3 WATER RESOURCE USES AND DESIGNATIONS

As the regulatory authority, OSM has the responsibility of assessing the potential impacts of the mining operation on the hydrologic balance, and to provide a determination for the potential to materially damage the hydrologic balance outside the lease area. Material damage implies that a quantifiable adverse degradation or reduction of surface or ground waters outside the lease area has occurred, resulting in the inability to utilize water resources for existing and foreseeable uses. Therefore, it is necessary to identify the existing and foreseeable water uses within the CIA's.

Surface and ground water within the CIA's will be evaluated for the following existing and foreseeable uses:

- Direct human use (including domestic and municipal water supply),
- Industrial water supply,
- Irrigation supply water,
- Livestock watering, and
- Aquatic and wildlife habitat

Multiple uses may be present at some locations. Tables summarizing use information within the surface Water and groundwater CIA's can be found in Appendix B, additionally Figure 12 shows all groundwater wells identified in the groundwater CIA and Figure 11 shows all surface water impoundments identified in the surface water CIA.

3.1 Direct Human Use

Within the surface water CIA Morgan Lake and the Chaco River from its mouth to the mouth of Dead Man's Wash are the only water bodies designated by the NNEPA for Primary Human Contact; all surface waters within the CIA are designated by the NNEPA for Secondary Human Contact. Primary Human Contact means use of water that causes the human body to come into direct contact with the water, typically to the point of submergence in the water body, or probable ingestion of the water, or contact by the water with membrane material of the body. Examples include ceremonial uses, swimming and water-skiing. Secondary Human Contact means the use of water which may cause the water to come into direct contact with the skin of the body but normally not to the point of submergence, ingestion of the water, or contact of the water with membrane material of the body, such contact would occur incidentally and infrequently, examples include boating and fishing (NNEPA 2007). Both Primary and Secondary Human Contact may occur during ceremonial or other cultural uses. Based on currently available information no cultural use waters have been identified within the vicinity of BNCC.

The Chaco River and all tributaries including the Chinde Wash and Cottonwood Arroyo are designated by the NNEPA for Fish Consumption. Fish Consumption means the use of water by humans for harvesting aquatic organisms for consumption. Harvestable aquatic organisms include, but are not limited to, fish, shell-fish, turtles, crayfish, and frogs. The lease does not contain any streams or ponds with fish, and Morgan Lake is the closest water body within the surface water CIA that provides a fishing habitat.

The closest surface water body to the mine designated by the NNEPA for domestic water supply is the San Juan River, which is outside of the surface water CIA. There are no surface water sources for municipal supply water within the CIA, however, the San Juan River, downstream of the BNCC lease area, is used as a municipal water source for Shiprock, NM. A hydrographic survey was conducted as part of an ongoing water rights settlement agreement between the State of New Mexico, the United States Federal Government, and the Navajo Nation. The survey did not distinguish between historic and current uses. The survey identified 59 impoundments within the surface water CIA that are used for municipal waste water treatment. These impoundments are supplied by local sewer systems and used for waste

settling. Of the 59 impoundments, 56 are west and/or south of the Chaco, and 3 are north of the Chaco and east of the Permit (United States of America 2011, Appendix D).

Within the groundwater CIA, the Burnham chapter was identified as a community whose water supply may be included for groundwater impact assessment. However, while the Burnham Chapter used to get their water from a nearby well, they currently have water piped in from the Carson/Huerfano area to the east, outside of the groundwater CIA. Additionally, the water withdrawn from the Carson/Huerfano area is from the Ojo Alamo aquifer, located well above the Fruitland formation. Therefore, although the Burnham Chapter is within the groundwater cumulative impact area, a specific water quantity assessment related to Burnham water use is not warranted since water used at this location is derived from a source outside the CIA. BNCC identified well #90 located west of Area V and the Chaco River completed in the PCS (BNCC 2011, Addendum 12-D-A). The hydrographic survey identified W-0312 east of the permit just south of the San Juan River, it is owned by the Navajo Tribal Utility Authority and W-0349 east of Area IV South along the Pinabete Arroyo (United States of America 2011, Appendix D). New Mexico State Engineer's Office Records and the USGS have identified SJ 00248 (G7, #6) in the alluvium of the San Juan River Northwest of the BNCC lease (Thorn 1993). BNCC also provides the community potable water at two locations, one near the Navajo North facilities and the other near the Area III facilities (BNCC 2011, Exhibit 11-168). These three community potable water locations are illustrated on Figure 12.

