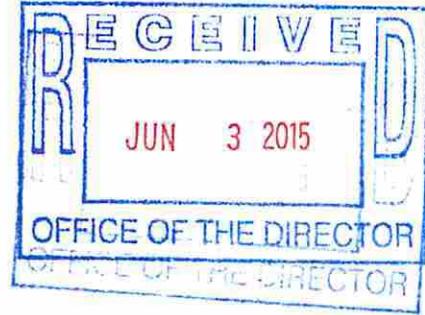


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12 **IN APACHE COUNTY SUPERIOR COURT**
13 **OF THE STATE OF ARIZONA**

14 IN RE: THE GENERAL ADJUDICATION
15 OF ALL RIGHTS TO USE WATER IN
16 THE LITTLE COLORADO RIVER
17 SYSTEM AND SOURCE

CIVIL NO. 6417

**THE HOPI TRIBE'S THIRD
AMENDED STATEMENT OF
CLAIMANT**

18 **Descriptive Summary:** The Hopi Tribe Files a Third Amended Statement of
19 Claimant.

20 **Number of Pages:** 50

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22 Water Resources by overnight delivery on June 2,
23 2015.

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1 I. INTRODUCTION

2 The Hopi Tribe submits its Third Amended Statement of Claimant
3 amending its original Statement of Claimant, filed November 3, 1986, its
4 Amended Statement of Claimant, filed January 29, 2004, and its Second
5 Amended Statement of Claimant, filed November 12, 2009. The Hopi Tribe
6 reserves the right to further amend or supplement its Statement of Claimant.

7 In submitting this Third Amended Statement of Claimant, the Hopi Tribe
8 does not waive its sovereign rights to the land and resources of the Hopi
9 Reservation or to other lands and resources owned by the Tribe. The Hopi
10 Tribe does not waive its right to change the use of its water rights or to seek
11 confirmation of additional water rights if the need for more water arises in the
12 future. The Hopi Tribe reserves right to administer its own water code, and in
13 filing this statement in no way submits to the jurisdiction of the State of
14 Arizona as to the control and administration of water decreed to the Hopi Tribe.

15 A significant portion of the water rights claimed by the Hopi Tribe relate
16 to anticipated future uses of water to maintain the Hopi Reservation as a
17 permanent homeland for the Hopi people. Proposals for future use are not
18 meant to indicate that the water right claimed must be used at the precise
19 proposed place or for the precise proposed purpose described. Instead, the
20 proposals demonstrate the quantity of water needed for the continued
21 development of the Hopi Reservation as a permanent homeland for the Hopi
22 people.

23 The Hopi Tribe's Third Amended Statement of Claim complies with the
24 requirements of the Arizona Revised Statutes and guidelines of the Arizona
25 Department of Water Resources (ADWR). Nevertheless, the ADWR and this
26

1 Court should evaluate the Tribe's water right claim with reference to federal
2 law, not state law. In this regard, the Court should bear in mind the following
3 admonition of the Arizona Supreme Court:

4 Indian rights are conferred by federal law, and it is the federal
5 substantive law which our courts must apply to measure those
6 rights in the state adjudication. Where state law conflicts, it must
7 give way. Our courts have neither the intention nor the power to
8 overturn the *Winters* doctrine or any other federal rule which
9 supports the Indian claims.

10 *United States v. Maricopa County Superior Court*, 144 Ariz. 265, 277
11 (1985)(internal citation omitted).

12 II. THE HOPI TRIBE'S STATUS AS A PARTY

13 The Hopi Tribe is a federally-recognized Indian tribe whose Reservation is
14 located within the Little Colorado River basin, in northeast Arizona. Since time
15 immemorial the Tribe has resided in the Little Colorado River basin using the
16 waters of the Little Colorado River, its tributary streams and washes, and the
17 groundwater of the basin. The Hopi Tribe has a paramount interest in these
18 waters, and the United States, as its trustee, also has filed a claim on the Hopi
19 Tribe's behalf. Nevertheless, the United States has a conflict of interest
20 representing the Navajo Nation as well as the Hopi Tribe. Consequently, the
21 Hopi Tribe intervened in this proceeding to present its own claim in addition to
22 the claims being presented for it by the United States.

23 A tribe's right to speak for itself in a general stream adjudication is firmly
24 established. *Arizona v. California*, 460 U.S. 605, 612-616 (1983). The Court
25 granted the Hopi Tribe's motion to intervene on April 30, 1985, finding that the
26 Tribe's interests were not adequately represented by existing parties. See Ariz.
R. Civ. Proc. 24.

1 III. **THE HOPI TRIBE'S HISTORY IN THE LITTLE COLORADO BASIN**

2 The Hopi are a Puebloan people who speak Hopi, except for one village
3 where Tewa is also spoken. The Hopi language belongs to the Uto-Aztecan
4 language family. It is related to Shoshone, Ute, Paiute, Piman, and Nahuatl
5 (the language of the Aztecs). The Hopi are the only Pueblo people to speak a
6 Uto-Aztecan language. By all accounts, the Hopi are an ancient people with
7 one of the oldest cultures in North America. Archaeological evidence indicates
8 that present day Hopi are descendants of the ancient Basketmaker culture that
9 existed in the Four Corners area after A.D. 100. Oraibi, a Hopi village on Third
10 Mesa, was founded by 1150 A.D., and has been continuously occupied since
11 then.

12 The Hopi people are composed of more than thirty clans that migrated
13 throughout the Southwest before reaching and settling on the Hopi Mesas, the
14 great majority in prehistoric times. Numerous Ancestral Pueblo ruins that dot
15 the Little Colorado River watershed are ancestral sites to specific Hopi clans.
16 Members of these clans continue to visit their ancestral sites for ceremonial
17 purposes (such as collecting eagles, and other resources, including
18 spring-water) throughout the Tribe's ancestral homeland, which tribal
19 members refer to as *Hopitutskwa*. The archaeological record thus confirms
20 more than 2,000 years of continuous, uninterrupted occupation of the Hopi
21 area culminating in the lifeway of the contemporary Hopi people.

22 The prehistoric Hopi were sedentary people who lived in large villages on
23 the valley floor, terraces, and tops of three mesas on the Colorado Plateau.
24 They were highly successful farmers who produced maize, beans, melons,
25 squash, and other crops by utilizing a variety of farming techniques. Hopi field
26

1 types included flood-water fields, akchin fields at the mouths of arroyos, sand
2 dune seepage fields, irrigated terraces fed by springs, and irrigated fields fed by
3 canals and reservoirs. Each of these field types took advantage of the relatively
4 scarce water available in the Little Colorado Basin. The Hopi also hunted game
5 and gathered native seeds and plants to supplement their agrarian lifestyle.
6 Livestock production became an important part of the Hopi economy during
7 the Spanish era, circa 1540-1680.

8 The court in *Healing v. Jones* concluded that "[n]o Indians in this country
9 have a longer authenticated history than the Hopis." *Healing v. Jones*, 210 F.
10 Supp. 125, 134 (D. Ariz. 1962), *aff'd*, 373 U.S. 758 (1963) (per curiam). The
11 court cited as a prime example a 1540 encounter by a detachment of the
12 Spanish explorer Coronado that "found the Hopis living in villages on mesa
13 tops, cultivating adjacent fields, and tending their flocks" *Id.* The period of
14 Spanish colonization in the Southwest provides the earliest written accounts of
15 life in the Southwest and provides extensive evidence of Hopi existence in the
16 area as well as their agrarian lifestyle.

17 For example, the mid-sixteenth century Coronado expedition referenced
18 in *Healing v. Jones* is discussed in GEORGE P. HAMMOND & AGAPITO REY,
19 NARRATIVES OF THE CORONADO EXPEDITION 1540- 1542, 215-16 (U.N.M.
20 Press, 1940), which chronicles the first Spanish contacts with the Hopi.
21 According to the account, the Coronado expedition set out to explore the
22 northern reaches of New Spain and encountered the Hopi and found them to
23 be living in well-established villages. The Hopi presented the Spaniards with
24 gifts of food and cloth, including corn meal, squash and fresh corn, and
25
26

1 accompanied them on their expedition, eventually leading them to the Colorado
2 River and the Grand Canyon.

3 It became readily apparent to these explorers that water was vital to Hopi
4 needs. In a letter to the Viceroy of New Spain, Coronado stated that,

5 [s]o far as I can find out, the water is what these Indians worship,
6 because they say that it makes the corn grow and sustains their
7 life, and that the only other reason they know is because their
8 ancestors did so.

9 George P. Winship, *The Coronado Expedition, 1540-1542, Part 8, reprinted in*
10 *14th ANN. REP. OF THE BUREAU OF ETHNOLOGY (1896)*. The Spanish found
11 that the Hopi grew crops using irrigation from springs, flood irrigation from the
12 washes, run-off from the hills and by plantings in sand dunes. In this regard,
13 it was noted that Hopi villages were situated so as to take advantage of the
14 considerable surface and groundwater run-off of Black Mesa and other areas.
15 Significantly, the Coronado expedition mentioned no other Indians as being
16 settled in the areas explored.

17 A subsequent Spanish expedition later in the sixteenth century also
18 encountered the Hopi. GEORGE P. HAMMOND & AGAPITO REY, *THE*
19 *REDISCOVERY OF NEW MEXICO 1580-1594, 190-91 (U.N.M. Press, 1966)*.
20 Again, the Hopi greeted the expedition with hospitality and gifts of food and
21 pieces of cloth. The Spanish noted Hopi success in agriculture by observing
22 that “[t]he natives cultivate sandy places without difficulty.” *Id.* They also
23 noted that the Hopi made use of the natural springs and wells in the area. The
24 expedition reported an instance where a camp established close to a well that
25 ran dry, “the natives brought us some [water] for the animals, in gourds and
26 kettles, from other wells.” *Id.* Furthermore, this expedition visited a number of

1 Hopi villages, including Shongopavi and Mishongnovi on Second Mesa, and
2 Oraibi on Third Mesa.¹

3 Experts estimate the Hopi population in the area to have exceeded
4 29,000 in the early sixteenth century, although the experts believe the
5 population dropped dramatically due to a smallpox epidemic to between 8,000
6 and 10,000 by the time the Spanish arrived in 1540. Thus, the earliest
7 accounts of Spanish exploration throughout the Little Colorado River basin
8 document a substantial Hopi population supported by a successful agrarian
9 lifestyle. In none of these early reports is there any mention made of Navajo or
10 other Indians settled near the Hopi or interfering with their use of land or
11 water.

12 The documented accounts of Hopi existence and agrarian lifestyle
13 continue uninterrupted for at least 300 years following the initial sixteenth
14 century Spanish expeditions. For instance, the period of Spanish colonization
15 was marked by numerous missions into this area in an attempt to convert the
16 Hopi to Christianity. The missionaries described the Hopi as having their own
17 government and religion, living in villages and farming their lands in the same
18 manner found by the early expeditions. In none of these reports are Navajo
19 described as living in this area or using its water.

20 Moreover, Hopi rights to occupation and use of the land and water were
21 specifically recognized and upheld under Spanish law during this period. The
22 *Recopilacion de leyes de los Reynos de las Indias* governed Spanish treatment
23 of natives within New Spain and expressly preserved native rights to land and
24

25 ¹ As with the previous expedition, no other Indians are mentioned as having settled in the
26 area of the Hopi.

1 water. The language of this body of law was unmistakable in its intent to
2 preserve native rights in this regard. For instance:

3 We order that the same regulation followed by the Indians in
4 dividing and distribution of water shall be observed and followed
5 by the Spaniards among whom lands are apportioned and
6 assigned. For this reason the same natives who were previously in
7 charge shall manage watering of the lands; and the water that each
8 must have shall be given to each one in turn. Penalty for violation
of this regulation shall be that he who wants, takes and uses the
water by his own authority shall be deprived of it until all those in
line after him have watered the lands assigned to them.

....

9 We command that no change be allowed in this regard, and that
10 they keep them as they did before their reduction so that they may
cultivate their lands and profit from them.

11 THE INDIAN CAUSE IN THE SPANISH LAW OF THE INDIES, *reprinted in*
12 WESTERN CIVILIZATION AND NATIVES PEOPLES, OCCASIONAL Paper No.
13 16, at 111 (S. Lyman Tyler ed., American West Center, Univ. Utah, 1980).

14 The legal protection afforded the Hopi under Spanish rule was carried
15 forward under Mexican rule. See G. Emlen Hall & David J. Weber, *Mexican*
16 *Liberals and the Pueblo Indians, 1821-1829*, 59 N.M. HIST. REV. 1 (1984). As
17 such, Indians, including the Hopi, were treated as citizens of Mexico. Later,
18 when the area came into the United States, Hopi rights were protected by the
19 Treaty of Guadalupe Hidalgo. The Treaty stated:

20 Mexicans who, in the territories aforesaid, shall not preserve the
21 character of citizens of the Mexican republic, conformably with
22 what is stipulated in the preceding article, shall be incorporated
23 into the Union of the United States, and be admitted at the proper
24 time (to be judged of by the Congress of the United States) to the
25 enjoyment of all the rights of citizens of the United States,
according to the principles of the constitution; and in the
meantime shall be maintained and protected in the free enjoyment

1 of their liberty and property, and secured in the free exercise of
2 their religion without restriction.

3 Treaty of Guadalupe Hidalgo, February 2, 1848, art. IX, 9 Stat. 922. Thus, the
4 United States protected the property rights, including water rights, of the Hopi
5 by the Treaty of Guadalupe Hidalgo in 1848.

6 IV. HOPI LANDS

7 A. The Hopi Tribe's Ancestral Homeland.

8 The Hopi Tribe's ancestral territory far exceeded those lands belonging to
9 the Hopi Tribe today. *Hopitutskwa* encompasses the entire Little Colorado
10 River watershed from its confluence with the Rio Puerco River west to its
11 confluence with the Colorado River. The Hopi people and their ancestors have
12 used or occupied nearly all of the Little Colorado River drainage basin in
13 Arizona over nearly twenty centuries. E. Charles Adams, *Hopi Use and*
14 *Development of Water Resources in the Little Colorado River Drainage Basin of*
15 *Arizona: An Archeological Perspective to 1700* 3 (2009). They have inhabited the
16 area between Navajo Mountain in the north to the Little Colorado River in the
17 south and between the San Francisco Mountains and the Luckchukas since
18 before 1300 A.D. *Hopi Tribe and Navajo Tribe v. United States*, 23 Ind. Cl.
19 Comm. 277, 292-93 (1973).

20 The Hopi Tribe retains aboriginal title to a portion of its ancestral
21 territory. Former Land Management District 6 ("District 6") is an area of land
22 located inside the boundaries of the 1882 Hopi Reservation (see below). The
23 federal courts have recognized exclusive Hopi title to District 6 during extensive
24 litigation that Partitioned the 1882 Reservation between the Hopi Tribe and the
25 Navajo Nation. See, e.g., *Healing v. Jones*, 210 F. Supp. 125 (D. Ariz. 1962)
26 ("*Healing II*"). In *Hopi Tribe and Navajo Tribe v. United States*, 23 Ind. Cl.

1 Comm. 277, 305-306 (1973), the Indian Claims Commission found that the
2 Hopi Tribe retained Indian title to District 6 lands. The federal reserved rights
3 doctrine recognizes aboriginal rights that pre-exist the creation of a reservation
4 and preserves such rights as part of the water rights reserved to serve the
5 purpose of the reservation. *See, e.g., United States v. Winans*, 198 U.S. 371,
6 381 (1905) (preserving a tribe's aboriginal rights); *Winters v. United States*, 207
7 U.S. 564 (1908) (recognizing aboriginal control over resources); *United States v.*
8 *Adair*, 723 F.2d 1394, 1414 (9th Cir. 1983) (recognizing and preserving
9 aboriginal water uses with a priority date of time immemorial). The Hopi
10 Tribe's water rights priority date precedes the establishment of the reservation
11 areas described below because the Hopi people continue to inhabit their
12 ancestral homeland.

13 **B. 1882 Executive Order Reservation.**

14 The President of the United States by Executive Order of December 16,
15 1882, set aside a reservation of some 2.5 million acres for the use of the Hopi
16 Indians "and such other Indians as the Secretary [of the Interior] may see fit to
17 settle thereon." This 1882 Reservation was only a portion of the land
18 traditionally and actually occupied by the Hopi Indians. One of the primary
19 purposes of the reservation was to protect the Hopi from incursions by Navajo
20 into Hopi land. Navajo incursions continued, however, and in *Healing v. Jones*,
21 the court held that by actions beginning in 1931 the Secretary settled certain
22 Navajo Indians in the Hopi Reservation. *Healing v. Jones*, 210 F. Supp. at 169.
23 The *Healing* court recognized that District 6 was being held exclusively for the
24 benefit of the Hopi Tribe and the remainder was recognized as a "Joint Use
25 Area" for both the Hopi Tribe and the Navajo Nation.

1 The Joint Use Area was later partitioned in accordance with the Act of
2 December 22, 1974, Pub. L. No. 93-531, 88 Stat. 1712 (codified as amended at
3 25 U.S.C. § 640d -24). The partition divided the 1882 Reservation joint use
4 area into Hopi Partitioned Lands (HPL) and Navajo Partitioned Lands (NPL).
5 The 1974 Act provides that partition of the surface shall not affect the joint
6 ownership "of the coal, oil, gas, and all other minerals within or underlying
7 such lands." 25 U.S.C. § 640d-6.

8 The Reservation is characterized by mesa and canyon topography.
9 Generally, the mesas range from 5,000 to 6,700 feet in elevation above sea
10 level. All the population centers are located in this elevation range. The
11 highest area on the Reservation is in its northeast corner, near Low Mountain,
12 at an elevation of 6,700 feet above sea level. The Hopi lands are dominated by
13 three mesas: First, Second, and Third Mesas. The major population centers of
14 Walpi, Sichomovi, Tewa, Polacca, Shungopavi, Mishongnovi, Shipaulovi, Oraibi,
15 Kykotsmovi, Bacavi, Hotevilla and Keam's Canyon are located on or near the
16 mesas. Spider Mound is a newer community located on the eastern portion of
17 the Reservation. Tawaovi is a new community north of Second Mesa. The
18 valleys separating the mesas slope gently from northeast to southwest toward
19 the Little Colorado River.

20 The Hopi lands are located in the Black Mesa drainage, and all streams
21 and washes are tributary to the Little Colorado River. Major streams and
22 washes on the reservation include: Dinnebito Wash, Oraibi Wash, Jeddito
23 Wash, Polacca Wash, Moenkopi Wash and Wepo Wash. These washes are
24 primarily ephemeral. However, each wash has limited perennial or intermittent
25 reaches supplied from springs.

26

1 **C. Moenkopi Island**

2 By Act of June 14, 1934, 48 Stat. 960 (codified at 25 U.S.C. § 640d-7),
3 Congress set aside for the Navajo “and such other Indians as were already
4 ‘located’ thereon” an additional area of land outside the boundaries of the 1882
5 Hopi Reservation. The 1934 Act authorized the Hopi Tribe to bring suit to quiet
6 title to lands it occupied in the area in 1934. Pursuant to that Act the Hopi
7 Tribe brought an action in the federal district court to establish the Tribe’s
8 right to the 1934 Reservation. The court subsequently declared that portions
9 of the 1934 Act area belong to the Hopi Tribe, including the Villages of Upper
10 Moenkopi and Lower Moenkopi and surrounding areas. *See Masayeva v. Zah,*
11 *65 F.3d 1445 (9th Cir. 1995).* The United States holds these lands in trust for
12 the benefit of the Hopi Tribe and the Hopi Tribe exercises exclusive jurisdiction
13 over the lands under federal law.

14 The Moenkopi portion of the Hopi Reservation, also referred to as
15 Moenkopi Island, is located at 5,000 feet in elevation above sea level along the
16 floodplain of Moenkopi Wash. Moenkopi Island includes a reach of Moenkopi
17 Wash. The wash flows across both the 1882 Reservation and the 1934 Act
18 Reservation and is ephemeral with limited perennial reaches supplied by
19 springs.

20 **D. Hopi Industrial Park, Hopi Ranches and Other Hopi Lands**

21 The Hopi Tribe re-acquired portions of its aboriginal lands located
22 outside of the Reservation lands discussed above. Pursuant to orders of this
23 Court and the delineated scope of this HSR, however, the Hopi Tribe will not
24 update claims for lands outside of the “main reservation” as defined by ADWR
25
26

1 in this statement of claimant.² The Hopi Tribe claims time immemorial water
2 rights to service these lands as fully as if the land had never left Hopi use,
3 occupation, and control.

4 V. WATER IN HOPI CULTURE

5 Water is the essence of Hopi secular and religious philosophy. It is hard
6 to imagine anything more sacred -- as substance or symbol -- than water in
7 Hopi religious thought and practice. Intrinsic to other religious
8 representations, and underlying much other symbolism in the panoply of Hopi
9 ritual, is the concern with water. "Springs, water, and rain are focal themes in
10 ritual costumes, kiva iconography, mythological narratives, personal names,
11 and songs, which call the clouds and rain from the varicolored directions to
12 bear their fructifying essence back into the cycle of human, animal, and vegetal
13 life." PETER WHITELEY, THE IMPORTANCE OF THE LITTLE COLORADO RIVER DRAINAGE
14 AND ITS WATER RESOURCES TO THE HOPI 24 (April 2005). That essence -- as
15 clouds, rain, and other water forms -- manifests the spirits of the dead. When
16 people die, in part they become clouds; songs call to the clouds as ascendant
17 relatives. Arriving clouds are returning ancestors, their rain both communing
18 with and blessing the living. The waters of the earth (where Katsina spirits live)
19 are, then, transubstantiated human life.

20 Hopi clan migration histories represent a pattern that is reiterated
21 dramatically in ceremonial performance. As a part of ceremonies, priests and
22 ordinary initiated members revisit the ancestral sites and collect their
23 resources, including water from springs. In this fashion they re-consecrate the
24

25
26 ² See *infra* Section VIII discussion regarding scope of Amended Statement of Claimant.

1 world, conceived as connected from all directions to the Hopi center,
2 throughout the landscape over which Hopi clans maintain a continuing claim.

3 Its mythological history and the re-enactment of this in ceremony or the
4 reiteration of it in tradition constitute crucial features of clan identity in Hopi
5 thought. The Orayvi Bow clan, or others associated with the Hopi *Sa'lako*,
6 revisits several shrines (like the *Sa'lako* spring in Pasture Canyon) and other
7 localities associated with its migration route each time the ceremony is
8 performed and gathers its resources for the ceremony. Similarly, the Water
9 clan continues to return to springs in the south to bring in water and
10 associated resources, especially with regard to *Kwanwimi*, the One Horn
11 ceremony. A significant number of the sites visited for ceremonial purposes are
12 found in direct proximity to the Little Colorado River, or its tributary drainages
13 -- on *both* sides of the river, not merely the northern/eastern side.

14 The documentary record shows that ceremonies continue actively into
15 the present, and draw, in an unbroken pattern since anthropologists first
16 recorded these activities in the late nineteenth century, upon the ancestral
17 estates along the clan's migration route. For example, the Snake clan
18 introduced the Snake ceremony to the Hopi community from Tokònavi
19 (villages in the Navajo Mountain area), the Flute clan brought the Flute
20 ceremony from Lenaytupqa (Tsegi Canyon area) and Lengyan'ovi (on northern
21 Black Mesa), the Badger clan introduced the Powamuy ceremony from Kiisiwu
22 (in the northeastern corner of Black Mesa) and Mesa Verde, the Water clan
23 brought the One Horn ceremony from its villages in the south, and so on.
24 Fourteen Hopi religious orders continue to practice actively into the present.

