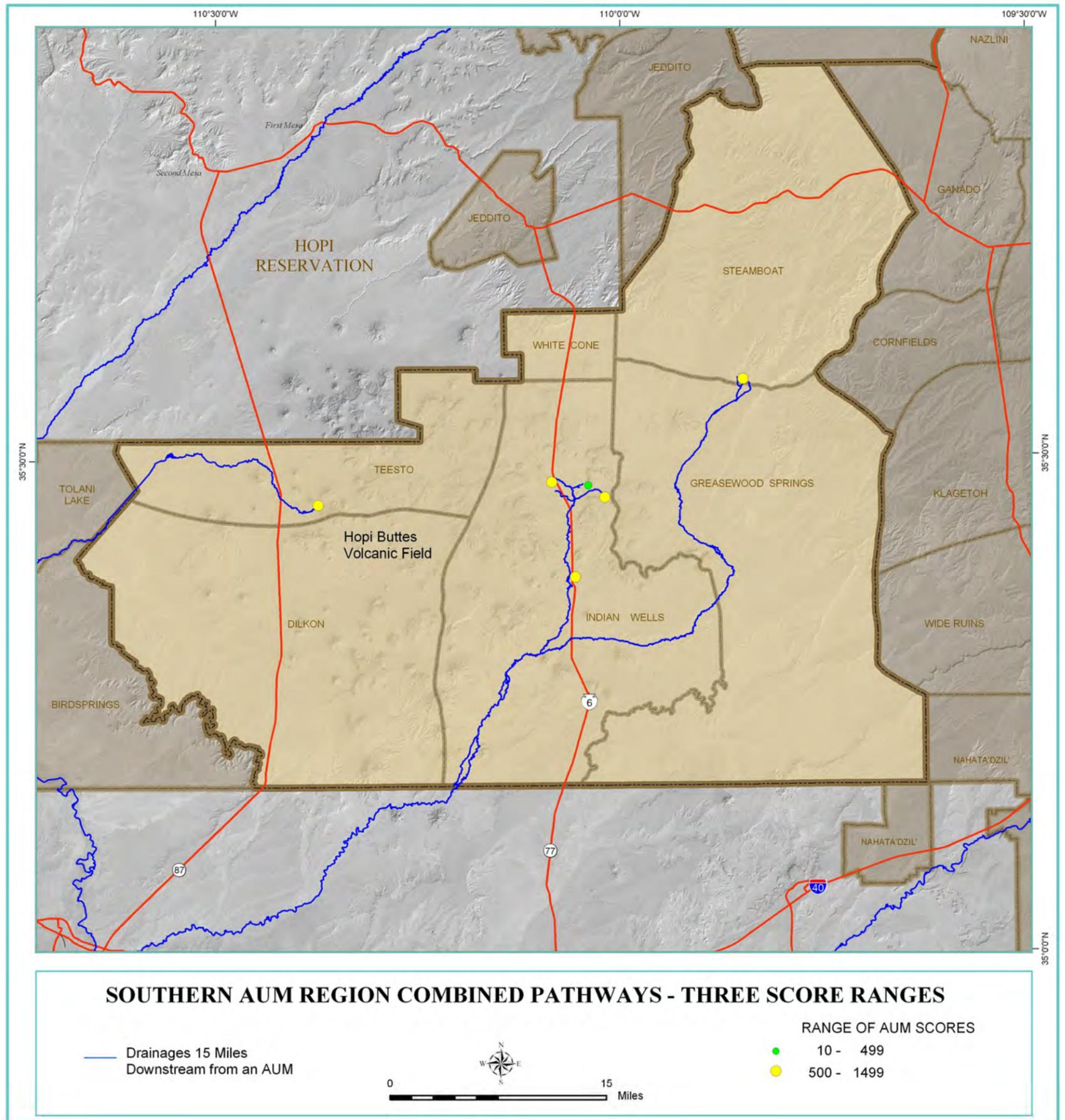


Figure 65. Southern AUM Region Combined Pathways Map with Three Score Ranges.

EASTERN AUM REGION SCREENING ASSESSMENT SCORE RESULTS

Much of the Eastern AUM Region is contained within the Grants Uranium District, the largest uranium producing area in the United States. Review of the Eastern AUM Region Combined Pathway Scores (Table 9) and Figure 66 “Eastern AUM Region Combined Pathways - Three Score Ranges” shows that there are twenty-four (24) AUM sites with scores that fall within the 1500 - 17,640 range. The highest scoring AUM site on the Navajo Nation is located in the Eastern AUM Region in the Crownpoint Chapter at the Crownpoint ISL (MAP-ID #E35). Since the primary HRS criteria are counts of structures and wells at specified distances from the AUMs, areas with high occurrences of homes and wells proximal to the AUM sites scored high. The highest scoring AUM in the Eastern AUM Region is an example of an AUM site that scored high (17,640) due to proximity of homes and wells (shown in pink on Figure 66). Conversely, remote AUM sites with sparse population and few wells score low. This can be seen in the generally low scores for the AUM sites in the Iyanbito and Smith Lake Chapters (shown in green on Figure 66).