3.2 Industrial Supply Water

The Arizona Public Service (APS) Four Corners Power Plant (FCPP) and BNCC are the primary industrial water users within the CIA's. FCPP is a 2040-megawatt coal fired power plant, which has been operating since 1963. In addition to APS and BNCC, significant oil and gas extraction occurs within the San Juan Basin, including the Chaco Watershed. Oil and Gas extraction wells use groundwater and not surface water resources within the vicinity of the mine. A few gas wells were identified within the GW CIA just north and east of the BNCC permit. Gas extraction is the only industrial use of groundwater within the groundwater CIA.

Both APS and BNCC hold water rights on the San Juan River, and neither entity withdrawals groundwater for industrial uses. BNCC holds Surface Permit Number 2838 issued by the New Mexico Office of the State Engineer in October 1958 and supplies water to the Four Corners Generating Station, the San Juan Generating Station, and the Navajo Mine under this permit. This permit provides BNCC a total diversionary right of 51,600 acre-feet annually (~71 ft3/second), with a consumptive right of 39,000 acre-feet annually (~54 ft3/second), for waters drawn from the San Juan River. BNCC typically diverts and consumes 825 acre-feet annually (~1.14 ft3/second) at the Navajo Mine; APS typically diverts 35,421acre-feet and consumes 28,611 acre-feet annually (United States of America 2011, Table L-1).

Water diverted from the San Juan River is diverted to Morgan Lake [P-0016], which is the primary source of industrial water in the area, and is used by both BNCC and APS. NNEPA has designated Morgan Lake for primary and secondary human contact, fish consumption, aquatic wildlife and habitat, and livestock watering. Morgan Lake is a manmade reservoir approximately 1.2 miles wide and 2.2 miles long; it has a maximum depth of about 100 feet and a surface area of 1,260 acres at its maximum storage. Built in 1961 and operated by APS, Morgan Lake holds approximately 39,200 acre-feet of water at normal storage and 42,800 acre-feet of water at maximum storage. Water from Morgan Lake is used as cooling water at the Four Corners Generating Station and also for use in dust suppression and reclamation irrigation activities associated with the BNCC Lease Area. APS uses an ultra-filtration system to purify the water before using it to cool the turbines, and diverts a small portion for drinking water within the plant.

APS manages 11 impoundments west of BNCC which are supplied by industrial water from the power plant and used for industrial purposes [P-0430 through P-0440]. There are an additional 3 impoundments supplied by industrial sources just south of Morgan Lake [P-0022 through P-0024] (United States of

America 2011, Table K-1). BNCC manages several impoundments on the current lease area, as outlined in PAP Section 11.5.4 and summarized in Appendix C, from which they extract water for use in dust suppression. In addition to impoundments operated by APS and BNCC, 6 impoundments supported by the Navajo Indian Irrigation Project (NIIP) irrigation channel are used as a fish hatchery east of the Neck section of Area II of the BNCC permit [P-1430 through P-1435] (United States of America 2011, Table K-1). Although El Segundo Mine is partially within the surface water CIA, the water supply for the mine is from a groundwater well outside of the groundwater CIA. All of these impoundments within the immediate vicinity of the BNCC lease area can be seen on Figure 13.

3.3 Irrigation Supply Water

Groundwater is not used for irrigation within the groundwater CIA. However, there is significant use of surface water for irrigation within the surface water CIA. The closest surface water body to the mine to be designated by the NNEPA for agricultural water supply is the San Juan River. Water from the San Juan River is used for irrigation by NAPI, BNCC and Navajo Nation Fruitland-Cambridge irrigation projects within the vicinity of the mine site. The Fruitland-Cambridge project is just north of BNCC and has a diversion right of 18,180 acre feet per year and depletion right of 7,970 acre feet per year, however all fields on the southern edge of the San Juan drain into the San Juan and do not extend south into the Chaco watershed. Therefore, this project does not extend into the surface water CIA. BNCC operates an irrigation pipeline (initiated in 1975), which provides water from Morgan Lake for the irrigation of revegetation plots as part of the approved reclamation plan (BNCC 2011, Ch. 11). NAPI withdrawals water from the Navajo Reservoir. The Navajo Reservoir is approximately 33 miles east of Farmington, NM and well outside of the surface water CIA.