25
26

1 As noted, the present Hopi Reservation boundaries are neither a
2 reflection of Hopi interest in, nor of actual documented use of the broader
3 landscape. Late nineteenth century ethnographer Walter Hough recorded that
4 the wide-ranging extent of Hopi knowledge of environmental resources was
5 exceptional among American Indians:

6 The Hopi are assiduous collectors. A catalogue of the substances
7 brought to their pueblos from long distances would awaken
8 surprise...Every house is a museum of the environment, with
9 specimens from the mineral, animal, and vegetal kingdoms, and
10 every Hopi is a repository of knowledge as to places where
11 materials may be secured. Time and distance are little thought of
12 when it comes to procuring the materials desired (Hough
13 1900:465).

14 Describing a specific 400-mile round-trip for moccasin-dye extracted from
15 birch bark in an area south of the San Francisco Peaks, Hough observes:

16 These journeys are common, for the Moki [Hopi] is no stay-at-
17 home, but roams far beyond the widest view from the high vantage
18 ground of his village, visiting the former seats of his people of by-
19 gone centuries. Thus he knows the flora and fauna over a wide
20 region, and is as much at home in the White Mountains as on the
21 Great Colorado. In former times, he may have journeyed to the
22 Gulf of California for precious sea-shells, to be used as ornaments
23 and for ceremonial trappings, or made long quests for the much
24 prized turquoise, just as he now goes to the Coconino canyon
25 [Cataract Canyon] for baskets or deerskins. His face is familiar at
26 Zuni, where he fares often on a neighborly visit (Hough 1898:138).

Both the Indian Claims Commission hearings in 1962 on Hopi land use, and
the 1934 Reservation legal proceedings have extensively documented Hopi
resource use - for hunting, gathering, farming, grazing of sheep, horses, and
cattle, and for collection of religious-use resources- throughout a large area
away from the mesa-top villages of the Hopi residences. In the Indian Claims

1 Commission case, the map of aboriginal claim prepared by the government's
2 own expert, Professor Florence Ellis, identified exclusive Hopi aboriginal
3 interest in an area that encompassed a large part of the Little Colorado River
4 watershed.

5 Water is important to the Hopi also as a critical element in agriculture.
6 Farming is an important part of Hopi identity. Agriculture has historically
7 been at the center of the Hopi economy and has served as an important source
8 of food and materials needed for Hopi religious life. Wherever the Hopi have
9 lived throughout the Little Colorado River basin, they have engaged in
10 agricultural pursuits. For example, the archeological record confirms that the
11 Hopi engaged in substantial farming at Homolovi, an historical village on the
12 Little Colorado River. Agriculture continues to serve these vital functions in
13 Hopi life today.

14 **VI. LEGAL BASIS FOR THE TRIBE'S WATER RIGHTS**

15 A. As a sovereign, long predating the United States, and the historic
16 guardian of its lands, the Hopi Tribe claims under its own retained sovereignty
17 the right to all groundwater and surface water in, on, or serving lands owned
18 by the Hopi Tribe or allotted or assigned to its members, or may hereafter be
19 recognized as belonging to it or its members. Specifically, the Hopi Tribe
20 claims a time immemorial priority date for lands within the 1882 Reservation
21 where the Tribe retains aboriginal title. The Hopi Tribe also claims a time
22 immemorial priority date for Moenkopi Island on the basis of its actual,
23 continuous beneficial use of water on lands occupied by the Hopi Tribe and its
24 ancestors.

1 B. As the owner of lands and waters under both Spanish rule and
2 Mexican rule, the Hopi Tribe further claims these waters under Articles VIII
3 and IX of the Treaty of Guadalupe Hidalgo, Treaty between the United States
4 and Mexico of February 2, 1848 (9 Stat. 922), reserving to citizens of Mexico
5 the rights that they held under Mexican law.

6 C. Under the reserved rights doctrine established in *Winters v. United*
7 *States*, 207 U.S. 564 (1908); *Arizona v. California*, 373 U.S. 546 (1963);
8 *Cappaert v. United States*, 426 U.S. 128 (1976), and as owner of all natural
9 resources forming part of its land, *United States v. Shoshone Tribe of Indians of*
10 *Wind River Reservation*, 304 U.S. 113 (1938), the Hopi Tribe claims the right to
11 all groundwater and surface water, in, on or serving lands owned by the Hopi
12 Tribe or allotted or assigned to its members, or that may hereafter be
13 recognized as belonging to it or its members.

14 D. The Hopi Tribe further asserts a right to water from other sources
15 as needed to supply the Tribe's needs to make its land a permanent homeland,
16 including water from the main stem of the Little Colorado River, the Colorado
17 River including Lake Powell, and the Coconino aquifer. *See United States v.*
18 *Winans*, 198 U.S. 371 (1905), *see also, Lyon v. Gila River Indian Community*,
19 626 F.3d 1059 (9th Cir. 2010)(an implied easement existed across the Indian
20 reservation to serve lands that were granted by the federal government for use
21 by the state as a school).³

22 E. As the owner of subsurface minerals underlying the Hopi
23 Reservation pursuant to the Navajo-Hopi Land Dispute Settlement Act of 1974,
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25 ³ If the present adjudication is not the appropriate venue for asserting the Hopi Tribe's
26 right to these waters, then the Hopi Tribe wishes to preserve its claim and right to pursue these
claims at a later date in a different adjudication.

1 25 U.S.C. §640d-6, the Hopi Tribe claims a proportionate right to water
2 discharging from the Blue Springs Complex into the lower Little Colorado River.

3 The Hopi Tribe makes these claims on behalf of and for the benefit of the
4 Tribe, its villages, clans and people.

5 **VII. THE HOPI TRIBE'S WATER RIGHTS PRIORITY**

6 The Hopi people have the oldest historic claim to water in the Little
7 Colorado Basin. Historical and archeological records confirm that the Hopi
8 people and their ancestors have used or occupied nearly all of the Basin for
9 over twenty centuries. Hopi traditions establish a substantially longer period of
10 occupation of the region by the Hopi. As the United States District Court held
11 in *Healing v. Jones*, 210 F. Supp. at 134:

12 No Indians in this country have a longer authenticated history
13 than the Hopis. As far back as the Middle Ages the ancestors of the
14 Hopis occupied the area between Navajo Mountain and the Little
15 Colorado River, and between the San Francisco Mountains and the
16 Luckachukas.

17 The Hopi occupied the Little Colorado Basin long before the Spanish or Navajo
18 arrived, and used its water resources to sustain their society and culture.
19 Oraibi, on Third Mesa, in the heart of the Little Colorado Basin, is widely
20 accepted as the oldest continually inhabited community in North America.

21 The Hopi Tribe claims a water right with a time immemorial priority,
22 senior to that of any other claimant, Indian or non-Indian. The Tribe claims
23 this right for water to serve lands presently owned by the Tribe or Hopi
24 allottees or assignees and for lands that may hereafter be recognized as
25 belonging to the Tribe or Hopi allottees or assignees. The Tribe asserts a senior
26 right with immemorial priority for waters from sources located outside the
boundaries of the main reservation lands as defined by ADWR, including from

1 the mainstem Little Colorado River, the Colorado River, including Lake Powell,
2 and the Coconino Aquifer.

3 **VIII. SCOPE OF THIRD AMENDED STATEMENT OF CLAIMANT**

4 Over the course of this adjudication's 30-year history, the Court, the
5 parties and ADWR have refined the focus of the Hopi Tribe's HSR. On
6 November 2, 2004, the Court issued a Minute Entry instructing ADWR to limit
7 the scope of the Preliminary Hopi HSR to claims for water on the "main
8 reservation." Minute Entry, dated November 4, 2004, p.2. ADWR complied
9 with the Minute Entry and limited its investigation and Preliminary HSR to the
10 Hopi lands within the 1882 Executive Order Reservation and the 1934 Act
11 Reservation (Moenkopi Island). Preliminary Hopi HSR, § 1.3 Scope, p. 1-4.
12 ADWR's investigation for the Preliminary Hopi HSR excluded the Hopi Ranches,
13 Hopi Industrial Park and any other newly acquired lands outside the "main
14 reservation."

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1 In June 2013, ADWR filed its Status Report with the Court, reiterating
2 that the Final HSR for the Hopi Reservation would not include and analysis of
3 the Hopi Tribe’s water right claims for the Hopi Industrial Park, the Hopi
4 Ranches or other Hopi-owned lands outside the boundaries of the Hopi
5 Reservation. ADWR Status Report Concerning Final Hydrographic Survey
6 Report for the Hopi Indian Reservation, filed June 10, 2013, p. 6-7. ADWR
7 concluded that the final HSR should not include the industrial park and
8 ranches because these lands were outside the main reservation lands and not
9 analyzed in the Preliminary HSR. *Id.* The Court issued a Minute Entry on July
10 2, 2013, confirming that ADWR should limit the scope of the Final Hopi HSR to
11 the minimum requirements of the existing statutes.

12 The Tribe’s Third Amended Statement of Claimant will similarly limit its
13 substantive amendments to claims related to the 1882 Executive Order
14 Reservation and Moenkopi Island. The Tribe expressly reserves its rights to
15 amend and update its water claims for Hopi-owned lands outside the main
16 reservation lands at an appropriate future date when the Court indicates that
17 water rights for those lands will be included in a hydrological survey report
18 pursuant to the Arizona Water Code. More specifically, the Tribe reserves its
19 rights to update its claims for Hopi Industrial Park, the Hopi Ranches, the
20 Cibola property and any other lands located outside the “main reservation
21 lands.”

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1 IX. STANDARDS FOR QUANTIFYING THE HOPI TRIBE'S RESERVED
2 WATER RIGHTS

3 The Arizona Supreme Court established standards for determining the
4 amount of water reserved for Indian lands.⁴ In *In re General Adjudication of All*
5 *Rights to Use Water in Gila River System and Source*, 35 P.3d 68, 74 (Ariz. 2001)
6 (en banc)(*Gila V*), the Court confirmed that a tribe is entitled to an amount of
7 water necessary to make the tribe's reservation a "permanent home and
8 abiding place, ... that is, a 'livable' environment." *Id.* at 74 (citations omitted).
9 Accordingly, the Hopi Tribe has an undisputed right to water necessary to
10 fulfill the purpose of its reservation - which is to provide a permanent
11 homeland for the Hopi people. The court found that a broad construction of
12 the purpose of Indian reservations is necessary to allow tribes "to achieve the
13 twin goals of Indian self-determination and economic self-sufficiency." *Id.* at 76.
14 It held that practicably irrigable acreage (PIA) must not serve as the exclusive
15 means for quantifying Indian water rights because it would implicitly limit the
16 purpose of a reservation to agriculture and "assumes that the Indian peoples
17 will not enjoy the same style of evolution as other people, nor are they to have
18 the benefits of modern civilization." *Id.* at 76. The court noted that parties
19 claiming rights under state law are not constrained to use the water in the
20 same manner as their ancestors and held, "[j]ust as the nation's economy has
21 evolved, nothing should prevent tribes from diversifying their economies if they
22 so choose and are reasonably able to do so." *Id.*

23 Although the Hopi Tribe wishes to pursue water for non-agriculture-
24 based economic development, water for irrigated agriculture will still play a key

25 ⁴ A substantial portion, though not all, of the water claimed by the Hopi Tribe is based on
26 the reserved rights doctrine.

1 role in creating a viable homeland for the Tribe and its members. While the
2 *Gila V* court rejected the PIA standard as the *exclusive* means for quantifying
3 Indian water rights, it stated that “[t]his does not mean that tribes are
4 prohibited from including agriculture/irrigation as part of their development
5 plans,” noting “future irrigation projects are subject to a PIA-type analysis:
6 irrigation must be both practically and economically feasible.” *Id.* at 80.

7 The court set out the key factors that must be considered in quantifying
8 Indian water rights. Overall, the court explained that the courts must examine
9 “actual and proposed uses, accompanied by the parties’ recommendations
10 regarding feasibility and the amount of water necessary to accomplish the
11 homeland purpose.” *Gila V*, 35 P.3d at 79. The court noted that this may be
12 presented in a master land use plan that specifies the quantity of water
13 necessary for different purposes on the reservation, but acknowledged that
14 tribes may present it in another manner as well. *Id.*

15 The court identified historical water use as a significant factor, holding
16 that “[d]eference should be given to practices requiring water use that are
17 embedded in Native American traditions... and tribes should be granted water
18 rights necessary to continue such practices into the future.” *Id.* at 79. The
19 court reasoned that “tribal prioritization of past water use will affect its future
20 development,” and historic use may indicate how the tribe has valued it. *Id.*

21 The court explained,

22 For example, a tribe that has never used water to irrigate is less
23 likely to successfully and economically develop irrigation projects
24 in the future. This does not mean that Indians may not use their
25 water allocations for new purposes on a reservation. However, any
26 proposed projects should be scrutinized to insure that they are
practical and economical. Such projects should also be examined

1 to determine that they are, in fact, appropriate to a particular
2 homeland.

3 *Id.* at 80.

4 The court also held that tribal culture must be considered, explaining
5 “[w]ater uses that have particular cultural significance should be respected,
6 where possible. The length of time a practice has been engaged in, its nature
7 (e.g., religious or otherwise), and its importance in a tribe’s daily affairs may all
8 be relevant.” *Id.* at 80. The Hopi people have farmed and continue to farm
9 their lands. The cultural significance of agriculture and farming in Hopi
10 society cannot be underestimated. The Tribe, therefore, also claims water for
11 ceremonial and subsistence farming. *See U.S. v. Winans*, 198 U.S. 371 (right to
12 water implied by a reservation of aboriginal ways of life).

13 The court also identified as an important factor, “the tribal land’s
14 geography, topography, and natural resources, including groundwater
15 availability” and explained, “[w]e anticipate that any development plan will
16 carefully consider natural resources (including potential water uses), so that
17 the water actually granted will be put to its best use on the reservation.” *Gila*
18 *V*, 35 P.3d at 80.

19 In addition to natural resources, courts must look at a tribe’s economic
20 base. The court explained that “[t]ribal development plans or other evidence
21 should address, and the court should consider, ‘the optimal manner of creating
22 jobs and income for the tribes [and] the most efficient use of the water’” *Id.*
23 (citation omitted). In examining such evidence, the court explained,

24 Economic development and its attendant water use must be tied,
25 in some manner, to a tribe’s current economic station. Physical
26 infrastructure, human resources, including the present and
potential employment base, technology, raw materials, financial

1 resources, and capital are all relevant in viewing a reservation's
2 economic infrastructure.

3 *Id.*

4 The court also identified present and projected tribal population as an
5 important factor to consider. It reasoned that, “[t]o act without regard to
6 population would ignore the fact that water will always be used, most
7 importantly, for human needs. Therefore, the number of humans is a
8 necessary element in quantifying water rights.” *Id.*

9 The court emphasized that the list of factors that it identified is not
10 exclusive, and the lower court must be given the latitude to consider other
11 information that it deems relevant to determining tribal water rights. The
12 Arizona Supreme Court explained that the primary requirement is that
13 “proposed uses be reasonably feasible.” *Id.* at 81. The court set out a two-part
14 analysis for determining compliance with this requirement,

15 First, development projects need to be achievable from a practical
16 standpoint—they must not be pie-in-the-sky ideas that will likely
17 never reach fruition. Second, projects must be economically
18 sound. When water, a scarce resource, is put to efficient uses on
19 the reservation, tribal economies and members are the
20 beneficiaries.

21 *Id.*

22 In *Gila V*, the Arizona Supreme Court also held that the reserved rights
23 doctrine applies to groundwater, explaining “[t]he significant question for the
24 purpose of the reserved rights doctrine is not whether the water runs above or
25 below the ground but whether it is necessary to accomplish the purpose of the
26 reservation.” *Id.* at 747.

X. Hopi Water Rights Claim

A. Hopi Tribe Claim Summary⁵

Table 1 -- Quantification

Use	Quantity (Acre-Feet per Year)
Domestic, Commercial, Municipal and Industrial Use	9,348
Agriculture	
- Past and Present Irrigation	101,121 ⁶
- Livestock	1,000
- Ceremonial and Subsistence Irrigation	7,385
- Water Storage	4,883
Present Mining Use	1,255
Energy Resources Development	27,600
Tourism	1,022
Recreation	41
Other Claims	
- Subsurface Mineral Rights	40,295
- Aesthetic, Cultural and Ecological Flows	>300 ⁷
- A) Pasture Canyon	
- B) White Ruin Canyon	
- C) Lower Little Colorado River (instream flows)	

⁵ The table is a summary for convenience and does not limit the broader claims made in the text above, *e.g.*, relating to the ownership of water resources as a whole; nor does the table limit the more precise description of each category that follows. This table does not include claims for water off the "main reservation" per ADWR. See Section VIII.

⁶ The Hopi Tribe also claims 333 acre-feet for irrigation storage plus evaporation and seepage losses.

⁷ The Tribe is working to quantify the flows at White Ruin Canyon Wash. The 300 acre-feet per year represents the quantification to protect the flows at Pasture Canyon only.

1	- Cultural, Religious and Ceremonial Uses	
2	Total	194,248

3 **B. Domestic, Commercial, Municipal and Industrial Use (DCMI)**

4 **1. Future DCMI Uses**

5 The Hopi Tribe claims 9,348 acre-feet of water annually for future
6 domestic, commercial, municipal, and industrial (DCMI) uses of water on the
7 1882 Reservation and Moenkopi Island.⁸ The Hopi Tribe projects a population
8 on its Reservation lands (not including the Hopi Industrial Park) of 50,255 in
9 2120 and that the population (not including the Hopi Industrial Park) will
10 stabilize at 52,016 in 2175. The Tribe's projections rely on the work of experts
11 retained by the United States, which have been updated since the projections
12 filed with the Tribe's 2009 Second Amended Statement of Claimant. The
13 details of the projections, including the growth rates upon which they are
14 based, are set out in Appendix 3 to the United States' Third Amended
15 Statement of Claimant on behalf of the Hopi Tribe (U.S. Third Amended SOC).

16 The Tribe is making this claim based on total tribal-wide DCMI demands
17 rather than on village-by-village water demands. The Hopi Tribe bases its
18 DCMI claim on a per-capita approach, in which the projected future stable
19 population on the Hopi Reservation is multiplied by an estimate of per-capita
20 DCMI usage. The Tribe projects future use of approximately 160 gallons per
21 capita per day (gpcpd), which includes residential indoor use, residential
22 outdoor use, commercial use, light industrial use and public uses and system
23 losses.

24 _____
25 ⁸ This amount no longer includes the DCMI needs of the Hopi Industrial Park (380 acre-
26 feet) as this land is outside the scope of the final HSR. The Hopi Tribe reserves its right to
assert this claim when ADWR begins the HSR process for that area.

1 The Tribe claims a priority of time immemorial for DDMI uses. The
2 sources are springs, groundwater wells in the N-Aquifer and other aquifers.

3 2. Existing and Future Wells

4 In support of this DDMI claim, the Hopi Tribe claims the right to
5 withdraw and deplete groundwater from both existing and future wells in the
6 N-Aquifer and other aquifers. The Hopi Tribe relies on Appendix 4 and
7 Appendix 7 to the U.S. Third Amended SOC. These appendices provide a list
8 and maps of existing wells which serve DDMI, as well as stock and other uses.
9 A specific pumping quantity is not claimed from individual existing wells
10 because, as is the case throughout much the Little Colorado River basin,
11 metering data or other evidence concerning the quantities of past or present
12 diversions from specific wells is often unavailable.

13 With respect to future wells, the Hopi Tribe asserts that its reserved
14 water rights necessarily include the right to establish new points of diversion
15 and withdrawal as needed to meet the Tribe's future needs. The location of
16 future wells, including quantities and points of diversion and withdrawal, for
17 rights reserved by the Hopi Tribe, but not yet exercised, cannot be ascertained
18 at present.

19 3. Springs

20 Springs also provide water for DDMI purposes, as well as livestock and
21 agricultural purposes. The Hopi Tribe claims the right to utilize all flows of
22 springs on the Hopi Reservation, including existing springs identified in
23 Appendix 5 to the U.S. Third Amended SOC, springs not identified due to
24 drought or other conditions, and springs that may occur in the future to meet
25 the needs of the Hopi Tribe.

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1 Appendix 5 and Appendix 7 to the U.S. Third Amended SOC provide a
2 list and map of existing springs that the Hopi Tribe has in the past used, or is
3 at present using. The Hopi Tribe claims the right to utilize the flow of each
4 spring at its described location, to make improvements, such as constructing
5 spring boxes or pipe collection systems, as may be necessary to preserve each
6 spring's utility, and to use water diverted from such springs for any use,
7 including livestock, domestic, agriculture, ceremonial, religious, and cultural
8 uses. A specific quantity is not claimed for each individual spring because, as
9 is the case throughout much of the Little Colorado River basin, metering data
10 or other evidence concerning the quantities of past or present flow at specific
11 springs on Hopi Tribal lands is generally unavailable. Additionally, spring
12 flows vary based on influences from climate conditions and hydrological effects
13 of other water uses such as groundwater pumping. The Hopi Tribe also claims
14 flows from springs not on the Hopi Reservation with present or historical uses
15 on the Reservation.

16 C. Agricultural

17 1. Past and Present Irrigation

18 ADWR concluded that approximately 63 percent of the Hopi Reservation,
19 or over one million acres, have soils that are suitable for irrigated agriculture.
20 The Hopi Tribe claims the right to irrigate 26,611 acres of land that has been
21 irrigated in past or is irrigated presently. This acreage requires diversion of
22 101,121 acre-feet of water on an average annual basis to irrigate the lands
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1 shown in Table 2.⁹ The past and present irrigated acreage consists of the
2 following and is shown in Appendix 1:

- 3 • 13,031.6 acres as described in the United States Third Amended
4 Statement of Claim for the Hopi Tribe;
- 5 • 1,853.3 acres of past and present irrigation identified by ADWR as
6 having complete evidence and not included in the Federal claim
7 listed above;
- 8 • 11,658.5 acres of past and present irrigation identified by ADWR-
9 as having partial evidence and not included in the Federal claim
10 listed above;¹⁰ and
- 11 • 67.5 acres not included in the above three categories that
12 represent a historic irrigation project on Dinnebito Wash called
13 Dinnebito 10 or DW10 and that ADWR did not attempt to verify
14 during their claim verification process for the 2008 Preliminary
15 Hopi HSR.

16 The sources of water for this claimed irrigation are all the surface and
17 groundwater resources of the Hopi Reservation, including the five washes,¹¹
18 minor tributaries that flow from north to south through the Hopi Reservation
19 and groundwater or other sources of water as necessary. Past irrigation was
20 limited to using mainly springs and washes flowing on the Reservation.
21 Nevertheless, the Hopi Tribe claims the right to develop additional sources of
22 supply such as, but not limited to, groundwater and/or additional storage
23 water may be developed to provide a full supply of irrigation water to the past

24 ⁹ This claim differs from the claim presented in the Tribe's 2009 Second Amended
25 Statement of Claimant because it is no longer based on a single time period of irrigation, i.e.,
26 1954-1955. The above acreage is appropriate under the doctrine that Indian water rights are
not lost through non-use. *Gila V*, 35 P.3d at 72 (a reserved right "retains priority despite non-
use").

¹⁰ This additional acreage was based on Geographical Information System (GIS) computer
files provided by the ADWR to the Hope Tribe's Consultant DOWL (formerly HKM and DOWL
HKM). ADWR developed the GIS files as part of their preparation of their 2008 Preliminary
Hopi HSR.