The NE Church Rock mine (MAP-ID #E6) was the fifth highest scored AUM in the Eastern AUM Region (2,750). It was also the fifth highest producing mine on the Navajo Nation, with 3,398,648 tons of ore and 9,773,362 pounds of uranium. High scoring AUMs did not necessarily produce large amounts of uranium. An example is the highest scored Crownpoint ISL AUM (17,490), and the second highest scored Section 29-Conoco (5,850) with no uranium or vanadium production (McLemore et al., 2005 - S09290601). A mine site was developed at the Crownpoint ISL (see Figure 11 on page 18) and several warehouses and office buildings were constructed by Conoco in the 1970’s. Conoco completed at least 157 drill holes in the 1970’s, totaling about 316,750 drilled linear feet. Conoco began development of the uranium resource and constructed a plant facility, leach ponds, and three shafts were sunk to the mineralized horizons. Falling uranium prices in the early 1980’s resulted in the termination of the mine development. The mine plan called for underground extraction with surface processing (Myers, 2006 - S09300601).

Conversely, one of the more significant uranium producing mines in the Eastern AUM Region was the Dysart No. 1 AUM adjacent to the Haystack Chapter (MAP-ID #E59). The combined score for Dysart No. 1 was 540, but 891,922 tons of ore were mined, with 3,795,495 pounds of uranium and 47,438 pounds of vanadium produced (McLemore et al., 2005 - S09290601).

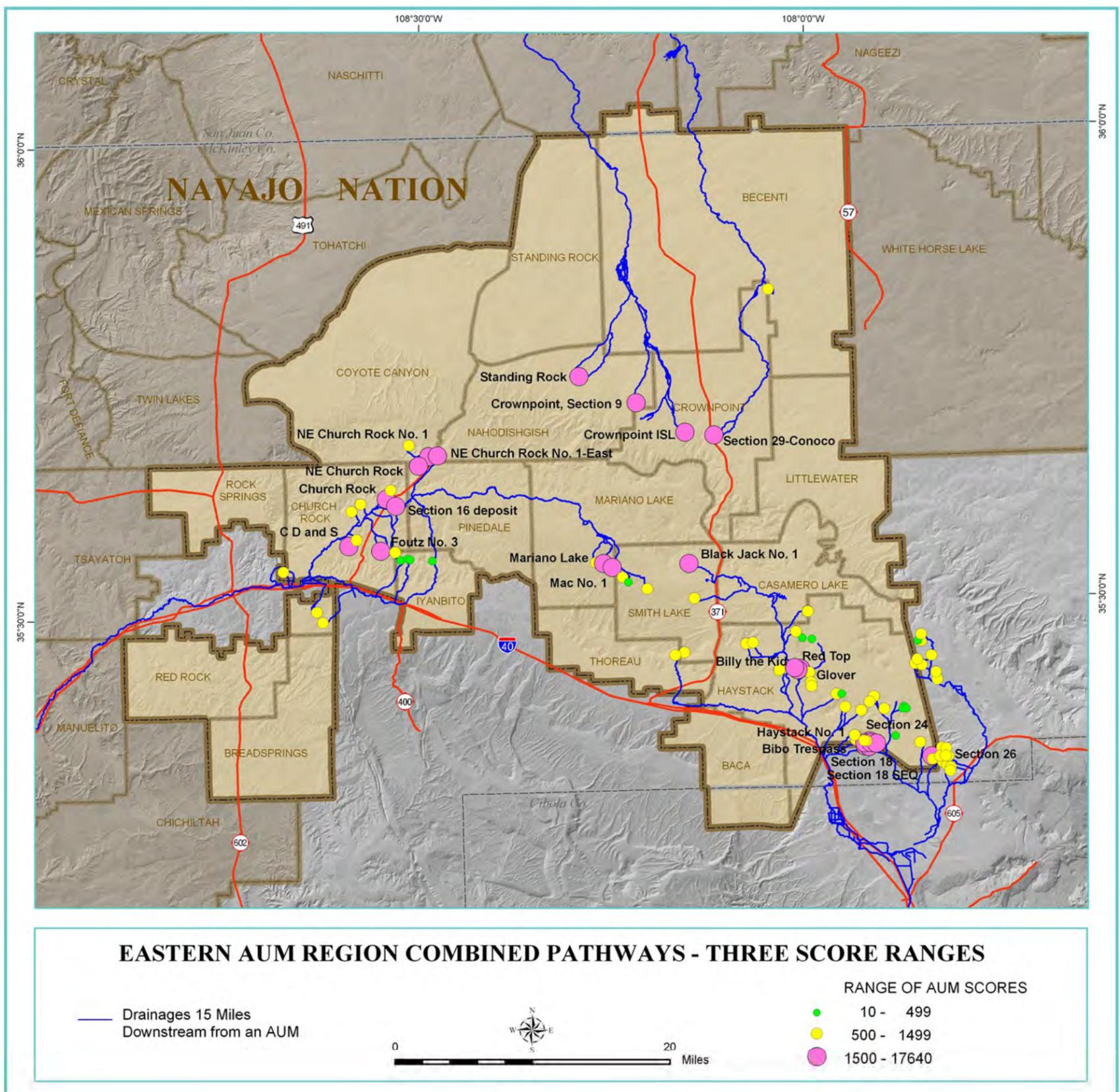


Figure 66. Eastern AUM Region Combined Pathways Map with Three Score Ranges.