NAPI is part of the Navajo Indian Irrigation Project (NIIP). On June 13, 1962, Congress authorized the NIIP to furnish irrigation water to 110,630 acres of land with an average annual diversion of 508,000 acre feet of water. The initial 1962 project authorization allowed for development of 77,543 acres of land east and 33,087 acres west of the Chaco River. On September 25, 1970, following a reevaluation of the project, the site descriptions authorized by the original 1962 Act were amended to exclude the proposed irrigated lands west of the Chaco River and include additional townships east of the river such that all proposed irrigated 110,630 acres were east of the Chaco River (United States of America 2011). NAPI was created by the Navajo Tribal Council on April 16, 1970 (Moore 2006). NAPI has developed in stages and by blocks; eleven blocks of approximately 10,000 acres each were created (United States of America 2011). On April 10, 1976 Farm Block I received its first release of water (Moore 2006).

Today, the project is still under construction. Blocks 1 through 8 and the first six fields of Block 9 of NIIP have been completed and are operational. Since 1962, of the acres authorized for development, 79,760 acres have been developed and are subject to project irrigation. Blocks 1, 2 and 4 are east of Gallegos Canyon and outside of the surface water CIA. Block 3 is just east of Area I and II and well within the surface water CIA. Block 2 is just north and east of Block 3, and while part of it drains into the Bitsui watershed it is outside of the Chaco watershed (surface water CIA). Block 7 is just east of Block 3 and partially contained within the CIA. Block 8 and 9 are south of Block 7 and also partially contained in the CIA (United States of America 2011, Appendix E).

In addition to NAPI and BNCC impoundments, 77 impoundments are supplied by surface water sources, other than the San Juan River, which are used for irrigation within the surface water CIA. The 77 impoundments include diversions, in-channel impoundments, and off-channel impoundments. All 77 of these impoundments drain into the Chaco from the opposite side of the basin from BNCC and are located either west or south of the Chaco. Additionally there are 15 impoundments used for irrigation within the SW CIA that are supplied by groundwater or spring sources, all drain into the Chaco from the opposite side of the basin from BNCC and are located either west or south of the Chaco (United States of America 2011, Appendix F).

The hydrographic survey also identifies acreage associated with tributary irrigation project lands that utilize water from sources other than the Mainstem of the San Juan River (Figure 14). One project which irrigates by diversion of surface flows from the No Name Wash is just South of Area IV North, and east of the Chaco River. Two projects which also irrigate by diversion of surface flows from the Teec-ni-di-tso Wash are southwest of Area V and east of the Chaco River. None of these tributary irrigation projects have associated impoundments. The fourth tributary irrigation project is the R.L. Tanner project located north of the Chaco River and southeast of BNCC in the Lower De-na-zin Wash HUC-12 Watershed. The project has an associated reservoir and irrigates by diversion of surface flows from the De-na-zin Wash. All other tributary irrigation project lands are located either west or south of the Chaco on the opposite side of the basin from BNCC (United States of America 2011, Appendix E).

3.4 Livestock Supply Water

Livestock grazing has been and is currently the largest land use on Navajo Lands. Within the San Juan Watershed a variety of water sources exist to meet the demands of livestock. Surface water from the mainstem of the San Juan River and its tributaries has been, and continues to be, used for livestock purposes. In addition, groundwater sources are also utilized to meet livestock demands. On Navajo Lands within the San Juan Watershed, there are 650 wells and 138 springs that have been identified as serving livestock purposes. Finally, on Navajo Land, stock impoundments have been built or maintained to create an additional source of water for livestock. These stock impoundments are supplied with water and are filled and refilled annually to the extent that water is available. The United States has identified that the reserved water right associated with livestock grazed on the lands held in trust for the Navajo Nation is 304 acre feet per year (afy) of depletion (486 afy diversion). Additionally, the Navajo Nation water rights associated with stock impoundments on trust lands amount to 12,693 acre-feet of storage with the associated right to fill and refill these stock impoundments as water is available (United States of America 2011).

BNCC has completed an inventory of wells and springs within the permit and adjacent area (BNCC 2011, Appendix 6-E). The inventory was extended several miles beyond the Navajo Mine permit boundary and includes wells completed in the alluvium of the Chaco River and the San Juan River. The hydrographic survey conducted as part of the ongoing water rights settlement agreement also identified wells and springs used for livestock watering within the groundwater CIA (United States of America 2011).