¹¹ The five washes are Moenkopi, Dinnebito, Oraibi, Polacca and Jeddito.

1 and present irrigated acres.¹² The Hopi Tribe should not be limited to
 2 historical methods of farming and irrigation and should be allowed to employ
 3 modern irrigation methods, including groundwater pumping. See e.g., *United*
 4 *States v. Washington*, 384 F. Supp. 312, 402, 407 (W.D. WA 1974) *aff'd* 520
 5 F.2d 676 (9th Cir. 1975); *Grand Traverse Band of Ottawa & Chippewa Indians v.*
 6 *Dir. Mich. DNR*, 141 F.3d 635, 639 (6th Cir. 1998).

7 **Table 2 -- Past and Present Irrigation Acreage and Average Annual**
 8 **Diversion Volume**

9 Category	Acres	NIR (ft)	Overall Irrigation Efficiency	Water Duty, ac.- feet/ac (rounded)	Avg. Ann Div. Vol, acre-feet (rounded)
10 U.S Third Amended Claim	13,031.6	2.09	55%	3.80	49,520
11 ADWR Complete Evidence not within the U.S. Claim	1,853.3	2.09	55%	3.80	7,043
12 ADWR Partial Evidence not within the U.S. Claim	11,658.5	2.09	55%	3.80	44,302
13 Historic project DW 10	67.5	2.09	55%	3.80	256
14 Total	26,610.9				101,121

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 17 The Hopi Tribe's claimed acreage is larger than the Tribe's claimed
 18 acreage from its Second Amended Statement of Claimant, but is still lower than
 19 the acreage likely farmed historically. Specifically, ADWR concluded that prior

20
 21 ¹² DOWL, the Hopi Tribe's water resources consultant, calculated a full-supply water duty
 22 for irrigation of the above-listed past and present irrigated acres. First, DOWL established a
 23 full-supply net irrigation requirement (NIR) by taking the average of the lower (1.72 feet) and
 24 upper (2.46 feet) NIR from Table 8-1 for modern farming in ADWR's 2008 Hopi Preliminary
 25 HSR to get an average of 2.09 feet NIR. The NIR is the total crop water demand less effective
 26 precipitation. Based on an assumed 85percent irrigation conveyance efficiency and 65percent
 on-farm efficiency, an overall irrigation efficiency of 55percent (rounded) was then calculated.
 The total per acre water duty was then calculated by taking the 2.09 feet average NIR and
 dividing by the 55percent overall irrigation efficiency to calculate a diversion requirement of
 3.80 feet or 3.80 acre-feet per acre. Multiplying a water duty of 3.80 acre-feet per acre water
 duty times an irrigated area of 26,610.9 acres results in an average annual diversion volume of
 101,121 acre-feet.

1 to 1930, the Tribe cultivated 2.5 acres per person annually. See Preliminary
2 HSR, 8-5; See also, CHARLES ADAMS, *HOPi USE AND DEVELOPMENT OF WATER*
3 *RESOURCES IN THE LITTLE COLORADO RIVER DRAINAGE BASIN OF ARIZONA: AN*
4 *ARCHAEOLOGICAL PERSPECTIVE TO 1700* 84 (April 2007). This average annual
5 acreage per person combined with the historic high population estimate of
6 29,305 people would require over 70,000 cultivated acres. See PETER WHITELEY,
7 *HISTORIC HOPi USE AND OCCUPANCY OF THE LITTLE COLORADO RIVER WATERSHED* 104
8 (January 2004). Even if we use the population estimate of 12,000 people, as
9 posited by Fred Andersen in Table 8 of his report prepared for ADWR, 2.5 acres
10 per per person translates to 30,000 cultivated acres.

11 The nature of much of the irrigation of lands from seasonal flows is such
12 that the field and diversion locations change over time. The Tribe claims a
13 priority of time immemorial for past and present irrigation.

14 2. **Livestock**

15 The Hopi Tribe claims 1,000 acre-feet of water each year to support the
16 maximum carrying capacity of livestock on the Hopi lands within the 1882
17 Reservation and Moenkopi Island. This claim is based on the maximum
18 carrying capacity of the rangeland within the 1882 Reservation and Moenkopi
19 Island. This rangeland includes approximately 1,622,455 acres of land, with a
20 maximum livestock carrying capacity of 44,486 animal units. The water
21 consumption for cattle is 12 gallons per animal unit per day (gpAUD) based on
22 ADWR's "Standard Water Use Quantities" document date revised January
23 2006. The Hopi Tribe used a diversion of 20 gpAUD for the Claim based on a
24 water use efficiency of 60 percent to account for evaporation, spills, and other
25 losses from wells. The 60 percent efficiency estimate assumes the use of metal
26

1 drinker tanks to store the stock well water although presently such water is
2 frequently stored in earthen facilities. The Tribe asserts the right to use more
3 than the 20 gpaud rate and 1,000 acre-feet of water annually to account for
4 decreased efficiency if earthen facilities continue to be used to store stock well
5 water in the future.

6 The primary water source for the livestock demand is groundwater (the
7 N-Aquifer and other aquifers) as provided by existing and future wells.
8 Appendix 4 to the U.S. Third Amended SOC provides a list of all existing wells
9 claimed, including the wells that serve livestock uses. The Hopi Tribe claims
10 groundwater as the primary source because of the importance of reliable water
11 sources for livestock in an arid climate. In addition to wells, some springs
12 provide livestock water. Appendix 5 to the U.S. Third Amended SOC identifies
13 the existing springs. The Hopi Tribe has the right to allocate this right among
14 wells as it deems necessary to meet the needs of the Hopi Tribe.

15 3. **Ceremonial and Subsistence Irrigation**

16 The Hopi Tribe claims 7,385 acre-feet of water per year for future
17 irrigation of small garden plots for ceremonial and subsistence purposes.¹³ The
18 Hopi people have a rich agricultural tradition that goes back millennia. The
19 Hopi farmers' ingenuity and hard work is largely responsible for the Hopi
20 peoples' long tenure and rich ceremonial life in such an arid region. While the
21 Hopi economy is no longer based on subsistence agriculture, traditional Hopi
22 agricultural practices continue to the present and are a major part of the
23 activities of many Hopi households. Nearly 40 percent of households still

24 ¹³ This number is based on the stable population and total number of households
25 projected for the Hopi villages with 25percent of the households carrying out ceremonial and
26 subsistence farming with each participating household requiring 0.8 acres. Additionally, the
Tribe relied on a CIR of 25.08 inches and efficiency of 75percent.

1 cultivate corn and other crops for ceremonial and subsistence use. Seventy-
2 eight percent of those who are not currently engaged in farming activities
3 reported that they would like to have a garden or field. Drought and lack of
4 land were the principal reasons given for not farming at present.

5 A growing Hopi population will need to expand the scope of current
6 agricultural activities on the Reservation in order to protect and to maintain its
7 agricultural heritage and ceremonial life. The limited and uncertain water
8 supplies currently used for ceremonial and subsistence irrigation are
9 insufficient to meet present and future demands. Down-cutting of the washes
10 has also reduced the availability of water to lands upstream in the washes.
11 Finally, in the future, climate change threatens the surface water flows on
12 which the Hopi currently rely. Traditional Hopi agricultural practices have
13 evolved over centuries to accommodate limited water supplies and erratic
14 rainfall, so Hopi farmers are skilled at cultivating in water-scarce conditions.
15 But as one looks to the future, Hopi farmers will need to adapt their traditional
16 agriculture practices somewhat to accommodate population growth and climate
17 change.

18 Providing a firm water supply for ceremonial and subsistence agriculture
19 will also provide important health benefits to the Hopi by ensuring a supply of
20 fresh fruit and produce and thereby helping in the fight to combat the alarming
21 incidence of adult-onset diabetes and other health conditions with ties to diet
22 which afflict so many Hopi.

23 Like current spring-fed and surface water irrigation, the planned garden
24 plots could be located in or near the Hopi villages. In the future, ceremonial
25 and subsistence gardens will cover a total of about 2,646 acres of arable land
26

1 surrounding the villages for the garden plots and storage ponds, as shown in
2 Table 3 below.

3 **Table 3**
4 **Ceremonial and Subsistence Irrigation**

5 Village	Irrigated acreage	Annual water requirement (acre-feet)
6 First Mesa villages	400	1,116
7 Second Mesa villages	385	1,075
8 Along Highway	31	88
9 Keams Canyon	100	280
10 Bacavi/Hotevilla	360	1,003
11 Kykotsmovi	351	978
12 Tawaovi	254	710
13 Moenkopi	452	1,262
14 Lower Moenkopi	206	574
15 Howell Mesa East	58	161
16 Side Rock Well (Kaibito Plateau)	49	138
Totals	2,646	7,385

17
18 The Tribe claims a right to store the capacities of each of the storage
19 facilities for the gardens. The Tribe claims a priority of time immemorial for
20 ceremonial and subsistence irrigation. The source is the N-Aquifer and other
21 available aquifers.

22 **4. Water Storage**

23 The Hopi Tribe claims the right to store 333 acre-feet of water flowing
24 from springs and surface runoff in and above Pasture Canyon in two reservoirs
25 in Moenkopi Island, as described in Table 4. The Hopi tribe reserves the right
26 to rebuild and rely on historic reservoirs that may or may not be included in

1 the impoundment inventory. The Tribe also claims 192 acre-feet of water
2 annually for evaporation losses.

3 **Table 4**
4 **Irrigation Reservoirs**

5

Reservoir	Max. Storage, AF	Max Surface Area, ac	Net evap. Rate, ft/yr	Evap. Loss, AF/yr
Pasture Canyon	212	32	4	128
Lower Lagoon	121	16	4	64
Total	333	48		192

6
7

8
9 Additionally, the Hopi Tribe claims the right to divert and deplete the
10 total 4,883 acre feet of water per year for livestock storage purposes from past
11 and present historic stock ponds served by surface flow from the washes and
12 tributaries. Stockponds are filled by surface water from washes and tributaries
13 to washes. As such, stockponds can be unreliable in dry years and are claimed
14 here as complementary sources to wells for livestock support. Despite the fact
15 that stockponds are not as reliable as groundwater, they play a vital role in
16 allowing livestock full access to the range for grazing purposes and represent
17 an important aspect of the livestock claim. See attached Appendix 2 for maps
18 and lists of impoundments.

19 The Hopi Tribe claims the right to maintain each reservoir at its
20 described location and dimensions, as well as the right to fill each reservoir to
21 its full capacity whenever the stated source of supply is available, and to use
22 the impounded water for livestock purposes. The Hopi Tribe has in the past
23 used, or is at present using, the impoundments identified in Appendix 2 for
24 stock purposes and Appendix 3 for an explanation of basis for keeping
25 impoundments deleted by ADWR and the United States. The Hopi Tribe claims
26 the right to construct future stock ponds necessary to satisfy the claimed

1 livestock demand of 1,000 acre-feet per year. In addition, subject to the total
2 quantity of rights asserted herein, the Hopi Tribe claims a right to repair, to
3 maintain, and to replace existing impoundments and to construct new
4 impoundments in the future for livestock water and soil and water
5 conservation benefits as needed to satisfy the livestock demand of 1,000 acre-
6 feet of water per year.

7 **D. Energy Resources Development**

8 The current Hopi economy is based mainly on a high degree of Federal
9 government involvement combined with revenues derived from coal mining
10 royalties for electric power generation. The primary natural resources available
11 to Hopi include coal, the potential for other petroleum hydrocarbons (coalbed
12 methane, natural gas, oil), and an abundance of sunlight. Under *Gila V*, the
13 Hopi Tribe claims water for an economic base that will provide for sustainable
14 and long-term employment for its stable population. To build the necessary
15 economic base to employ the projected stable population, the Tribe claims the
16 water necessary to allow it to rely on areas where it has a relative economic
17 advantage. The Tribe has a strategic economic advantage in the area of solar
18 power, coal, natural resource extraction and the ancillary businesses attendant
19 to mineral extraction, including use of petroleum hydrocarbons as feedstock for
20 secondary and tertiary processed products. In addition to coal mining and a
21 mine mouth power plant, the Tribe asserts that it should have adequate water
22 supply to support industrial uses including, but not limited to, coal
23 liquefaction/gasification facility (CLG) and CLG byproduct processing.

24 The following discussion describes possible elements, from the
25 perspective of water supply, of a strategy that offers the potential for building
26

1 on existing Hopi resources to build a long-term, economically viable future for
2 the Tribe. Water supply is a critical component in insuring that the Hopi
3 Reservation can become a permanent homeland and again become
4 economically viable for the Hopi people.

5 **1. Present Mining Use**

6 The Tribe claims 1,255 acre-feet per year for present coal mining needs
7 for the Peabody Coal Company's mine at Black Mesa.¹⁴ The current source is
8 the N-Aquifer. The Hopi Tribe claims a priority of time immemorial for water
9 for mining activity.

10 **2. Future Coal Mining**

11 Estimates of the amount of coal availability at Black Mesa vary from
12 between 3.6 and twenty billion tons. The Tribe currently leases a small part of
13 its overall coal resources- approximately 330 million tons- to Peabody Coal
14 Company which mines the coal and conveys it to the Navajo Generating Station
15 for power generation. However, the Tribe's coal resources substantially exceed
16 the amount which Peabody may mine under its lease from the Tribe.

17 The Tribe asserts the right to mine its vast reserves of coal presently and
18 in the future. The Tribe claims 500 acre-feet for the additional mine. The
19 exact location of wells and the distance from which the water would be drawn
20 cannot currently be known, nor can contractual arrangements as to its use.

21 **3. Future Energy Resource Development**

22 The Hopi Tribe claims 27,100 acre-feet of water annually for future
23 energy resource development. Power generation could include a concentrated
24 solar facility with after dusk thermal power generation. An additional use of

25 ¹⁴ This amount is slightly higher than the 1,236 acre-feet per year claimed in 2009. The
26 Tribe bases this increase on the latest records available for current use.

1 the coal mined on Hopi lands could be coal liquefaction/gasification and
2 processing of the related byproducts of the CLG process. The integrated
3 approach below provides an illustrative example of how such a plan could be
4 accomplished for the Hopi Tribe. The Hopi Tribe as a sovereign, however, has
5 the right to determine how it would like to develop economically in the future
6 depending on the Tribe's desires and the market. The Tribe, however, claims
7 the amount of water described below to allow it to make the Reservation a
8 permanent homeland for the Hopi people.

9 **a. Potential Future Solar/Thermal Power Plant**

10 The Hopi Tribe claims 6,500 acre-feet of water annually to allow the Tribe
11 to build, should it choose to do so, a 1,500 megawatt solar power plant,
12 supplemented by after-dusk conventional generation fired by liquid/natural
13 gas products of liquefaction or gasification plant.¹⁵ This water is necessary
14 because concentrated solar with wet cooling requires anywhere from 800
15 gallons to 1,000 gallons of water per megawatt hour.

16 The source is the N-Aquifer or other water sources as necessary. The
17 Hopi Tribe claims a priority of time immemorial for water for a power plant.

18 **b. Potential Development of Coal Liquefaction/Gasification
19 and secondary products**

20 The Hopi Tribe claims 20,600 acre-feet of water annually for the potential
21 development of a no-liquid-discharge coal liquefaction/gasification facility
22 (CLG) and related secondary manufacturing. The coal liquefaction/gasification

23 ¹⁵ The 500 kV power line that crosses the main reservation has a capacity of about 1500
24 mW, most of which is no longer committed to Southern California from the Four Corners power
25 plant. FERC will reallocate the unused capacity, which is likely about 1000 mW. If half of this
26 were reserved for a Hopi combined solar thermal/conventional 500 mW power plant, new
transmission capacity would not initially be required. An additional 500 kV line may also be
necessary to transmit the additional power produced.

1 process requires 12,600 acre-feet of water annually and may also be used to
2 produce varying ratios of primary products, including natural gas, liquid fuels
3 (diesel, jet fuel, and gasoline), naphtha, etc. There are thousands, of products
4 that can be produced from the primary products of coal
5 liquefaction/gasification. Development of businesses related to the secondary
6 manufacturing requires between 6,000 and 8,000 acre-feet per year.

7 The potential bundling of CLG and secondary businesses would allow the
8 Tribe to further monetize its competitive economic advantages. For example,
9 availability of primary CLG products at competitive prices could potentially
10 support a wide range of production chains. Very briefly tracing just one
11 possible production chain illustrates the future potential. Naphtha can be the
12 primary feedstock for ethylene production. Ethylene is in turn one of the
13 highest demand industrial inputs for many types of products. Between 2005
14 and 2011, ethylene demand worldwide increased by one-third, reaching 140
15 million metric tons. As an industrial commodity, the ethylene market is very
16 broad and deep, with new uses being developed on an ongoing basis. Like
17 copper or electricity, modern economies cannot function without ethylene.

18 An adequate water supply to support the additional employment
19 necessary to make the Reservation a permanent homeland requires 20,600
20 acre-feet of water annually. The source is the N-Aquifer or other water sources
21 as necessary. The Hopi Tribe claims a priority of time immemorial for water to
22 allow the Reservation to become a permanent homeland for its future stable
23 population.

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1 **E. Tourism**

2 Tourism is the most important non-industrial, non-governmental source
3 of income in northern Arizona. In 2013, there were 5.3 million international
4 visitors to Arizona, alongside 33.8 million domestic visitors, for a total of 39.1
5 million visitors. In 2013, there were over 7.1 million domestic overnight visits
6 to Northern Arizona (including the Grand Canyon and Indian country). These
7 numbers are expected to increase. According to a 2000 study prepared by
8 Northern Arizona University, an estimated 200,000 non-reservation residents
9 visited the Hopi Reservation each year.

10 The Hopi share of visitors to northern Arizona is relatively small. For one
11 thing, there are relatively few places to stay overnight at Hopi. During the
12 1990s, two motels existed on the Hopi Reservation for overnight guests, one at
13 Keams Canyon and the other on Second Mesa at the Hopi Cultural Center.
14 The Keams Canyon motel closed in 2001, leaving the Hopi Cultural Center as
15 the only on-reservation lodging available for tourists. Since 2001, the
16 Moenkopi Developers Corporation opened the Legacy Inn and Suites at Tuba
17 City. The recent success of the Legacy Inn and Suites demonstrates the
18 potential for growth. The Hopi Tribe's economic development plans include
19 expansion of the Hopi Cultural Center and related commercial development
20 nearby.

21 Compared to other regions in Arizona, domestic overnight visitors to
22 northern Arizona have high incomes and high education levels and the highest
23 participation in visiting historic sites. Visitors to Hopi include a greater share
24 of the more highly-educated and higher-spending market segment of visitors to
25
26

1 the region. There is a tremendous potential to increase the Hopi share of the
2 existing tourist market in the region.

3 The richness of the Hopi traditions, mythology, and language are a
4 unique cultural resource and represent an immense, untapped economic value,
5 particularly for increasing the Reservation's share of the tourism market.
6 Because such cultural assets are increasingly being lost elsewhere, these Hopi
7 assets will become ever more valuable. Recently the Hopi Tribe designated
8 State Route 264 between Moenkopi and Keams Canyon as the Hopi Arts Trail
9 with a brochure identifying all businesses along the route. See Appendix 4,
10 Hopi Comprehensive Economic Development Strategy. Many people
11 throughout the world will seek to see the world from a Hopi perspective and to
12 learn about their culture and traditions. The Tribe has only begun to tap the
13 nascent tourism market. The success of the Legacy Inn & Suites and the travel
14 center demonstrate the untapped potential for responsible tourism. A 2008
15 survey at Hopi demonstrates that a majority of the Hopi support tourism
16 development on the Hopi Reservation.

17 The Hopi Tribe claims 1,022 acre-feet of water annually for a future
18 destination resort with the potential for an RV park, golf course and other
19 destination resort amenities, possibly at Keams Canyon,, and for expansion of
20 the Hopi Tribal Cultural Center.¹⁶ The Hopi Tribe claims a priority of time
21 immemorial for the water for tourism. The source is groundwater or other
22 sources as necessary.

23 F. Recreation

24 _____
25 ¹⁶ This does not include the possible hotel, casino, golf course and RV park at the Hopi
26 Industrial Park in Winslow due to the limited scope of the Final HSR. The Hopi Tribe claims
522 acre-feet annually for the projects in the Hopi Industrial Park. The source is groundwater
and the Tribe claims a priority date of time immemorial.

1 basis of this Riparian and Wetland Habitat Claim as compared to the Irrigated
2 Lands which are subject to the Past and Present Irrigation Claim outlined
3 above. While this claim was not included in the Second Amended SOC filed in
4 2009, these areas were in existence and are of continuing ecological
5 significance to the Tribe.

6 White Ruin Canyon Wash is located near the headwaters of Moenkopi
7 Wash, at the following GPS coordinates: 36° 12' 2.9844" N; 110° 44' 10.5108"
8 W. This wetland habitat is a unique ecosystem that is of great historic and
9 present significance to the Hopi Tribe. The Hopi Tribe claims a non-
10 diversionary right to protect White Ruin Canyon Wash.¹⁹

11 Finally, the Hopi Tribe claims a non-diversionary water right for instream
12 flows in the lower Little Colorado River. This area hold tremendous cultural
13 and religious significance for the Hopi people. The quantity of water needed to
14 protect the aquatic, cultural and religious resources of the lower Little Colorado
15 River are unknown at the present time.

16 Since time immemorial, Pasture Canyon, White Ruin Canyon Wash and
17 the lower Little Colorado River watersheds have played a critical role in Hopi
18 spiritual life and an integral part of Hopi cultural life and should be protected.
19 In addition to the spiritual significance, Hopi wetlands are an important source
20 of fish, wildlife and plant materials for Hopi ceremonial, cultural, and day-to-
21 day uses. The wetlands also provide materials for the Hopi arts and crafts
22 industry.

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¹⁹ The Hopi Tribe is working to quantify the flows at White Ruin Canyon Wash.

1 **3. Cultural, Religious and Ceremonial Uses**

2 Appendix 5 and Appendix 7 to the U.S. Third Amended SOC provide a
3 list and map of existing springs that the Hopi Tribe has in the past used, or is
4 at present using. The Hopi Tribe claims the right to utilize the flow of each
5 spring at its described location, to make improvements, such as constructing
6 spring boxes or pipe collection systems, as may be necessary to preserve each
7 spring's utility, and to use water diverted from such springs for ceremonial,
8 religious, and cultural uses. The Hopi Tribe also claims flows from springs not
9 on the Hopi Reservation with present or historical uses on the Reservation.

10 H. **Reservation of Rights for Lands Not Included in HSR**

11 The Tribe is not updating its claims for the ranch lands in this Third
12 Amended Statement of Claimant. However, the Hopi Tribe reiterates its 2009
13 claims for water for the five ranches based on state law as provided in Section
14 12(a)(l)(B) of the Navajo-Hopi Land Dispute Settlement Act of 1996. The Tribe
15 also asserts the additional rights recognized in the Navajo-Hopi Land Dispute
16 Settlement Act, Pub. L. 104-301, 110 Stat. 3649, for trust lands acquired
17 under that Act. These rights shall “not be subject to forfeiture or
18 abandonment arising from events occurring after the date the lands are taken
19 into trust.” *Id.* § 12(a)(2).

20 A summary of the amounts previously claimed for present irrigation and
21 non-irrigation uses is set out in Table 3. The Hopi Tribe also claims water for
22 evaporation and seepage losses associated with the storage facilities. The
23 water uses on each ranch property and water right abstracts are set out in
24 Appendix 5 to the Hopi Tribe’s Second Amended Statement of Claimant.²⁰ The

25
26 _____ ²⁰ Appendix 5 is a series of spreadsheets saved on a compact disk.