All together thirty-nine wells used for stock watering were identified within the groundwater CIA. Three wells are located along the San Juan River north of the BNCC lease, two of these are specifically identified as alluvial wells [W-0695 (G-2), SJ 00264 (#7)], and the other well [W-0593] does not have an identified completion level. There are fifteen wells along the Chaco, nine of which are identified to be alluvial [W-0202, W-0607, W-0203, W-0204, W-0519, W-0645, 13-AW, GM-32], one is identified to be in the PCS [#90], and the other four [W-0342, W-0520, W-0538, W-0539] have unidentified completion levels. Two wells are located along Bitsui Wash, one east [W-0313] and one north [W-0603] of the lease, both have unidentified completion levels. One improved spring [S-0767] is located adjacent to the Chinde Wash east of the lease area. Two wells used for stock watering are located west of the lease area within the Cottonwood Arroyo alluvium [W-0618, W-0644]. Seven wells are identified along Pinabete Arroyo, 4 within the lease area [W-0343, W-0345, W-0344, W-0346] and 3 west of the lease boundary [W-0348, W-0349, GM-22], six are identified to be in the alluvium, and one has no identified completion level. There is one well within the lease area along No Name Wash which has no identified completion level [W-0606]. Six wells have been identified as used for stock watering along Brimhall Wash, none of which have identified completion levels [W-0314, W-0537, W-0540, W-0544, W-0545, W-0624]. There are an additional seventeen wells identified within the groundwater CIA with no identified use. Livestock watering is the primary use of groundwater within the CIA. The location of all referenced wells can be found in Appendix B and Figure 13.

All surface waters within the CIA are designated by the NNEPA for livestock watering use, including Morgan Lake. Surface water flows are used opportunistically by sheep or other livestock which might be in the vicinity when the channels are carrying water. However, livestock normally use stock watering ponds which have been constructed to catch surface flows. Surface water use adjacent to the El Segundo mine is confined to opportunistic use by ranchers for livestock watering (NMEMNRD 2008).

BNCC has conducted an inventory of the stock watering ponds within the permit and adjacent area (BNCC 2011, Exhibit 10-3). The inventory found 11 pre-mine stock ponds, which have been disturbed, or will be disturbed by mining. BNCC also identified 4 ponds west of Area II, 3 east of Area II, 2 west of Area III, and 11 east of Area III.

The hydrographic survey conducted as part of the ongoing water rights settlement agreement also identified stock ponds within and adjacent to the lease area (United States of America 2011). One in-channel impoundment [P-5378] was indentified east of Area II slightly south of Area I. Five impoundments were identified east of the Chaco, west of the Areas II and III, three in Chaco tributaries north of the Cottonwood [P-5358, P-5354, P-5305], one in a Cottonwood tributary south of the main fork [P-5294], and one in a Chaco tributary south of Cottonwood [P-0384]. Fourteen in-channel stock impoundments were identified east of Area II and III, six in the Chinde [P-0365, P-1769, P-0366, P-5352, P-0367, P-0354], two in the north fork of Cottonwood [P-5306, P-5318], one in the South Barber Arroyo [P-5344], and five in Lowe Arroyo [P-5325, P-5324, P-5323, P-5320, P-5316]. All referenced impoundment locations can be found in Appendix B and page 1 of Figure 13.

Additionally, twelve in channel impoundments were identified east of Areas III and IV North, in Cottonwood Arroyo and Cottonwood Arroyo tributaries [P-5318, P-0382, P-0355, P-0356, P-5311, P-0695, P-0691, P-0690, P-5280, P-5357, P-0700, P-0692]. South of Area IV North, 41 stock impoundments were identified; sixteen in-channel impoundments are within Pinabete Arroyo and Pinabete Arroyo tributaries [P-5274, P-5261, P-5233, P-5232, P-0350, P-0349, P-0348, P-5241, P-0346, P-0345, P-5262, P-0685, P-0688, P-0687, P-5250, P-0689], two in No Name Wash [P-0332, P-0342], and 23 in Brimhall Wash and Brimhall Wash tributaries [P-0337, P-0339, P-5192, P-5184, P-0341, P-5187, P-5190, P-5209, P-0343, P-5213, P-0344, P-0813, P-5180, P-0608, P-5183, P-0610, P-0611, P-0594, P-0593, P-5195, P-5189, P-0593, P-0591] (United States of America 2011, Appendix M). All referenced impoundment locations can be found in Appendix B and Figure 13.

Outside of the permit and adjacent area, 242 stock impoundments were identified northeast of the Chaco River on the same side of the watershed as BNCC; 205 are in-channel, two are off-channel, three are NIIP supplied, and one is a diversion. 791 stock impoundments were identified southwest of the Chaco River; 767 are in-channel, nine are off-channel, and fifteen are diversions (United States of America 2011, Appendix M). Additionally, BNCC provides water to local permitees in tanks for livestock use in areas around the lease, when requested (BNCC 2011, Section 11.6). Given the total number of stock impoundments, it is evident that livestock watering is the primary use of surface water within the CIA.

3.5 Aquatic and Wildlife Habitat Water Supply

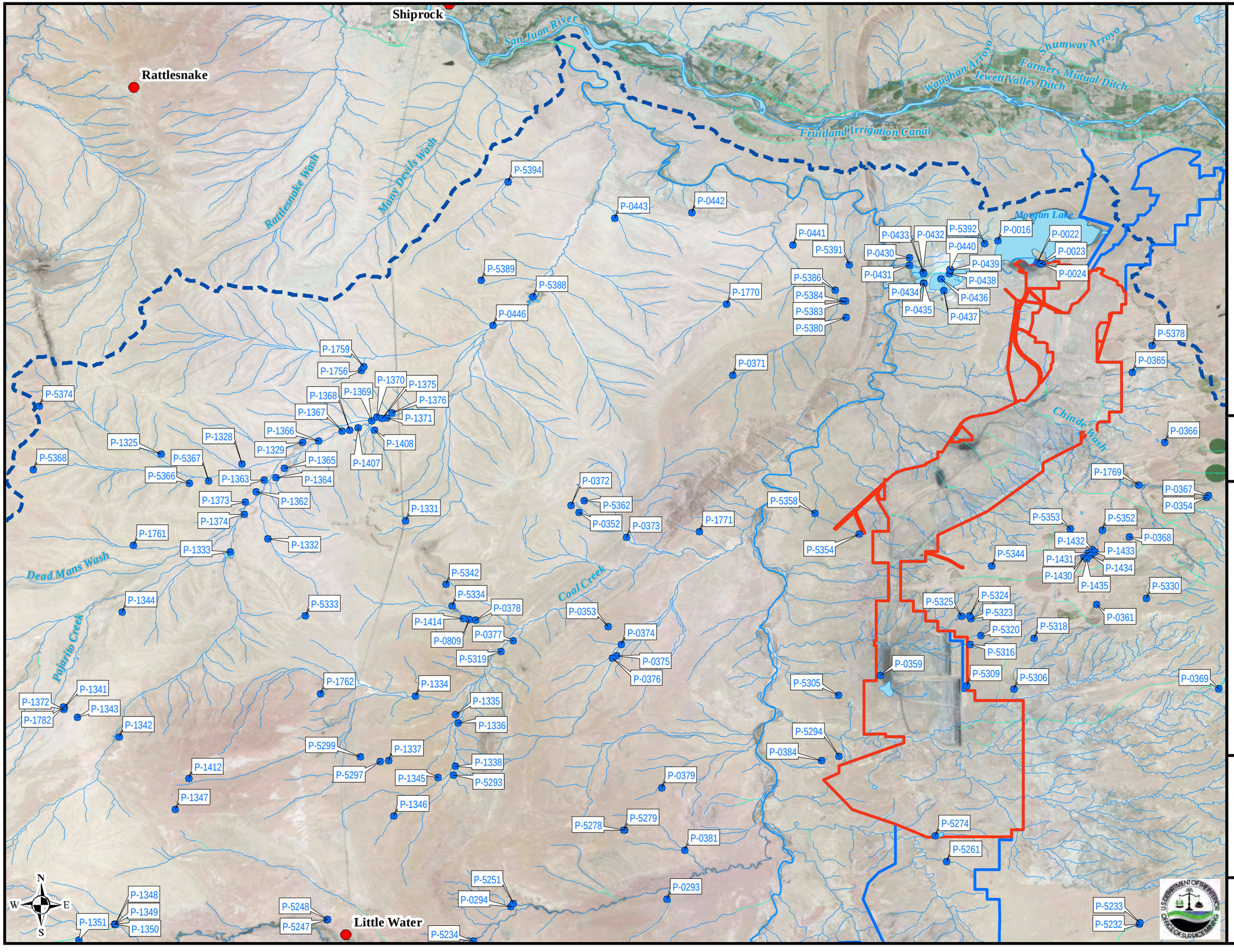
The Chaco River and all tributaries including the Chinde Wash and Cottonwood Arroyo are designated by the NNEPA for Aquatic & Wildlife Habitat use. The Aquatic and Wildlife Habitat designated use indicates that the water body supports use by animals, plants or other organisms, including salmonids and non-salmonids, and non-domestic animals (including migratory birds) for habitation, growth or propagation (NNEPA 2007).