1 sources are the C-Aquifer and surface runoff. The Tribe reserves its right to
 2 amend and supplement these claims at the appropriate date in the future when
 3 the Court indicates that water rights for those lands will be included in a
 4 hydrological survey report pursuant to the Arizona Water Code.

5 **Table 3 -- Present Water Uses on Hopi Ranches²¹**

6 Ranch	Irrigation Use		Non-Irrigation Use		Total	Total
	7 Annual AF	Storage AF	Annual AF	Storage AF	Annual AF	Storage AF
8 26 Bar Ranch	507.00	184.00	302.99	67.33	809.99	251.33
9 Aja Ranch			654.74	636.27	654.74	636.27
10 Clear Creek Ranch			604.90	912.16	604.90	912.16
11 Hart Ranch			275.17	235.99	275.17	235.99
12 Drye Ranch			21.33	53.02	21.33	53.02
13 Total	507.00	184.00	1859.13	1904.77	2366.13	2088.77

15
 16 The source for the water claimed on the ranches are the C-Aquifer and
 17 other aquifers and surface runoff.

18
 19
 20 ²¹ Notes:

- 21 1. The above table includes water uses on deeded ranch land and associated leased
 22 state land and Forest Service permit land used by the ranches.
- 23 2. Irrigation use on the 26 Bar Ranch is for 193.5 acres. The 507 acre-feet annual
 24 use includes 217 acre-feet supplemental supply from groundwater.
- 25 3. Non-irrigation uses include domestic, stockpond, stockwater, recreation, fish,
 26 and/or wildlife.
4. The above water use amounts were based on an analysis of associated water
 right filings and actual use. In cases where no filings or data exist for a water use,
 amounts were estimated.

1 I. Hopi Claims to Off-Reservation Water Supplies

2 The claims described above identify groundwater and local surface water
3 as the source of supply. However, the groundwater resources beneath the
4 Reservation and surface water will likely be insufficient to supply these
5 demands into the indefinite future, particularly if Navajo withdrawals are
6 permitted from the same aquifers. Furthermore, increasing groundwater
7 withdrawals will affect the resources of the Reservation, reducing the flows of
8 valuable springs and washes. Such environmental effects have already been
9 documented as a result of prior and present pumping. The Hopi people place
10 great value on a proper balance in the environment and protection of their
11 resources, particularly water resources. The Tribe is gravely concerned about
12 effects on groundwater and related resources from continued and increased
13 rates of pumping and the effects of over grazing of lands around springs on
14 spring flows. While the Hopi Tribe must assert its rights to local water
15 resources, it also believes and asserts that water must be imported to the
16 Reservation in order to satisfy these demands and make the Reservation a
17 permanent homeland while protecting the long-term viability of the
18 groundwater.

19 Accordingly, to the extent that on-Reservation water resources are
20 insufficient to satisfy any of the demands, or any part of said demands,
21 identified in this Third Amended Statement of Claimant, or to do so without
22 serious increases in pumping depths and damage to the aquifers, the Hopi
23 Tribe further asserts a right to water from sources located outside the
24 boundaries of its lands, including from the main stem of the Little Colorado
25 River and the Colorado River, Lake Powell and the Coconino Aquifer, to satisfy
26

1 those demands, and the right to transport water from those sources, or from
2 Hopi lands separated from the Hopi Reservation by Navajo lands, to any part of
3 the Hopi Reservation with or without permission from the Navajo Nation.

4 Date: June 2, 2015

5 Respectfully submitted,

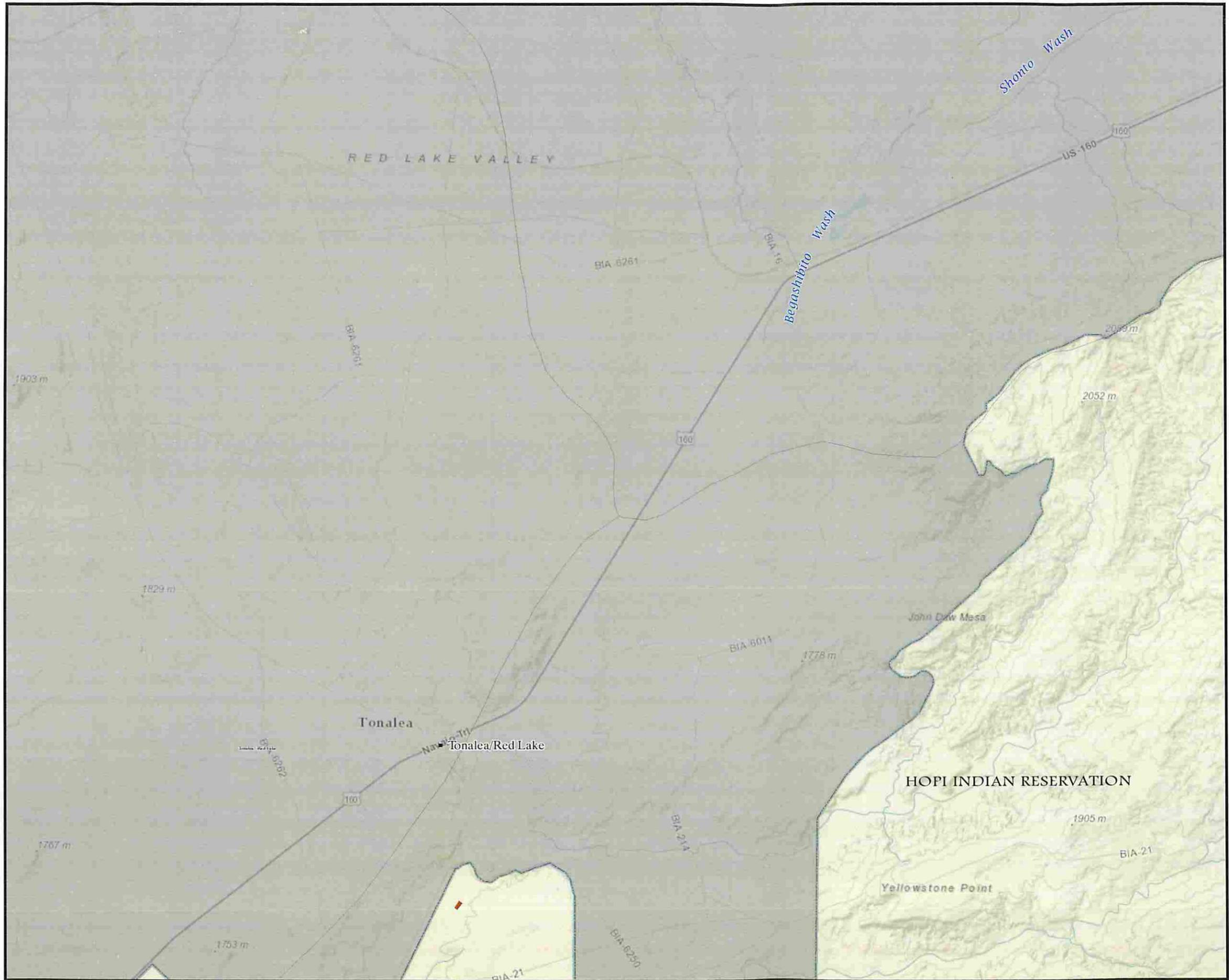
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16 By: Joe Mentor
17 Joe Mentor, Jr.

18 *Counsel for the Hopi Tribe*
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23
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25
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Appendix 1



HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

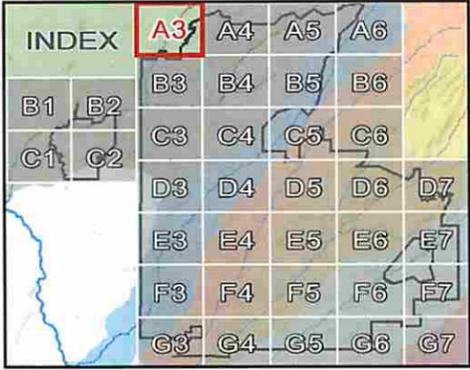
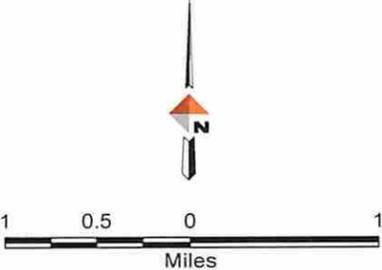
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- Previously Identified HIA; ADWR Did Not Attempt to Verify

Northern Wash Subbasins

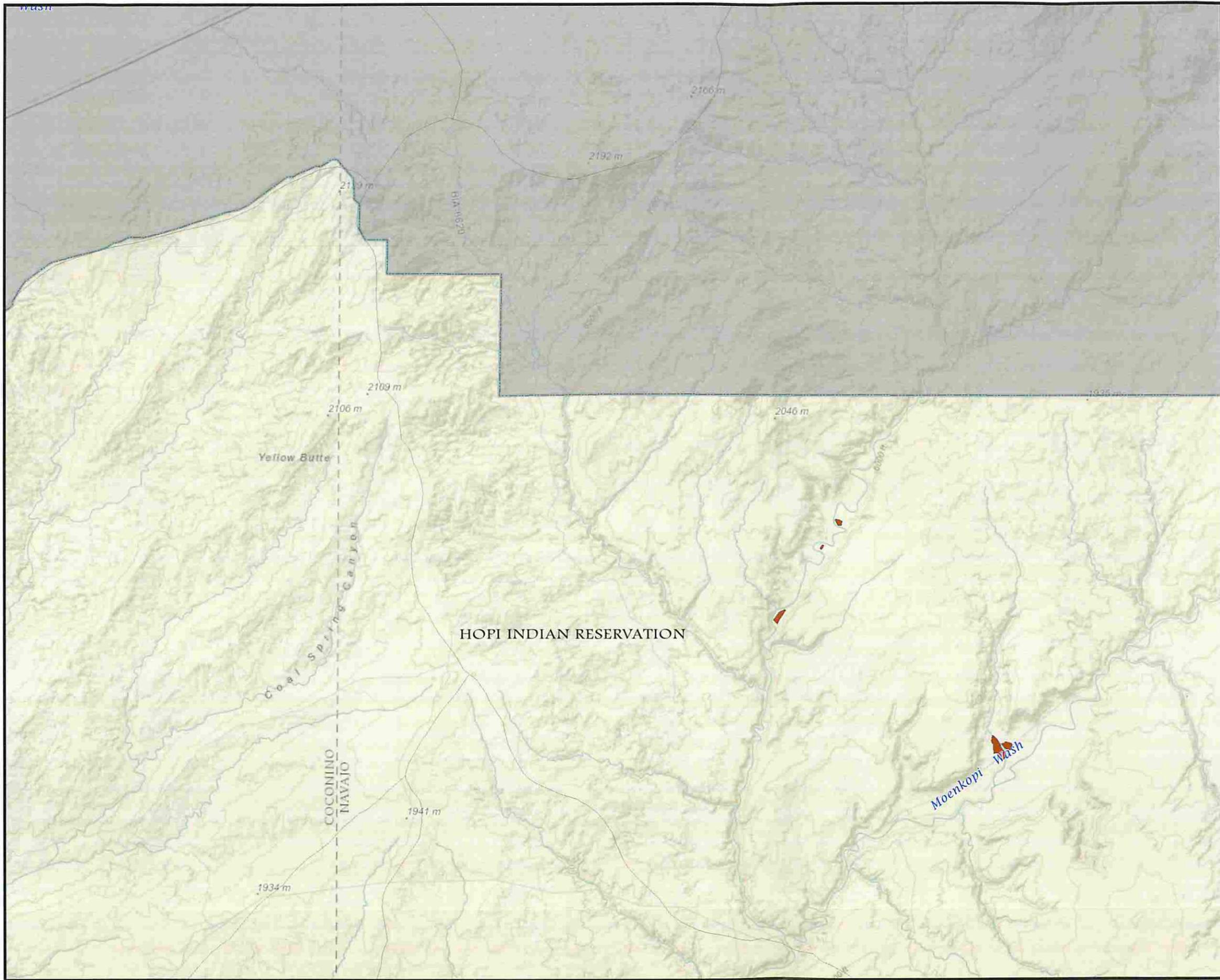
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- Oraibi
- Polacca
- Jeddito
- Cottonwood

Hopi Reservation Boundary



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HOPI INDIAN RESERVATION

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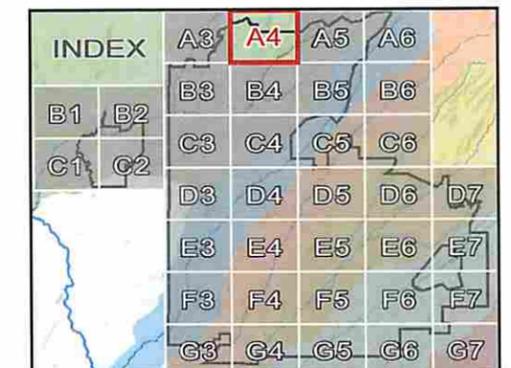
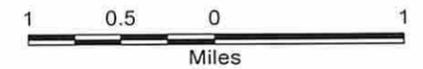
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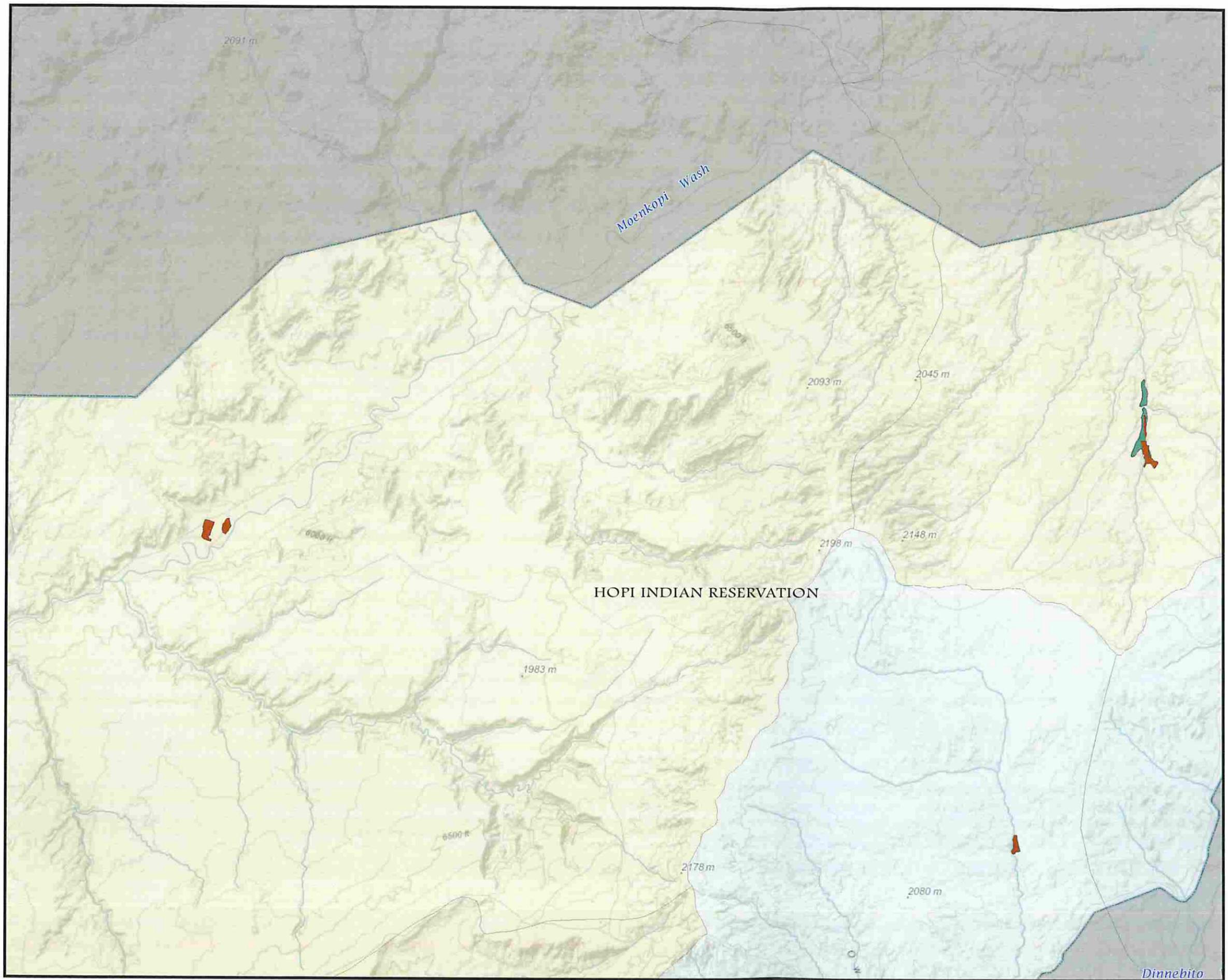
Hopi Reservation Boundary



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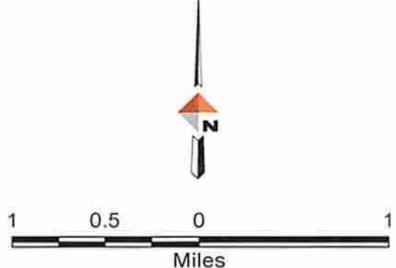


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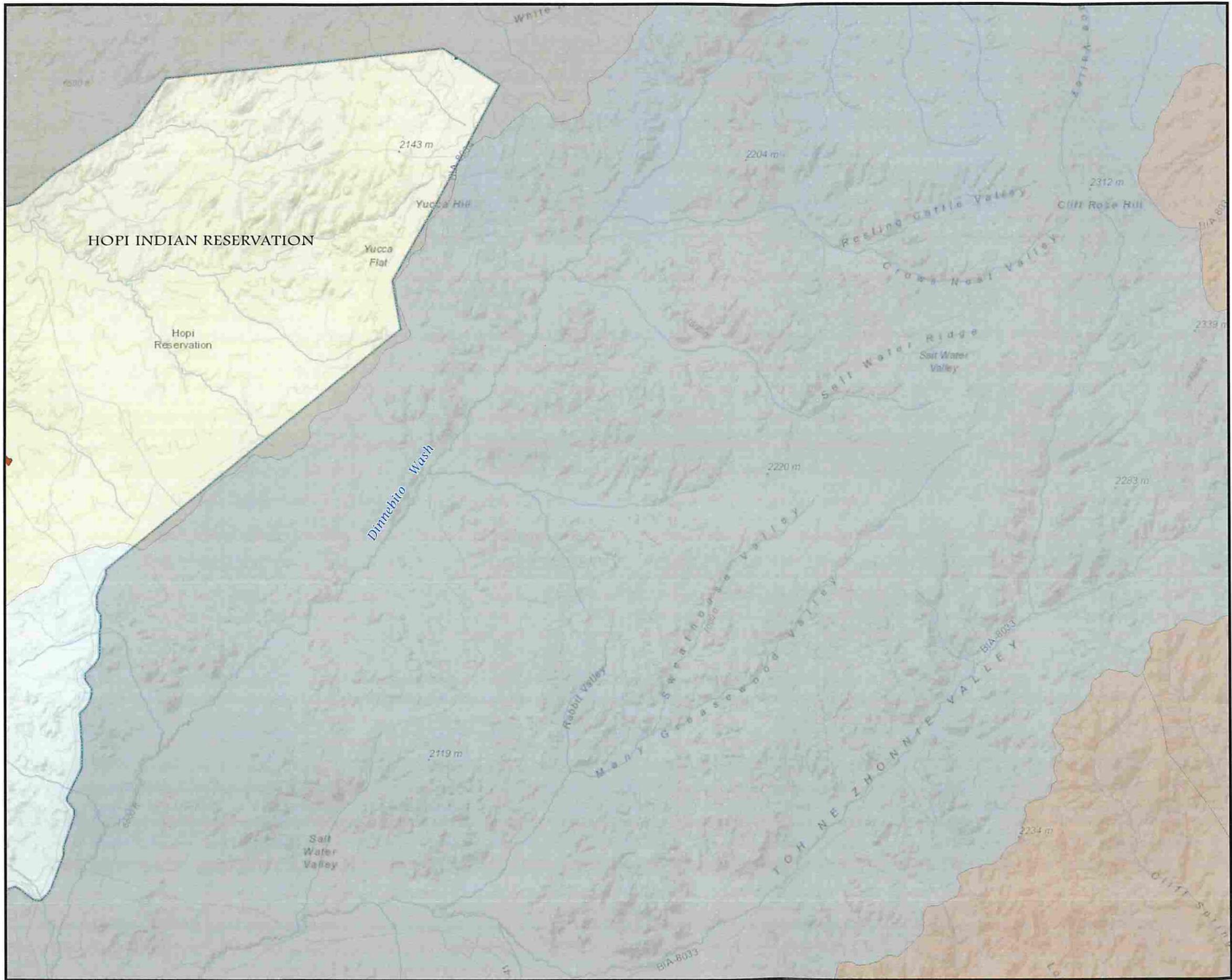
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Hopi Reservation Boundary



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HOPI INDIAN RESERVATION

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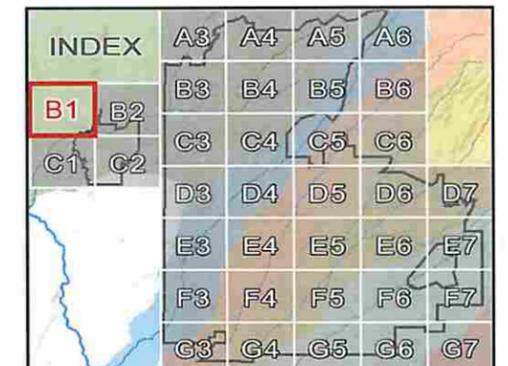
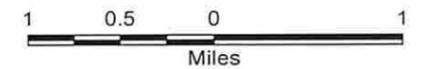
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Hopi Reservation Boundary