All water sources are considered wildlife habitats, particularly in the arid region within which the Navajo Mine lease occurs. The vegetation around water sources may be more vigorous or comprised of different species than found in the surrounding area. The predominant wildlife water sources are ponds and impoundments on the lease and nearby areas. Of particular interest are three ponds located on pre-law

lands at the french drain discharge point in Area II, based on observations the ponds appear to be permanent year long features. Other small ponds only contain water after precipitation events and are dry most of the time; off lease stock ponds depend on runoff for their water supply. Wildlife and their habitats on and adjacent to the Navajo Mine lease have been surveyed during several studies conducted at various times since 1973 through 1987 and 1989. The lease does not contain any streams or ponds with fish, and Morgan Lake is the closet water body within the surface water CIA that provides fishing habitat. The scarcity of suitable water sources on the lease limits the potential habitat for amphibians. The lesser earless lizard, western whiptail, and sagebrush lizard were the most frequently observed reptiles on the lease (BNCC 2011, Ch. 10).

Waterfowl in the area use water sources such as stock ponds and impoundments on the lease opportunistically as they migrate through the area. Morgan Lake, which is located off lease but within the surface water CIA, provides more suitable waterfowl habitat than is available on the lease. Horned larks are by far the most abundant passerine bird species throughout the year. Other common breeding birds are mourning doves and rough-winged swallows. Mourning doves were the most frequently observed game bird, and mourning dove and waterfowl hunting is provided at Morgan Lake. Blue-winged or cinnamon teal were the most common species observed using the small ponds. White-faced ibis migrate through the region and are occasionally observed at stock ponds or other water sources. Raptors nesting within the lease and adjacent buffer zone during 1987 were ferruginous hawk, red-tailed hawk, American kestrel, and burrowing owl. One active ferruginous hawk nest was located on the lease and several were located within approximately one-quarter mile of the lease boundary. Three red-tailed hawk nests were located on the lease during 1987. Burrowing owls nested on several of the active and abandoned prairie dog colonies on the lease. Additional raptors nesting beyond the one-quarter mile buffer include ferruginous hawk, red-tailed hawk, golden eagle, prairie falcon, and barn owl (BNCC 2011, Ch. 10).

Mule deer are the only big game animal that has been reported on the lease, though they are infrequently observed. Deer mice and silky pocket mice are the most abundant small mammals throughout most of the habitats on the lease. Prairie dogs and kangaroo rats are relatively common on the upland habitats on the lease. Blacktailed jackrabbits and cottontails are common medium-sized mammals. Common predators include red fox, kit fox, coyote, and badger. The prairie dog colonies on the lease provide potential habitat for the endangered black-footed ferret, however, no black-footed ferret has been found during over 1000 hours of night spotlight surveys conducted on the lease. Other endangered species that may use the area are bald eagle and peregrine falcon. Neither of the species nests on the lease and no suitable nesting habitat for either of them occurs on the lease. Both species may occasionally use the area during the migration or winter periods. Other species of high interest that breed on the lease are ferruginous hawk and mountain plover (BNCC 2011, Ch. 10).



Legend

- Impoundments [1]
- Water Body [2]
- Permit Area
- Coal Lease Area
- Surface Water CIA
- Natural Stream [2]
- Artifical Path/Ditch [2]
- Population Centers

Data Sources:
Aerial Photography (Bing Mapping Service)
[1] Navajo Nation Hydrographic Survey (2010)
[2] USGS National Hydrography Dataset

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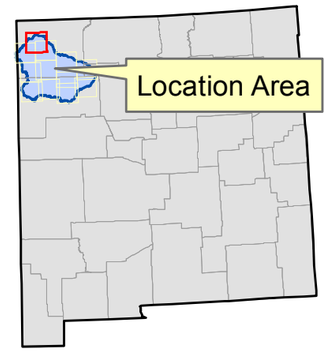
Miles