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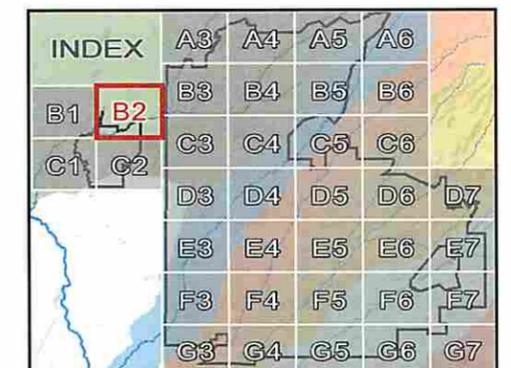
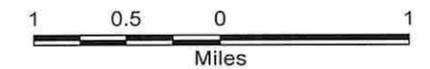
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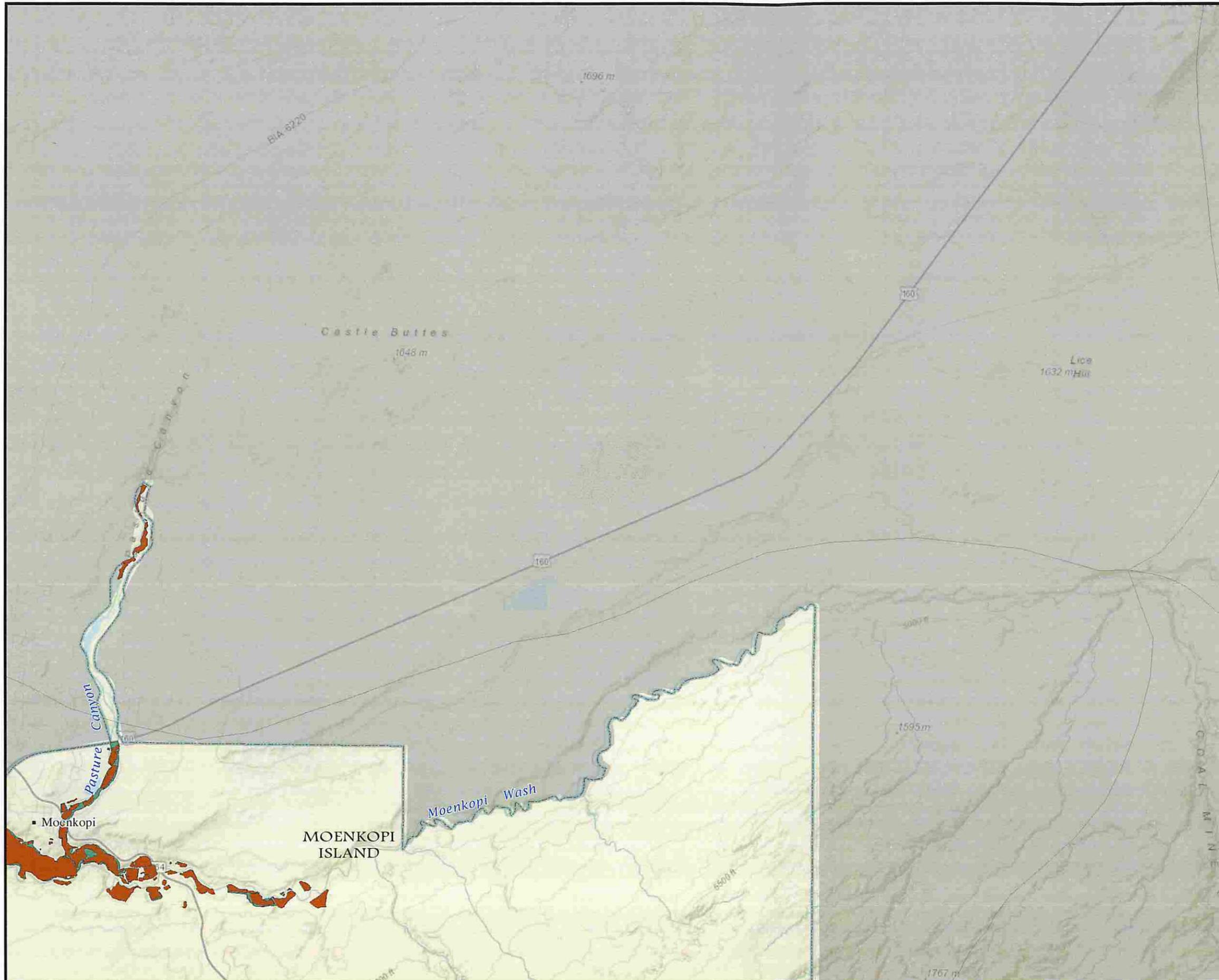
Hopi Reservation Boundary

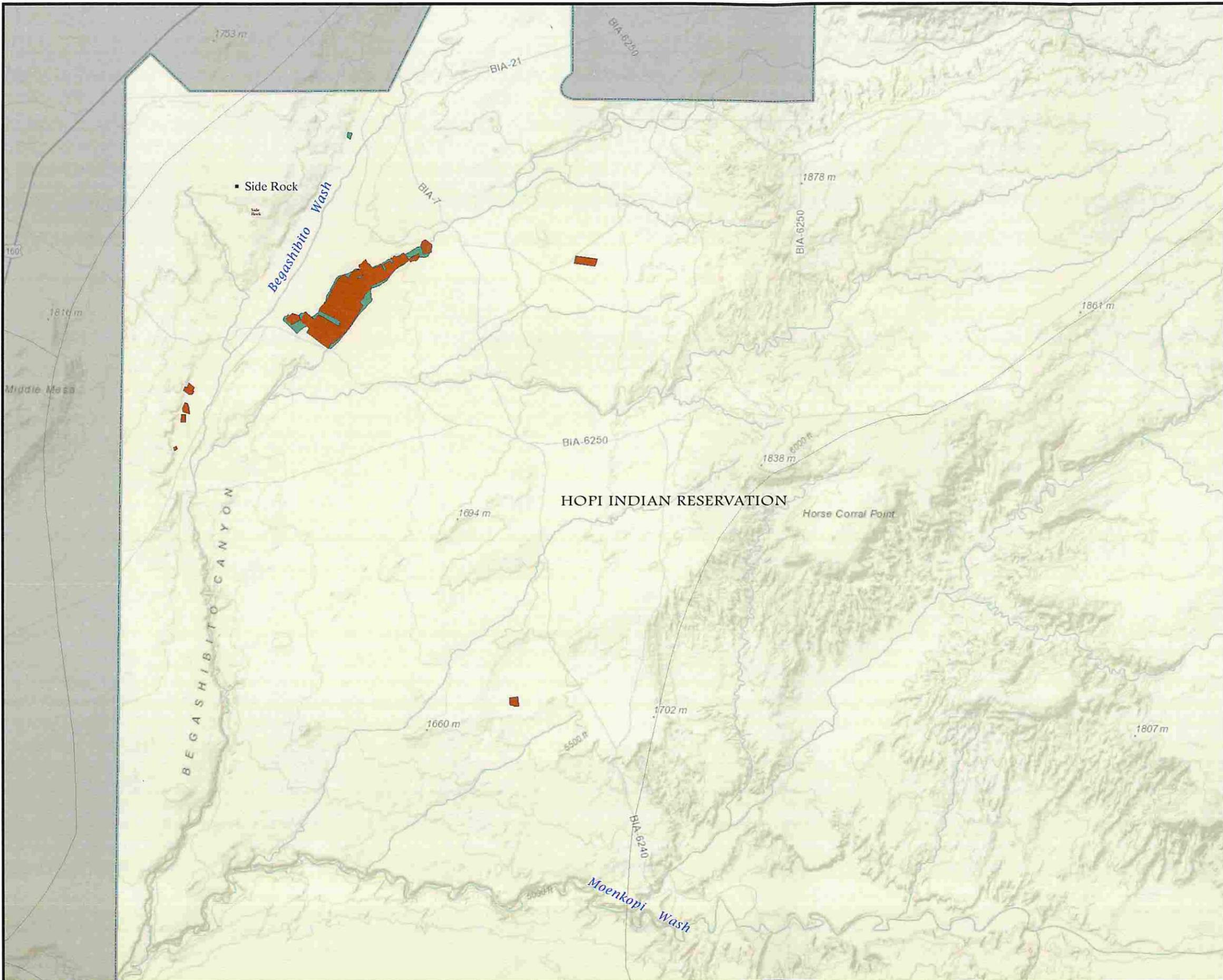


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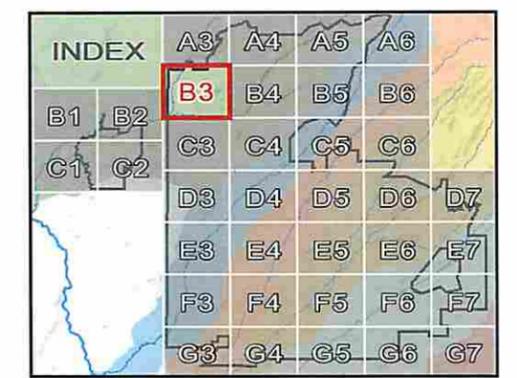
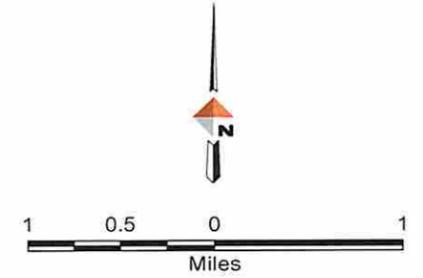


HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

- LEGEND**
- Federal - Historically Irrigated Acreage (HIA)
 - Additional ADWR Verified HIA
 - Previously Identified HIA; ADWR Did Not Attempt to Verify

- Northern Wash Subbasins**
- Moenkopi
 - Dinnebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood
- Hopi Reservation Boundary



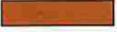
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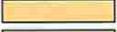
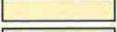
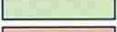
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HOPI INDIAN RESERVATION HISTORIC IRRIGATION

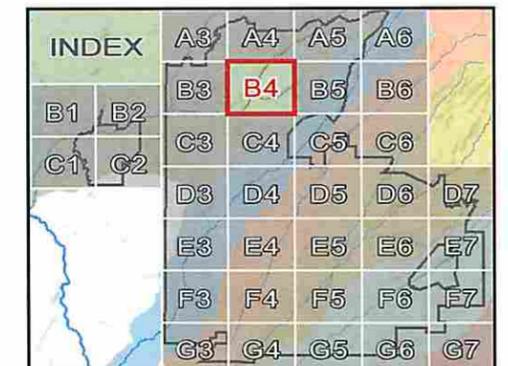
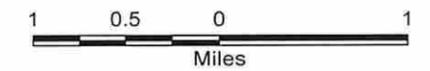
LEGEND

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Northern Wash Subbasins

-  Moenkopi
-  Dinnebito
-  Oraibi
-  Polacca
-  Jeddito
-  Cottonwood

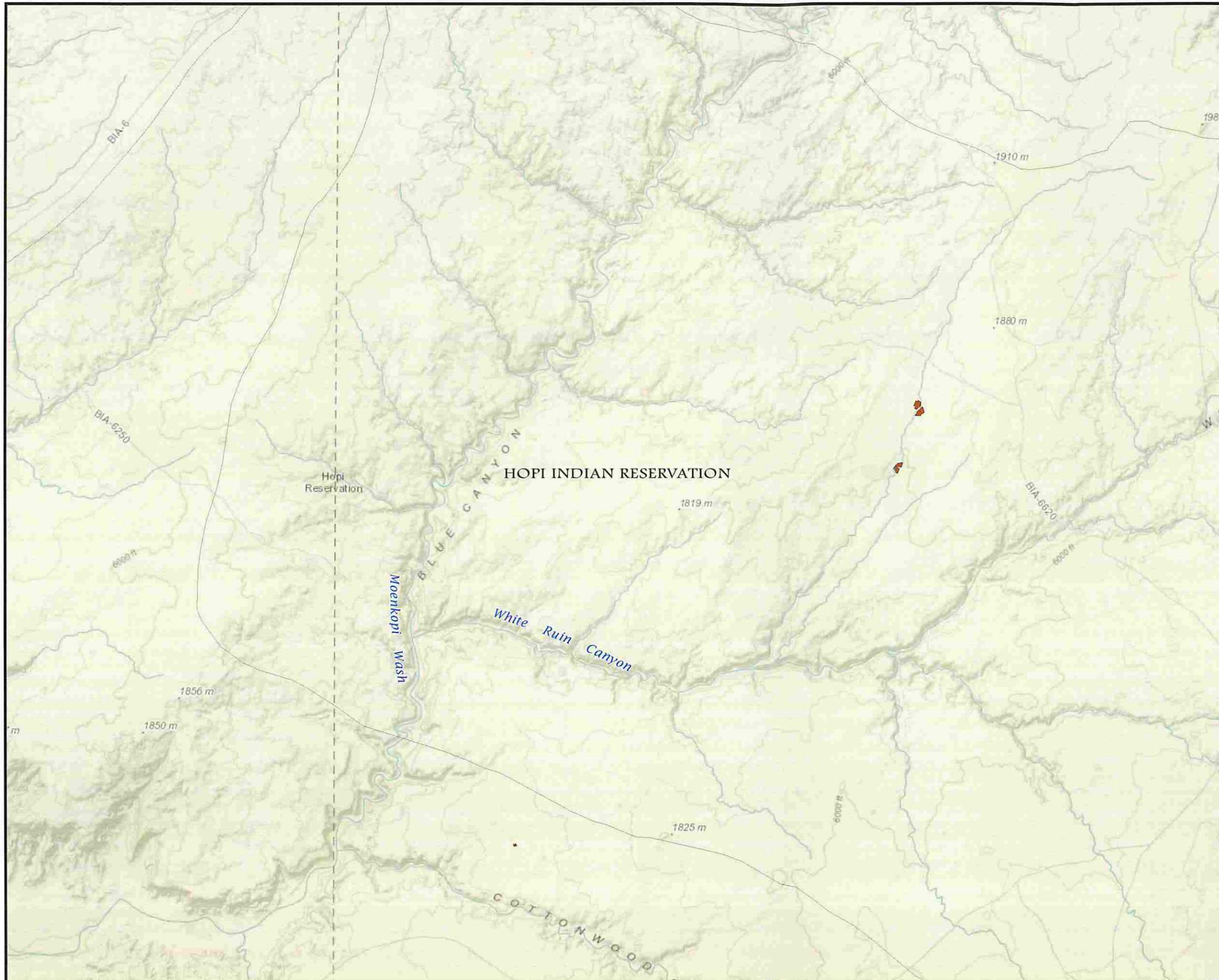
-  Hopi Reservation Boundary

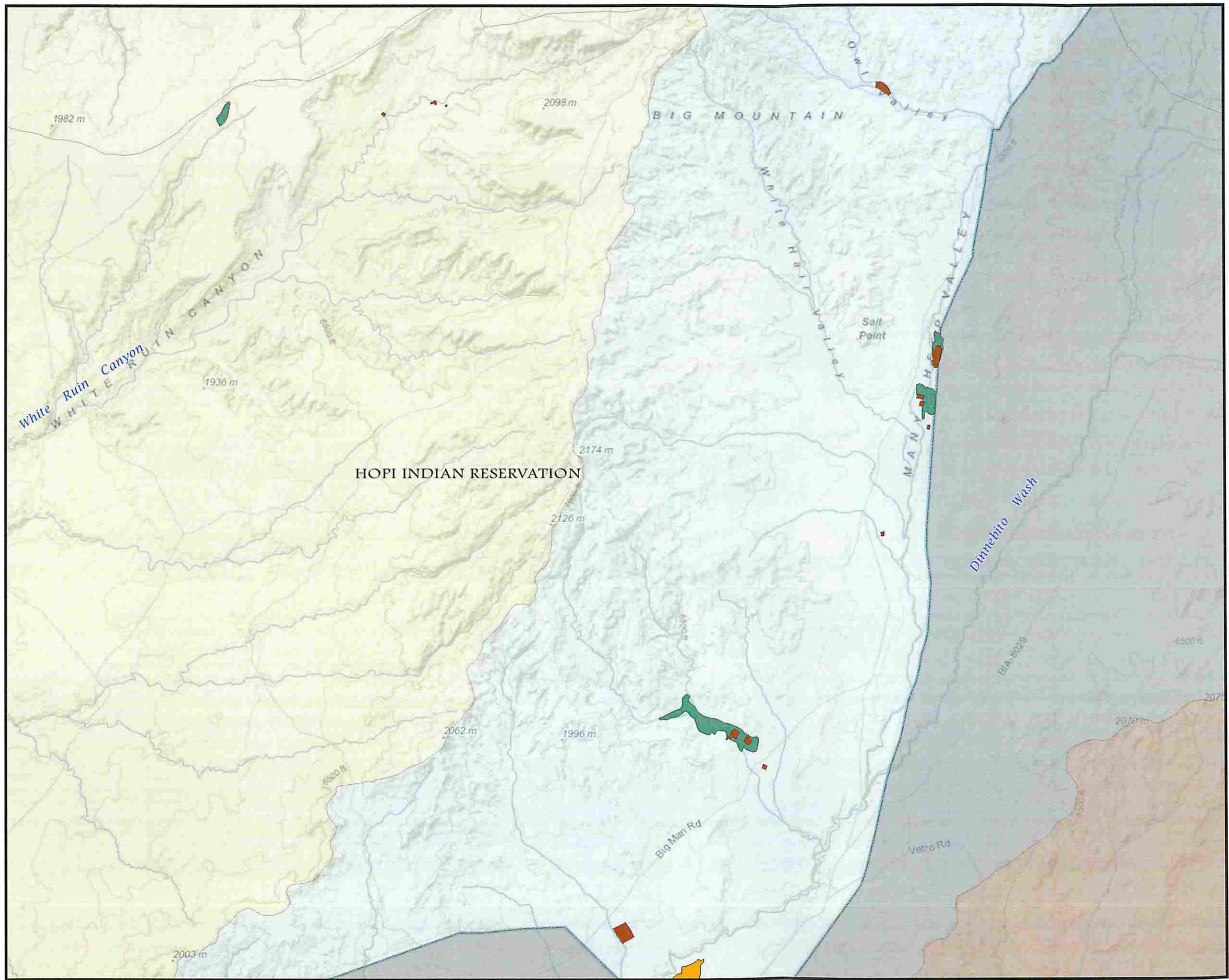


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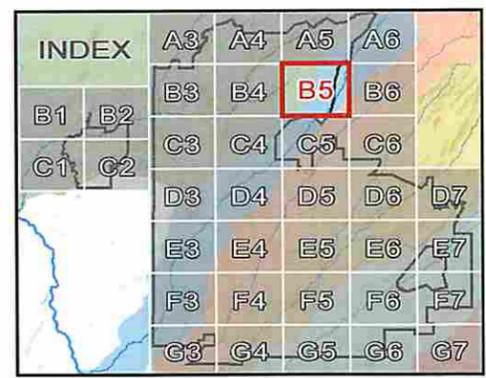
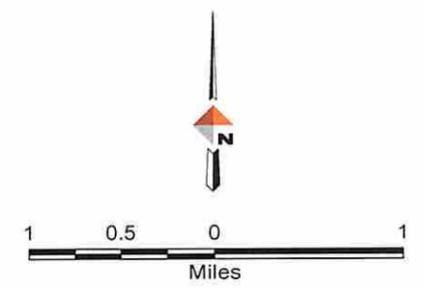


HOPI INDIAN RESERVATION HISTORIC IRRIGATION

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 - Previously Identified HIA; ADWR Did Not Attempt to Verify

- Northern Wash Subbasins**
- Moenkopi
 - Dinnebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood

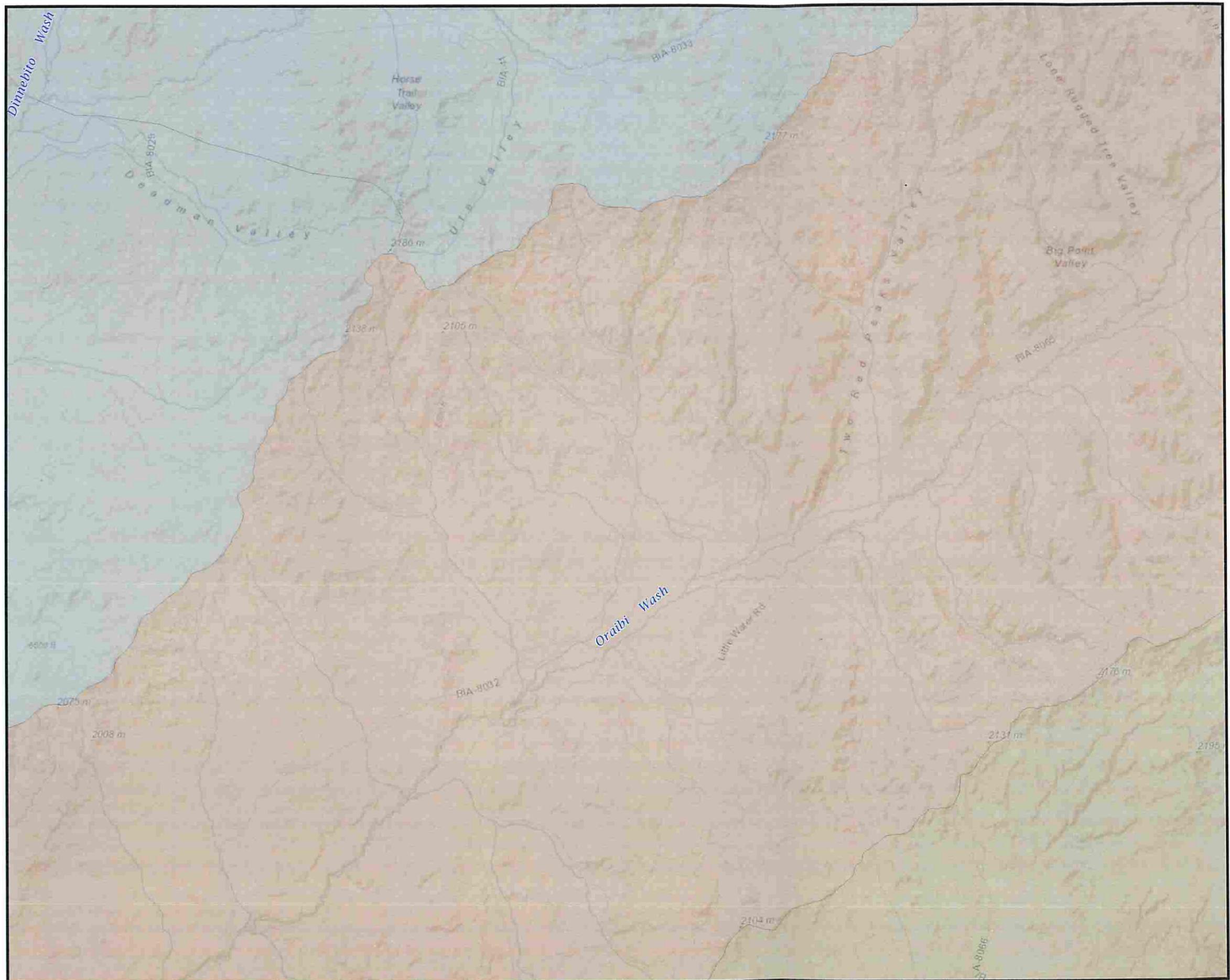
Hopi Reservation Boundary



B5

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HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

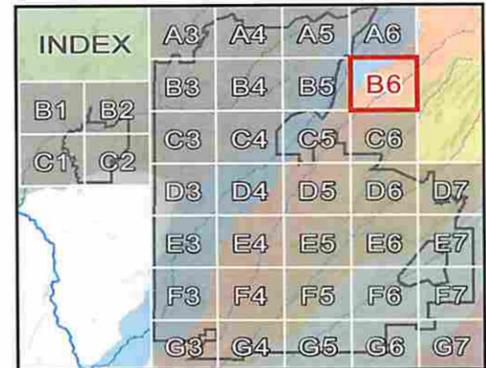
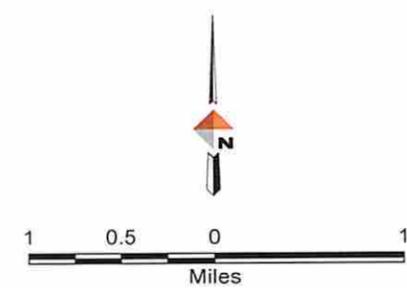
LEGEND

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Northern Wash Subbasins

- Moenkopi
- Dinnebito
- Oraibi
- Polacca
- Jeddito
- Cottonwood

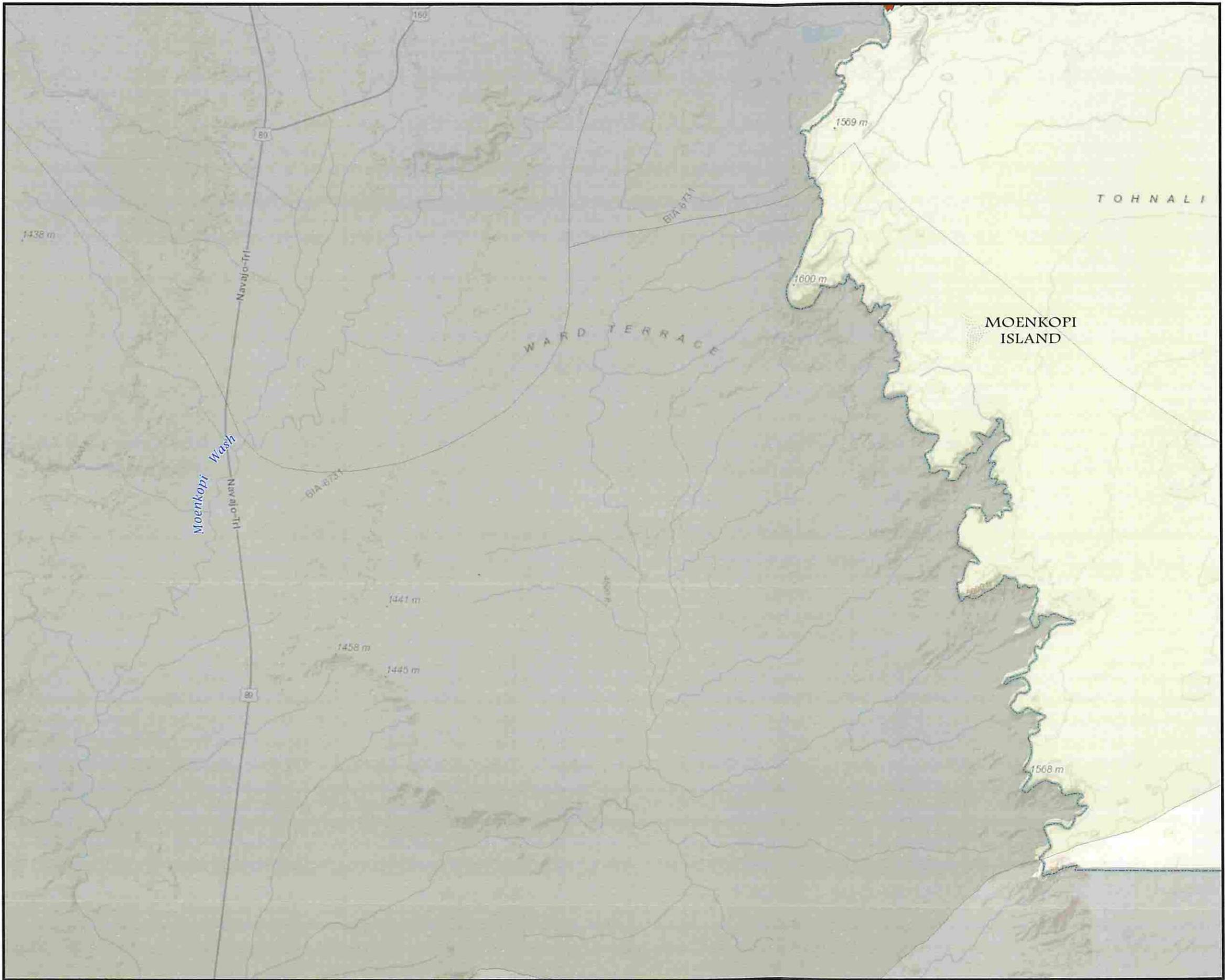
Hopi Reservation Boundary



B6

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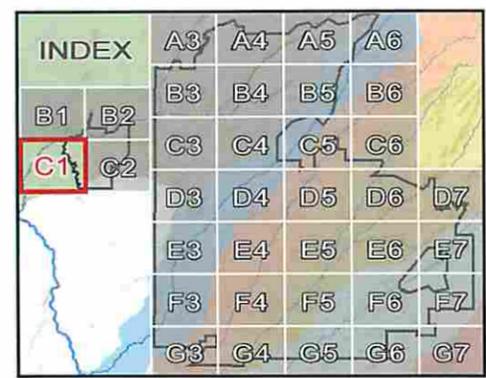
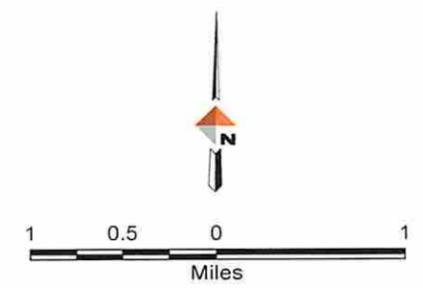


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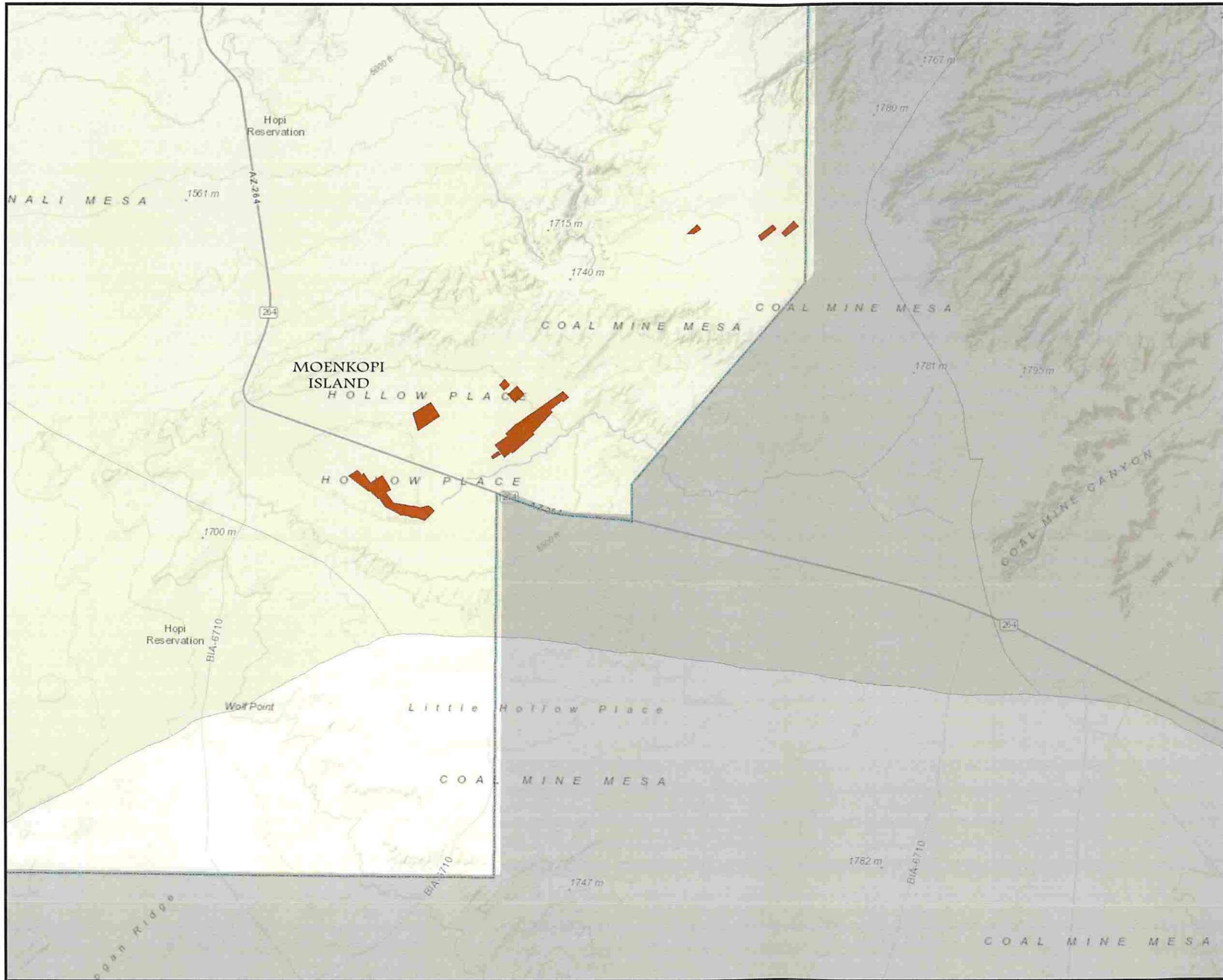
HISTORIC IRRIGATION

- LEGEND**
- Federal - Historically Irrigated Acreage (HIA)
 - Additional ADWR Verified HIA
 - Previously Identified HIA; ADWR Did Not Attempt to Verify

- Northern Wash Subbasins**
- Moenkopi
 - Dinnebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood
- Hopi Reservation Boundary



C1



HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

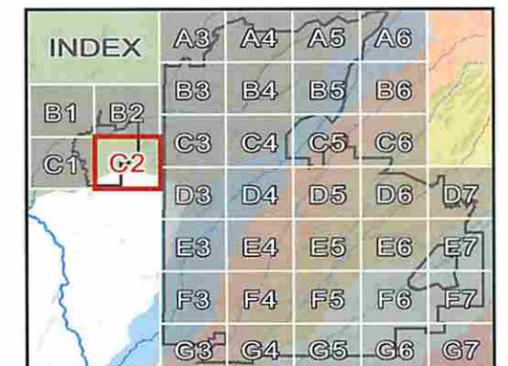
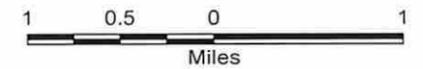
LEGEND

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Northern Wash Subbasins

- Moenkopi
- Dinnebito
- Oraibi
- Polacca
- Jeddito
- Cottonwood

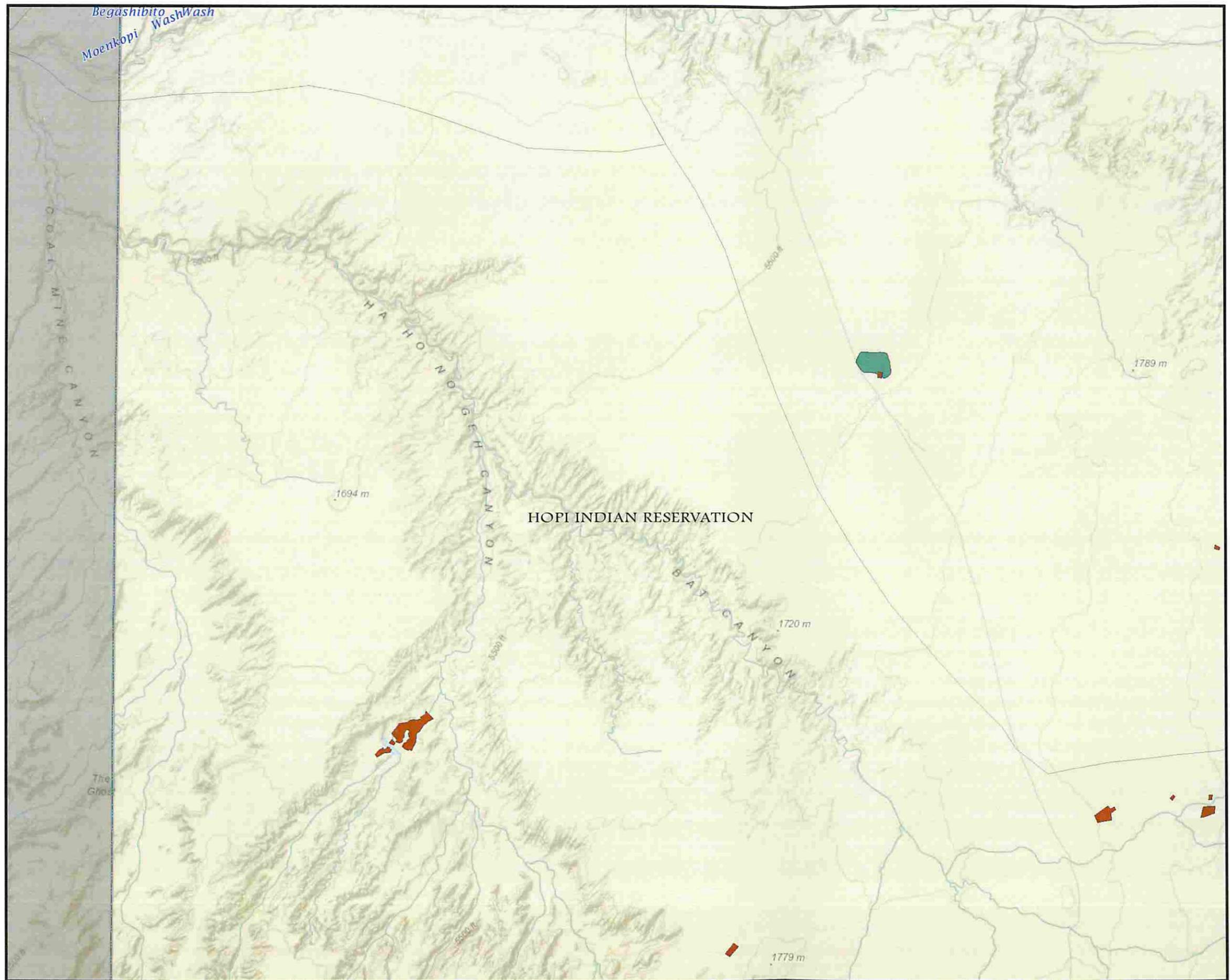
Hopi Reservation Boundary



C2

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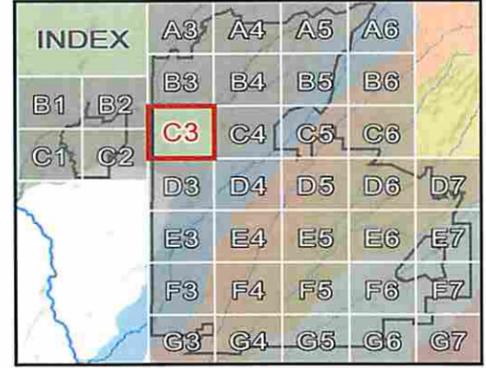
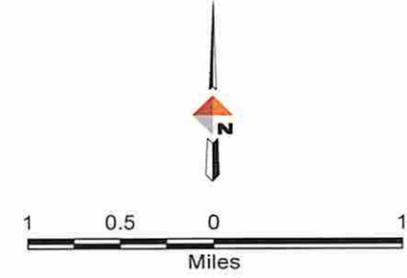


HOPI INDIAN RESERVATION

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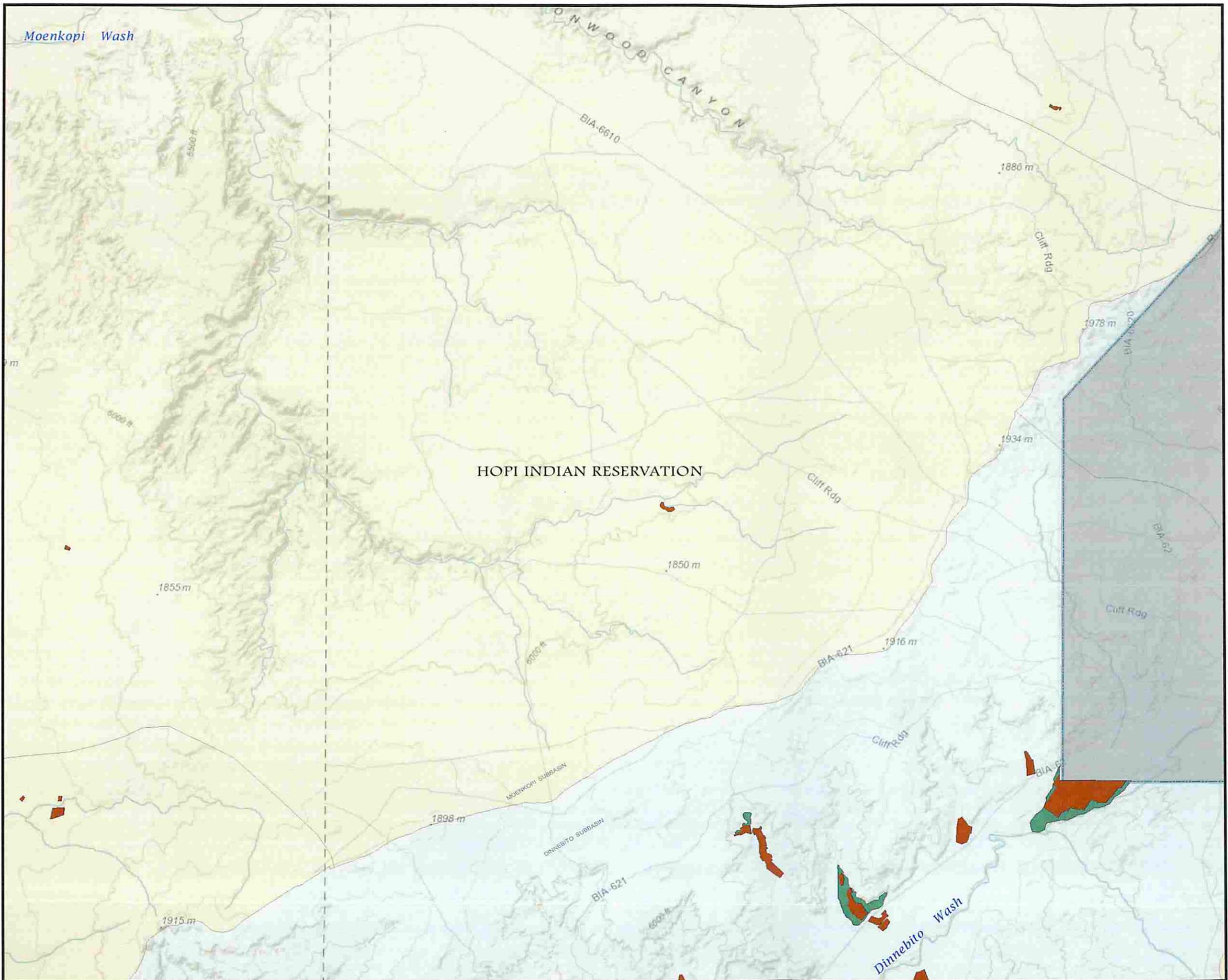
- Northern Wash Subbasins**
- Moenkopi
 - Dinnebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood
- Hopi Reservation Boundary



C3

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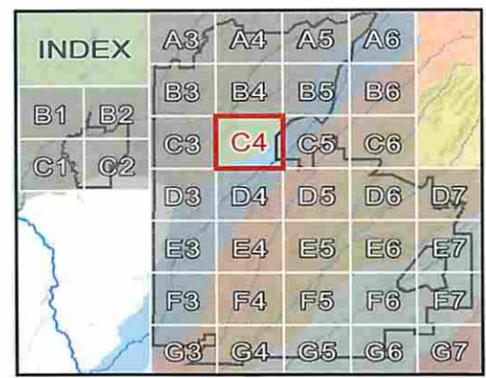
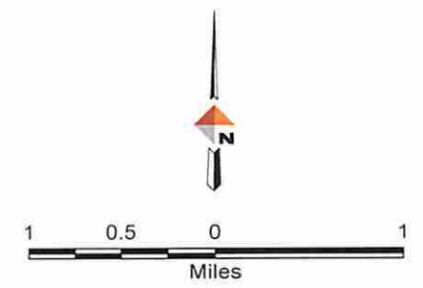


HOPI INDIAN RESERVATION

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- Moenkopi
 - Dinnebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood
- Hopi Reservation Boundary



C4

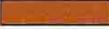
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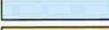
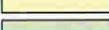
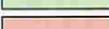
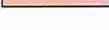
HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