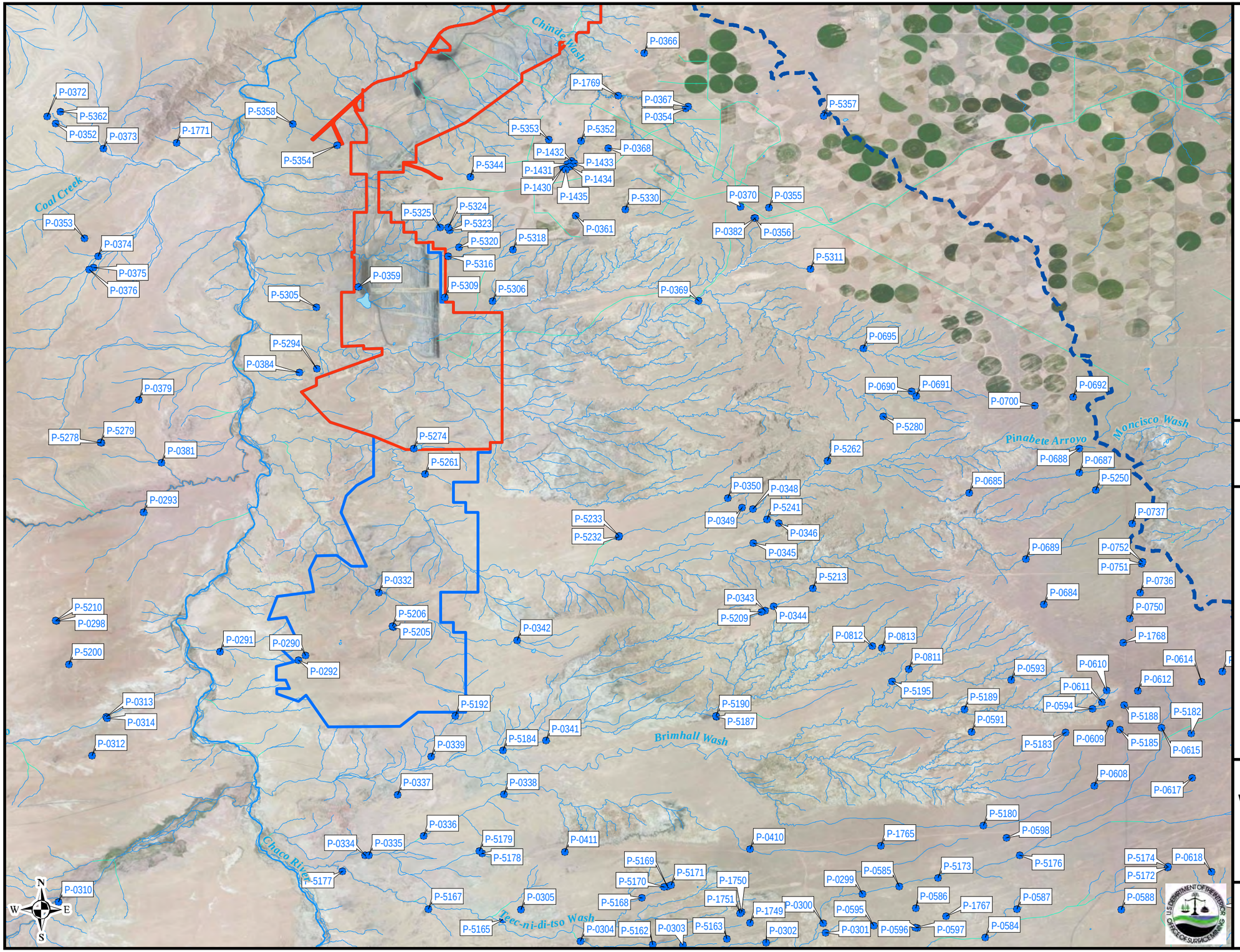


Coordinate System: GCS North American 1983
Datum: North American 1983
Units: Degree

Non-BNCC Surface Water Impoundments Within the Vicinity of Navajo Mine

Figure 13

(pg 1 of 2)



Legend

- Impoundments [1]
- Water Body [2]
- Permit Area
- Coal Lease Area
- Surface Water CIA
- Natural Stream [2]
- Artifical Path/Ditch [2]
- Population Centers

Data Sources:
Aerial Photography (Bing Mapping Service)
[1] Navajo Nation Hydrographic Survey (2010)
[2] USGS National Hydrography Dataset

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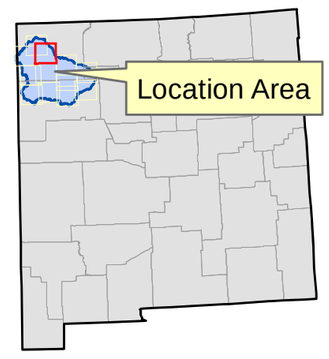

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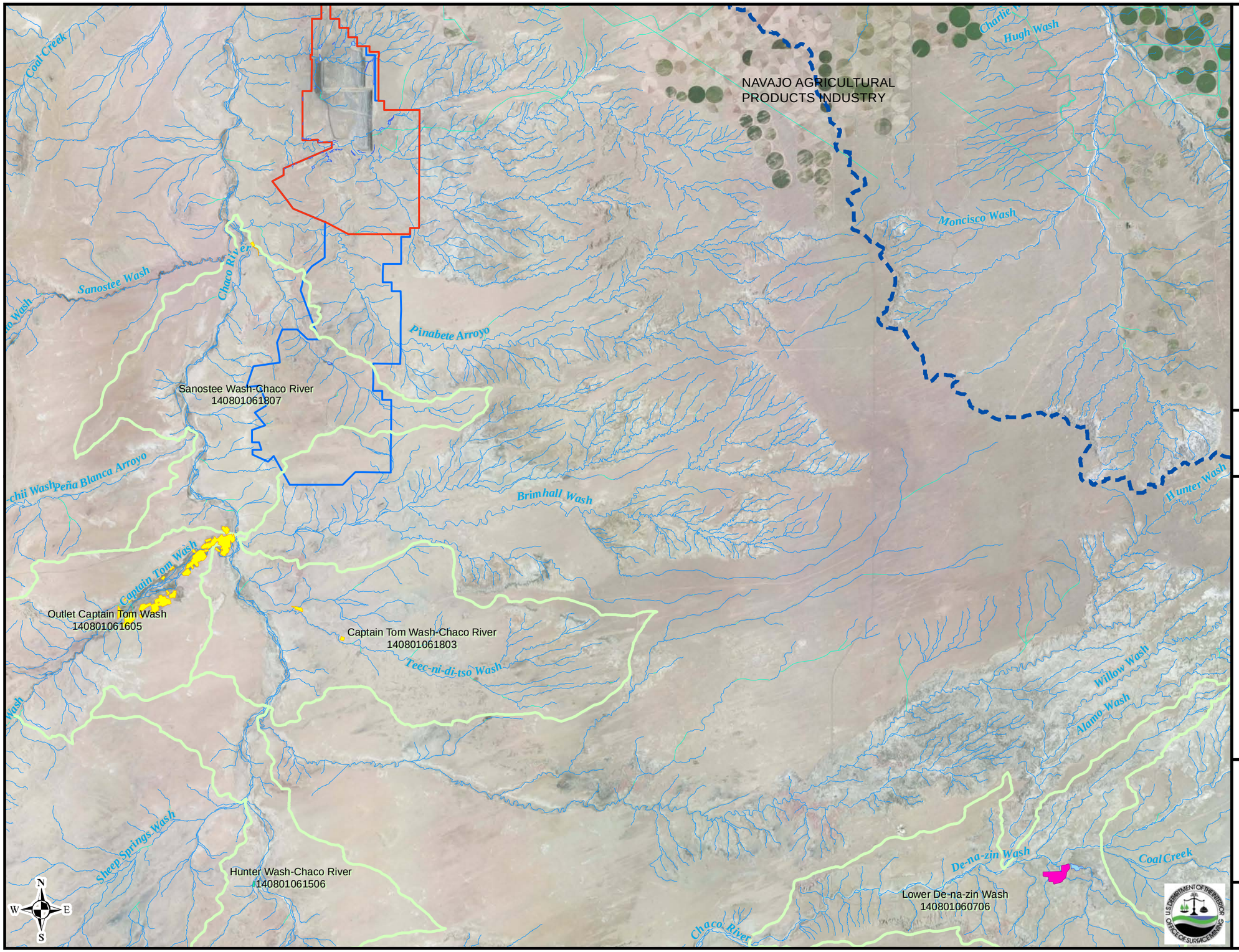
Non-BNCC Surface Water Impoundments Within the Vicinity of Navajo Mine

Figure 13
(pg 2 of 2)



Legend

Irrigation Type:

- Diversion with Reservoir[1]
- Diversion[1]
- Floodwater[1]
- Ponds & Reservoirs
- Natural Stream [2]
- Artifical Path/Ditch [2]
- HUC12 Watersheds[2]
- Surface Water CIA
- Permit Area
- Coal Lease Area

Data Sources:
Aerial Photography (Bing Mapping Service)
[1] Navajo Nation Hydrographic Survey (2010)
[2] USGS National Hydrography Dataset

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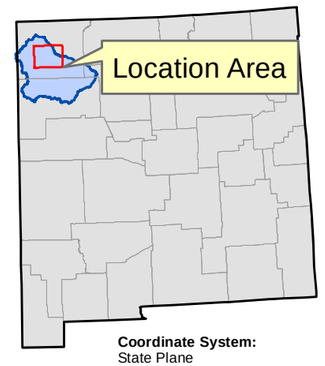
Miles



Coordinate System:
State Plane
North American Datum 1927
New Mexico West (FIPS 3003)
Feet

Navajo Mine CHIA
Select Tributary **Irrigation Project Lands**

Figure 14