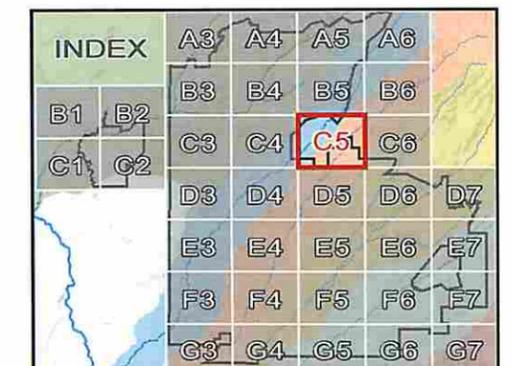
LEGEND

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Northern Wash Subbasins

-  Moenkopi
-  Dinnebito
-  Oraibi
-  Polacca
-  Jeddito
-  Cottonwood

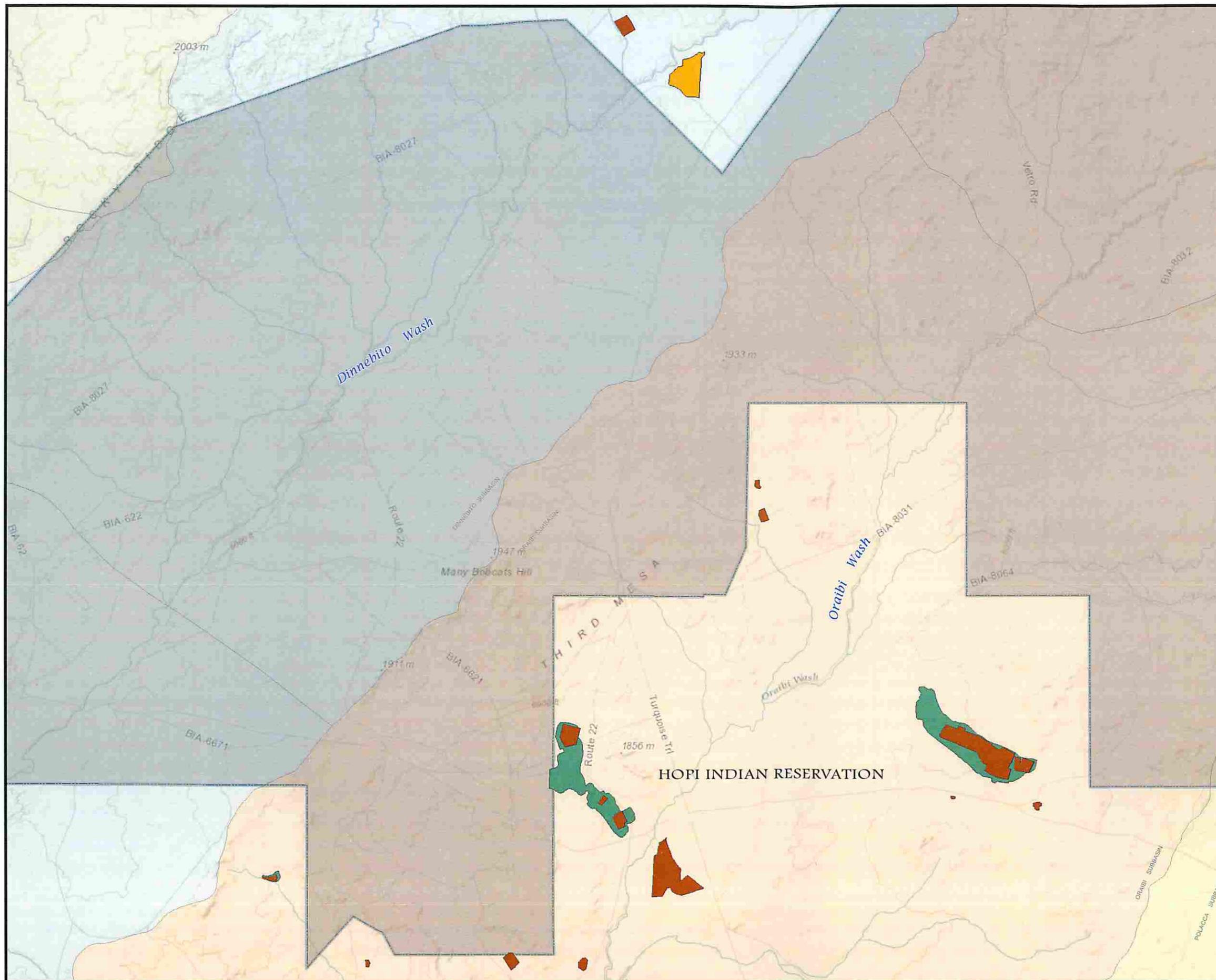
 Hopi Reservation Boundary

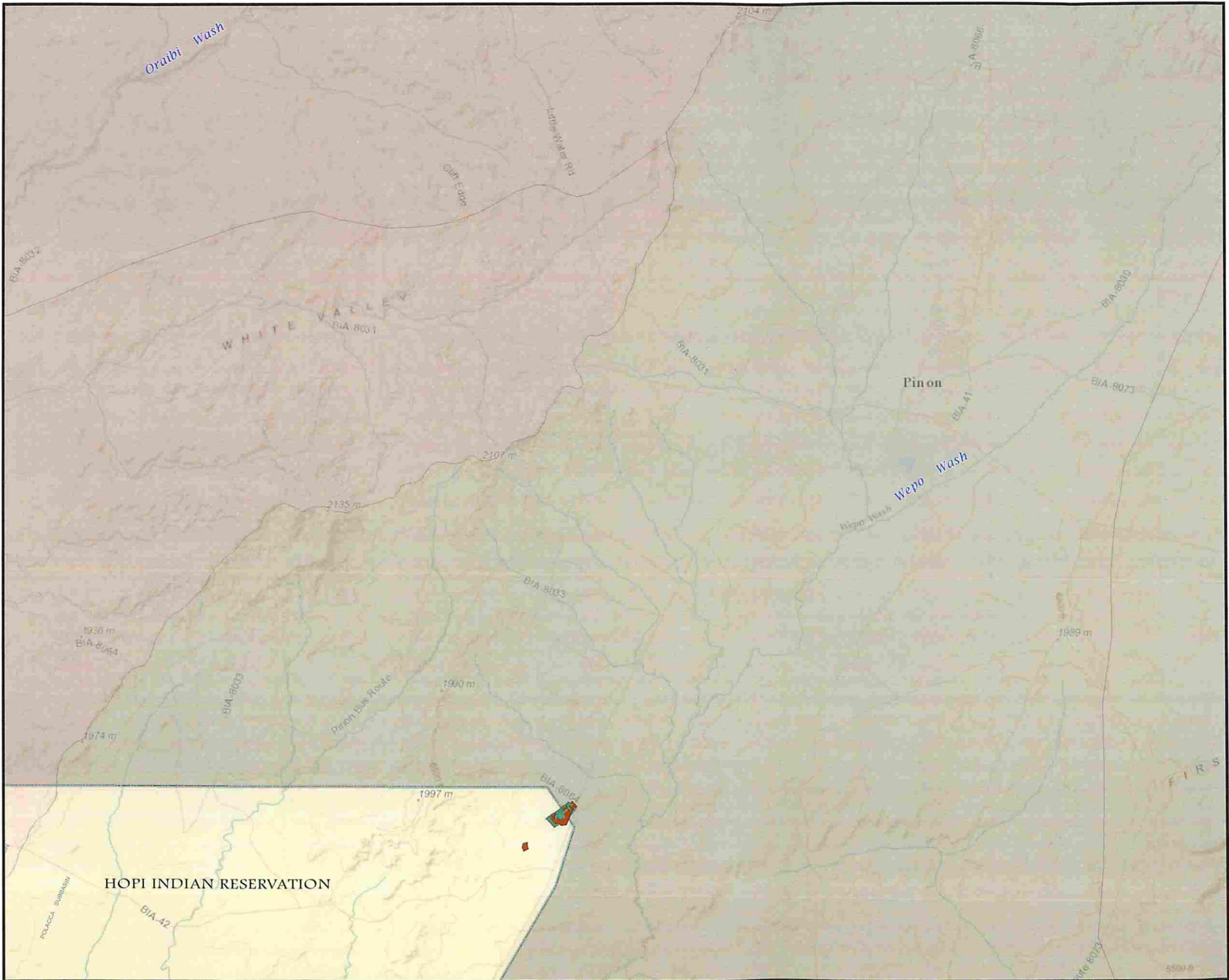


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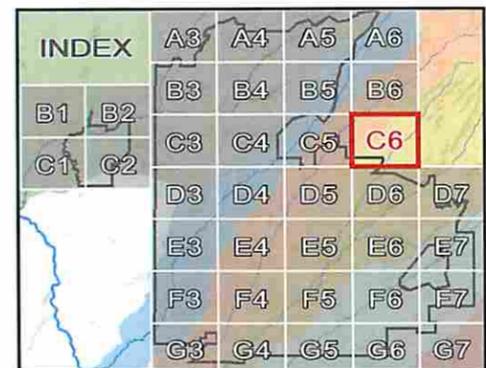
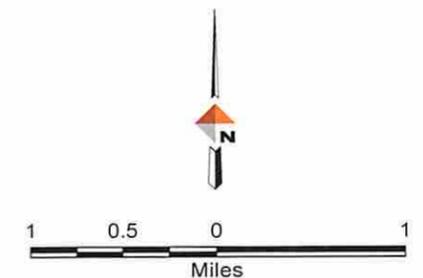


HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

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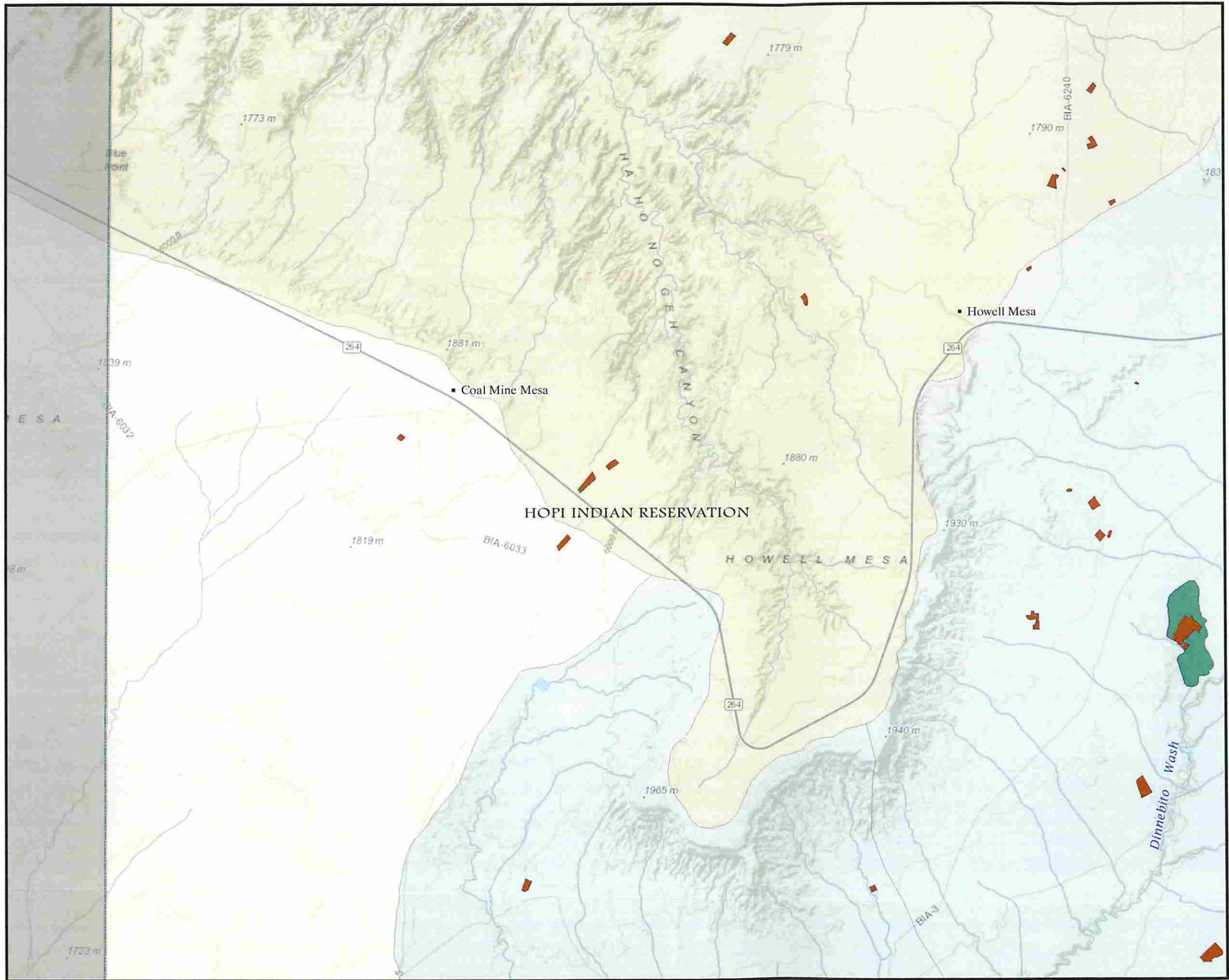
- Northern Wash Subbasins**
- Moenkopi
 - Dinnebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood
- Hopi Reservation Boundary



C6

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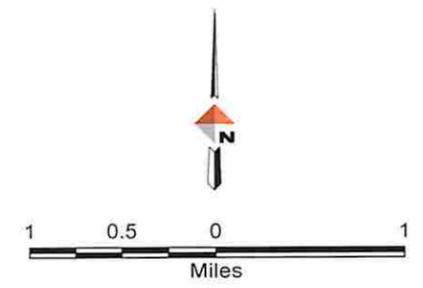
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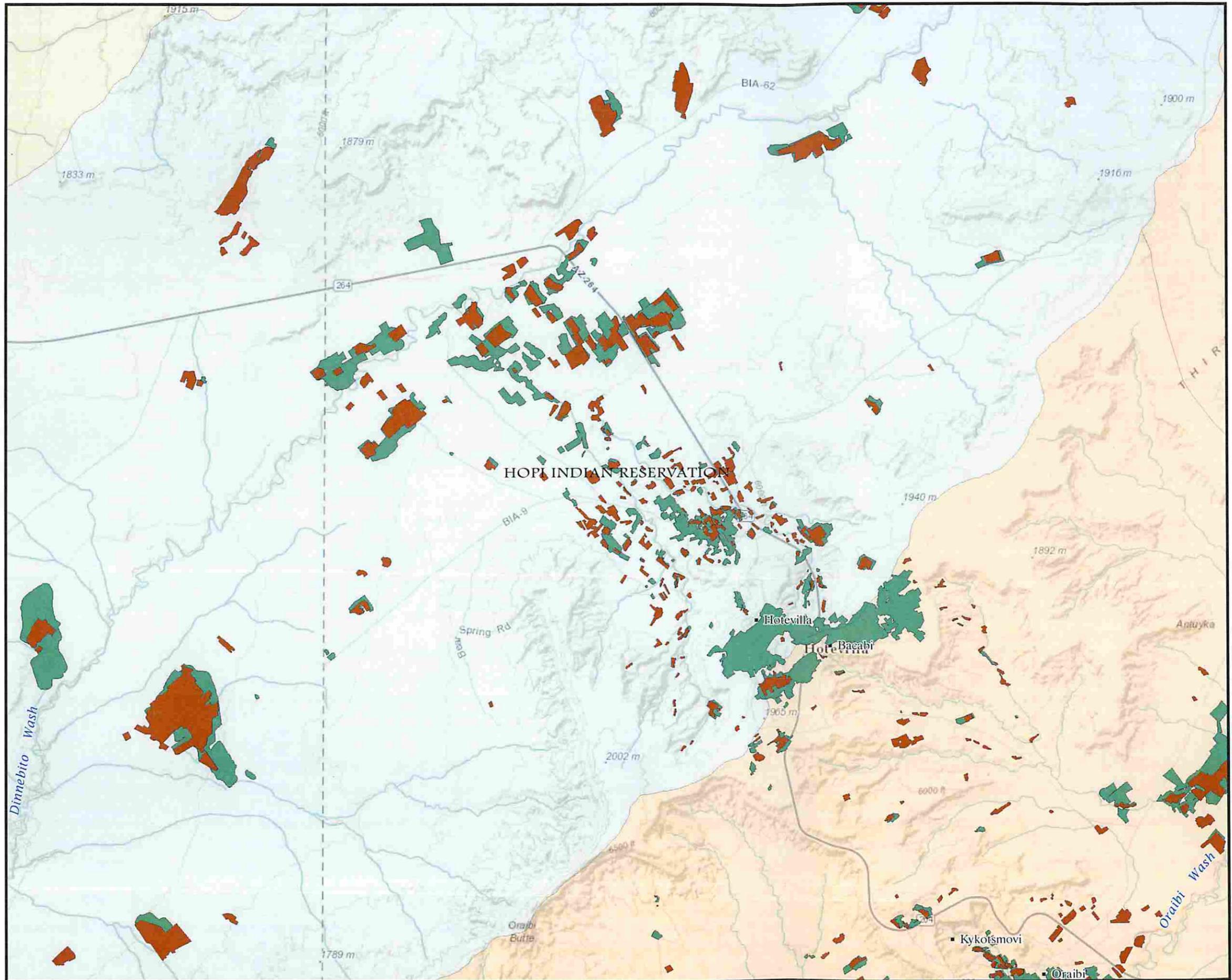
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		G3	G4	G5	G6
					G7



D3

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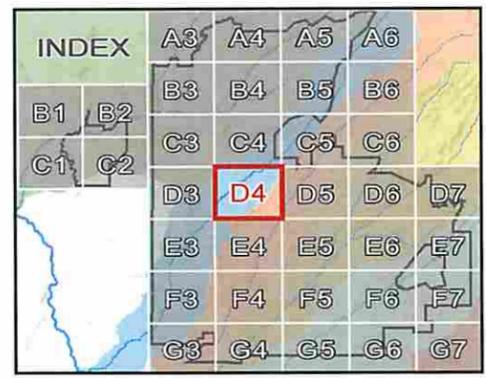
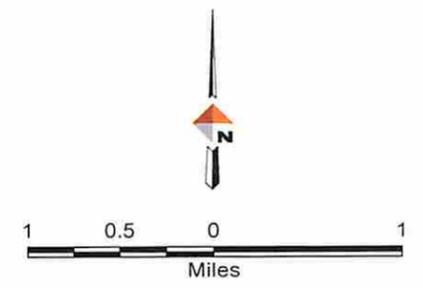
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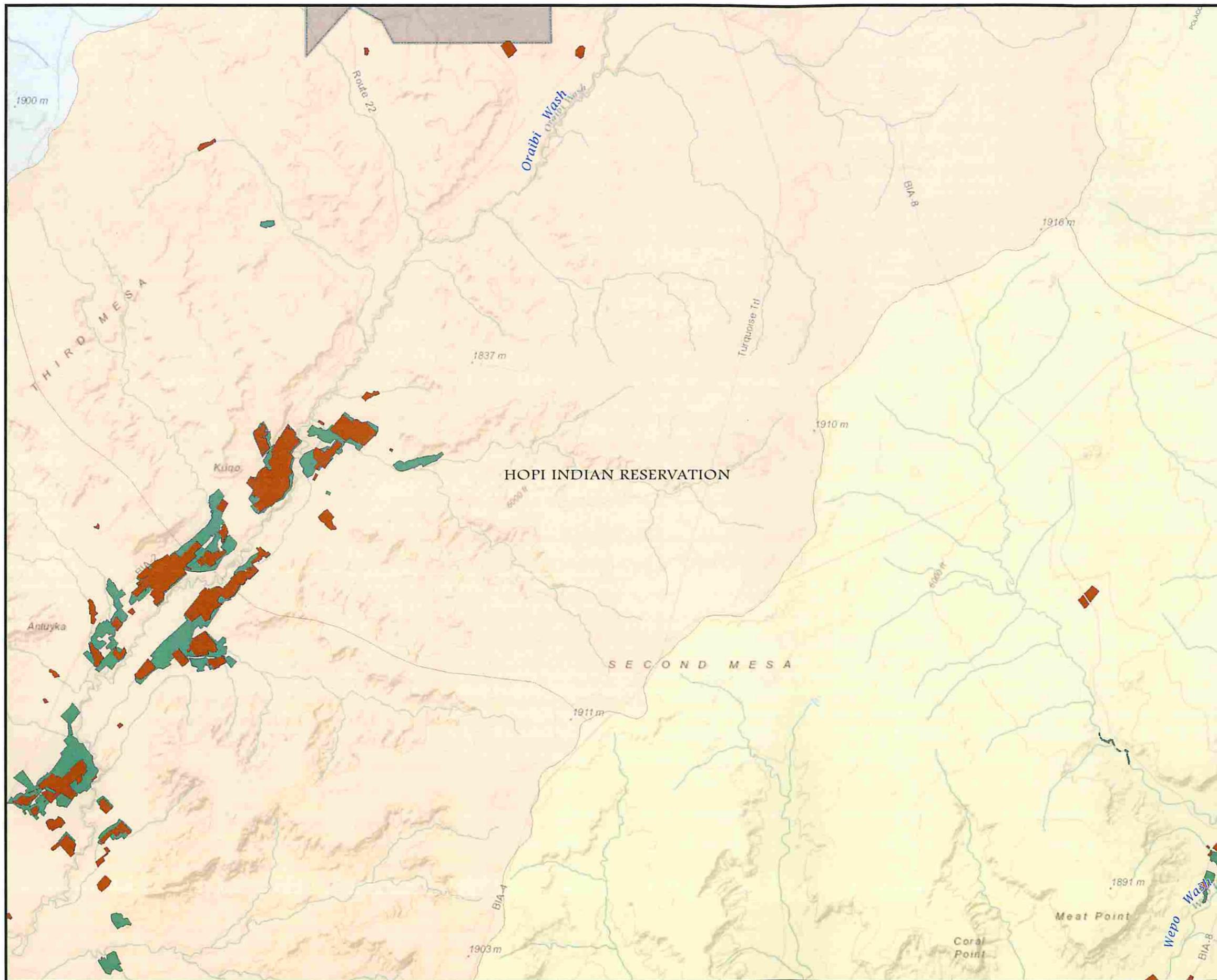
- Northern Wash Subbasins**
- Moenkopi
 - Dinnebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood
 - Hopi Reservation Boundary



D4

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HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

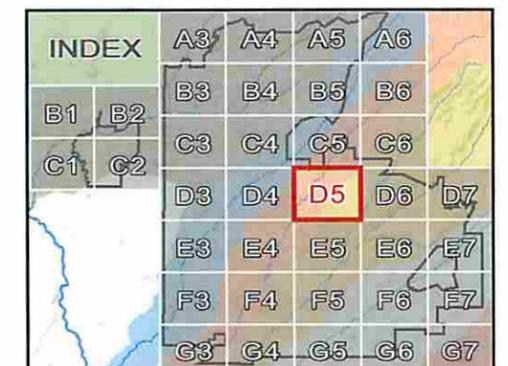
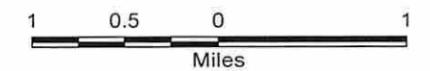
LEGEND

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Northern Wash Subbasins

- Moenkopi
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- Oraibi
- Polacca
- Jeddito
- Cottonwood

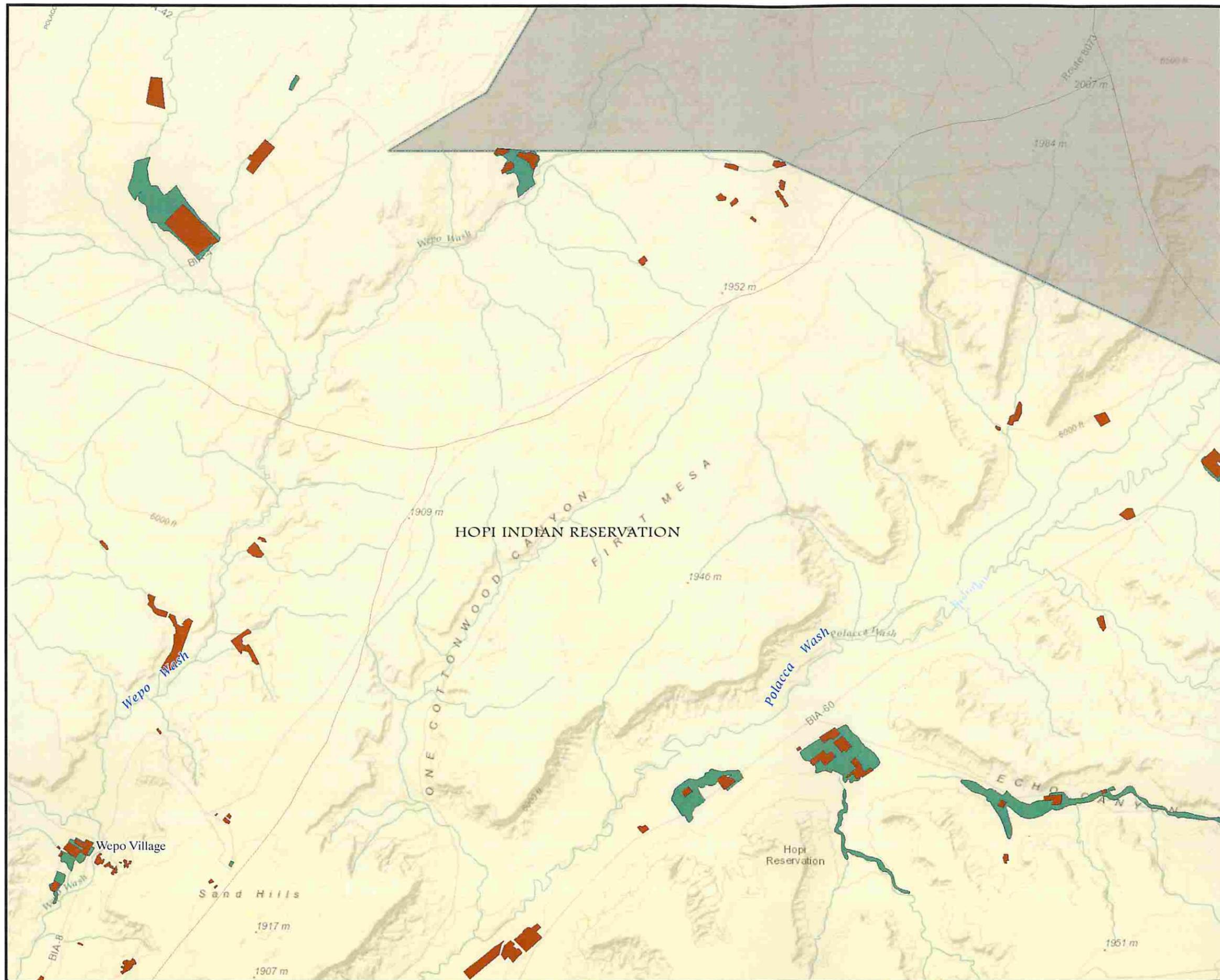
Hopi Reservation Boundary



D5

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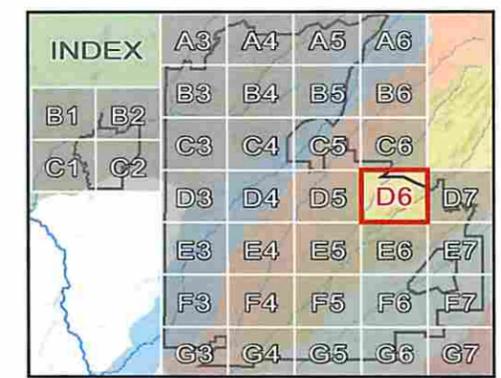
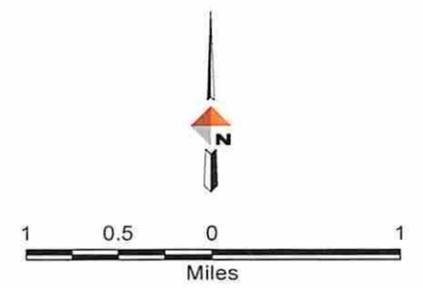
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HOPI INDIAN RESERVATION HISTORIC IRRIGATION

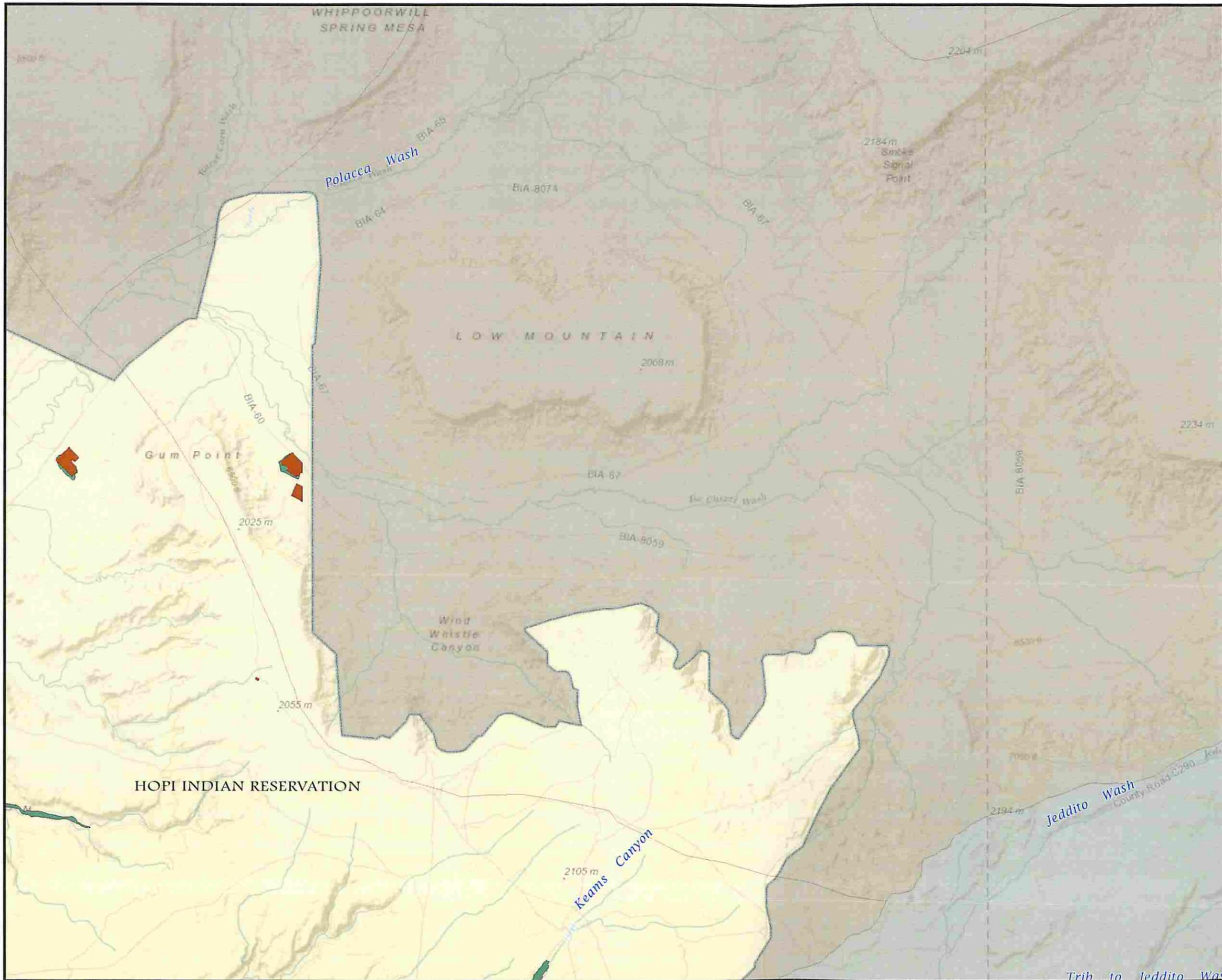
- LEGEND**
- Federal - Historically Irrigated Acreage (HIA)
 - Additional ADWR Verified HIA
 - Previously Identified HIA; ADWR Did Not Attempt to Verify

- Northern Wash Subbasins**
- Moenkopi
 - Dinnebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood
- Hopi Reservation Boundary



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HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

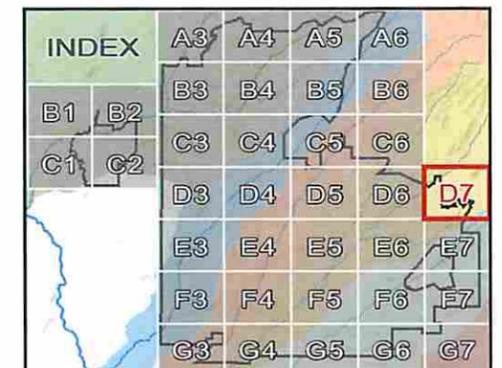
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Northern Wash Subbasins

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- Jeddito
- Cottonwood

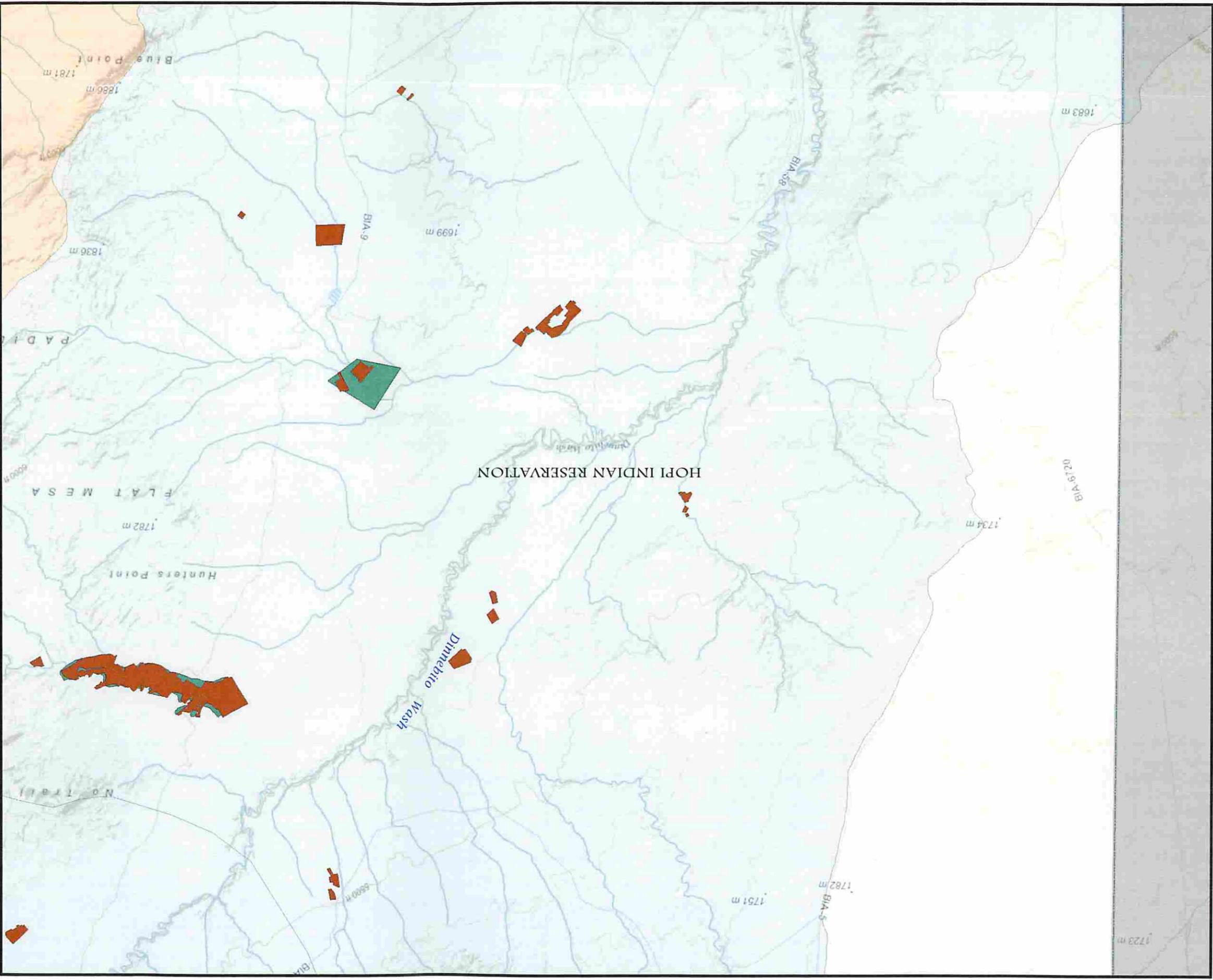
 Hopi Reservation Boundary



D7

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 - Dimebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood
 - Hopi Reservation Boundary

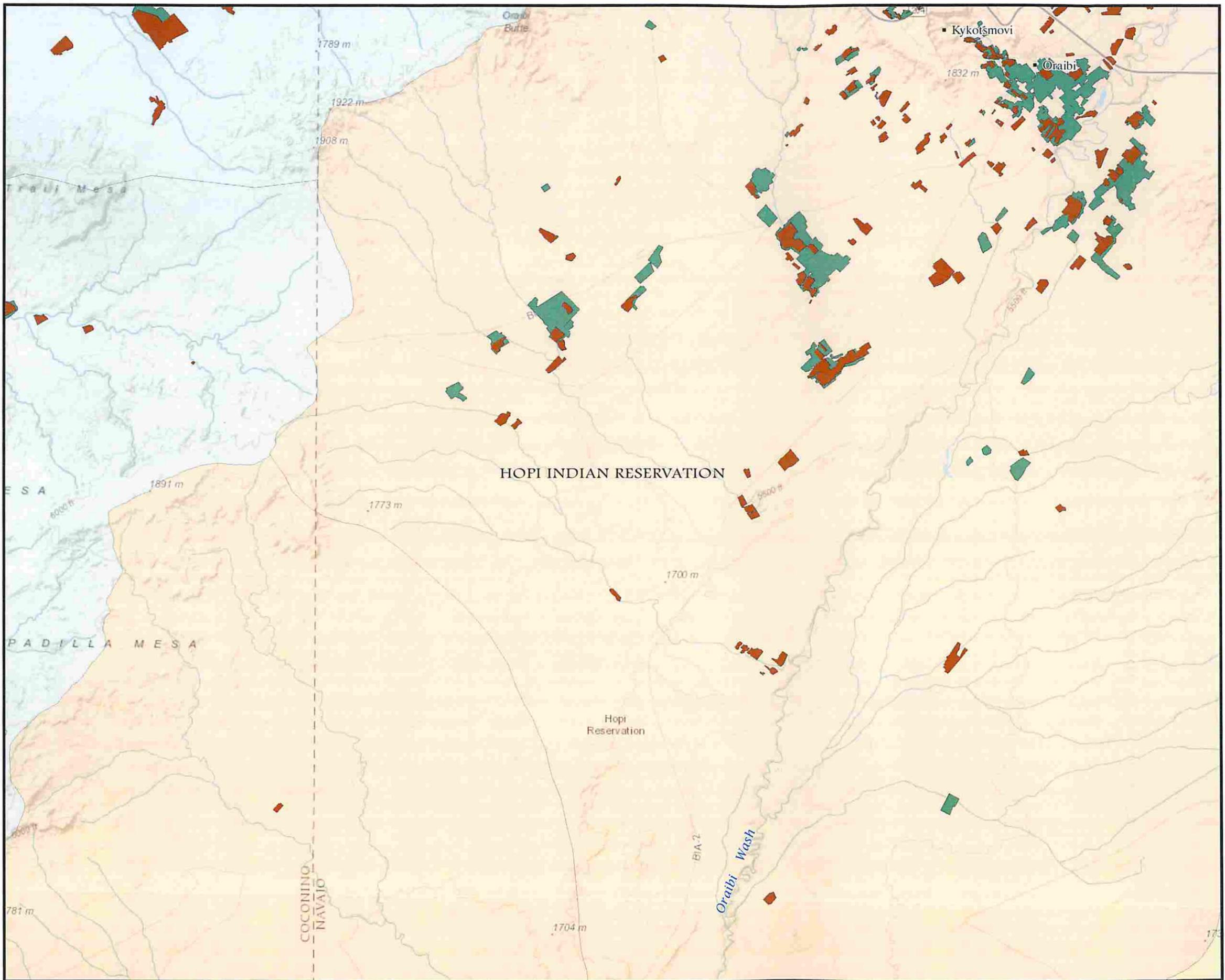


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HOPI INDIAN RESERVATION

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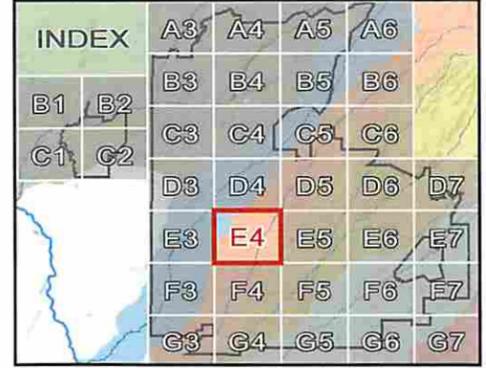
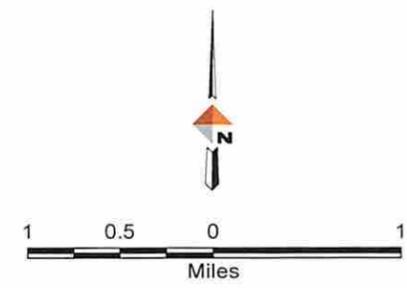
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Northern Wash Subbasins

- Moenkopi
- Dinnebito
- Oraibi
- Polacca
- Jeddito
- Cottonwood

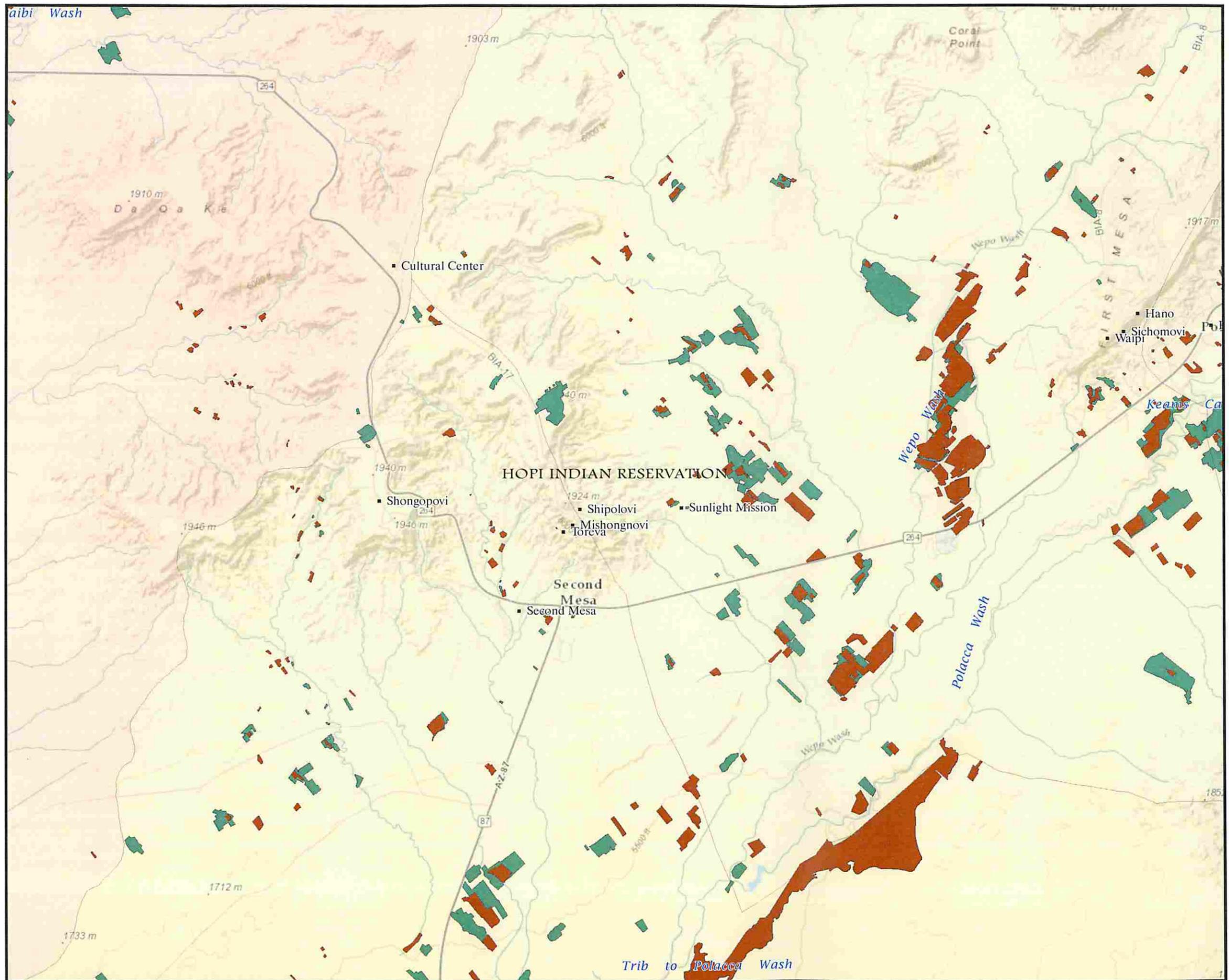
Hopi Reservation Boundary



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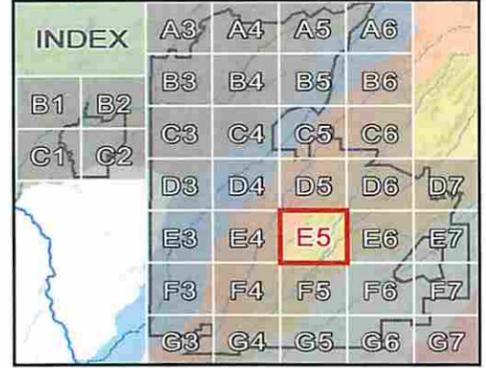
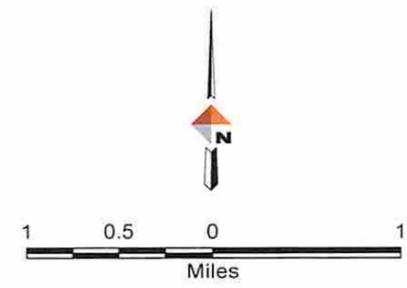
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Northern Wash Subbasins

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- Polacca
- Jeddito
- Cottonwood

Hopi Reservation Boundary

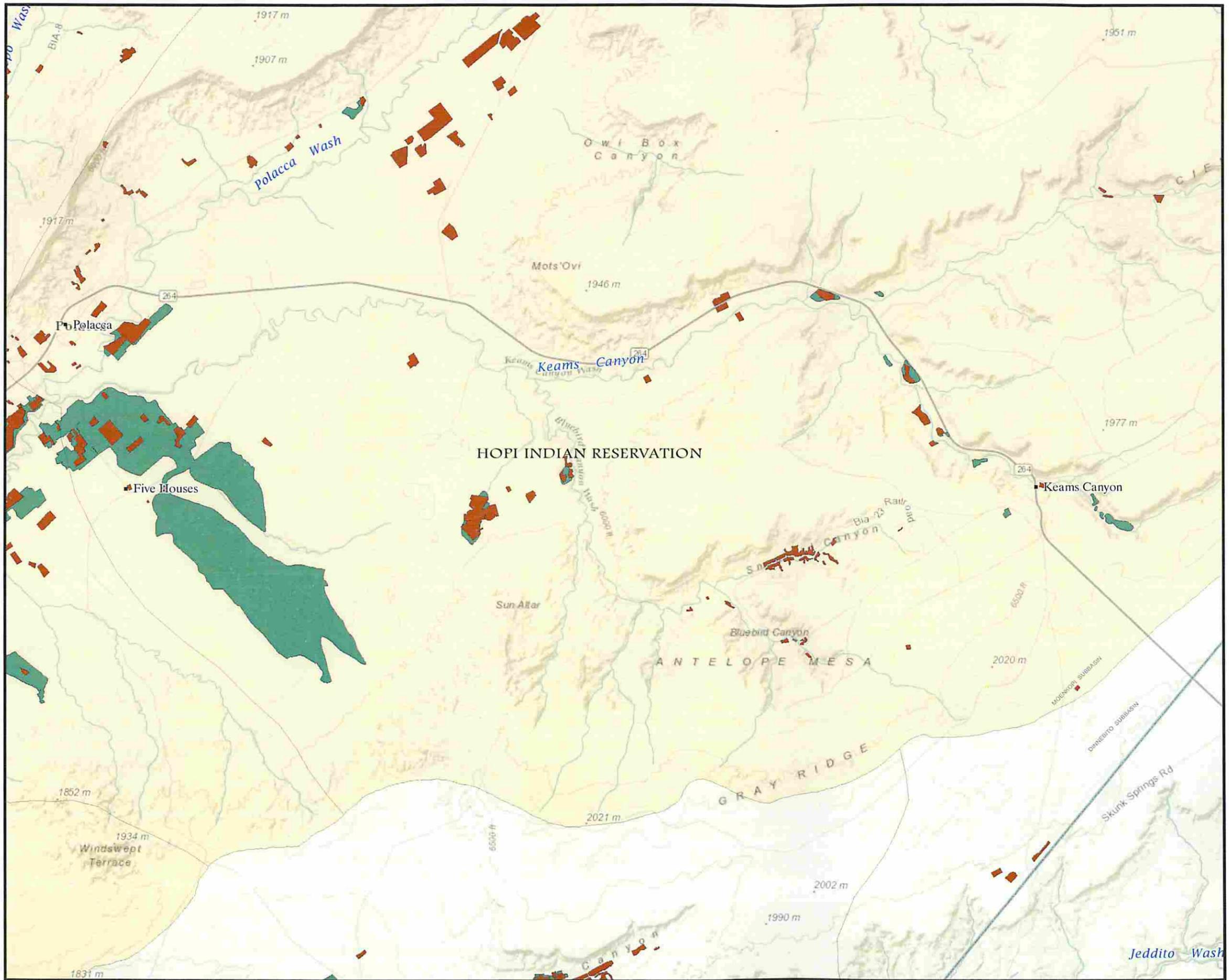


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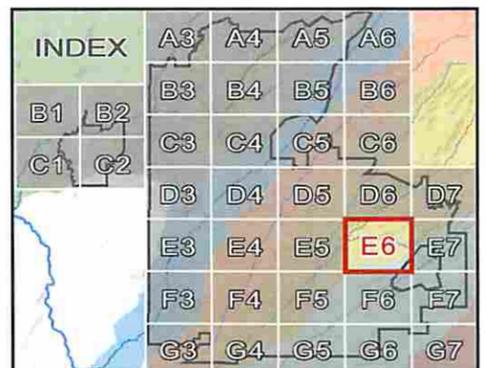
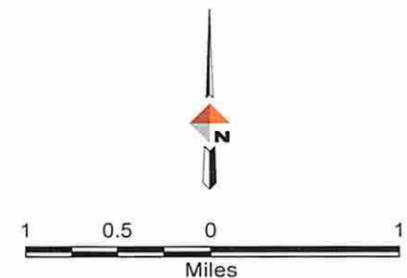
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Northern Wash Subbasins

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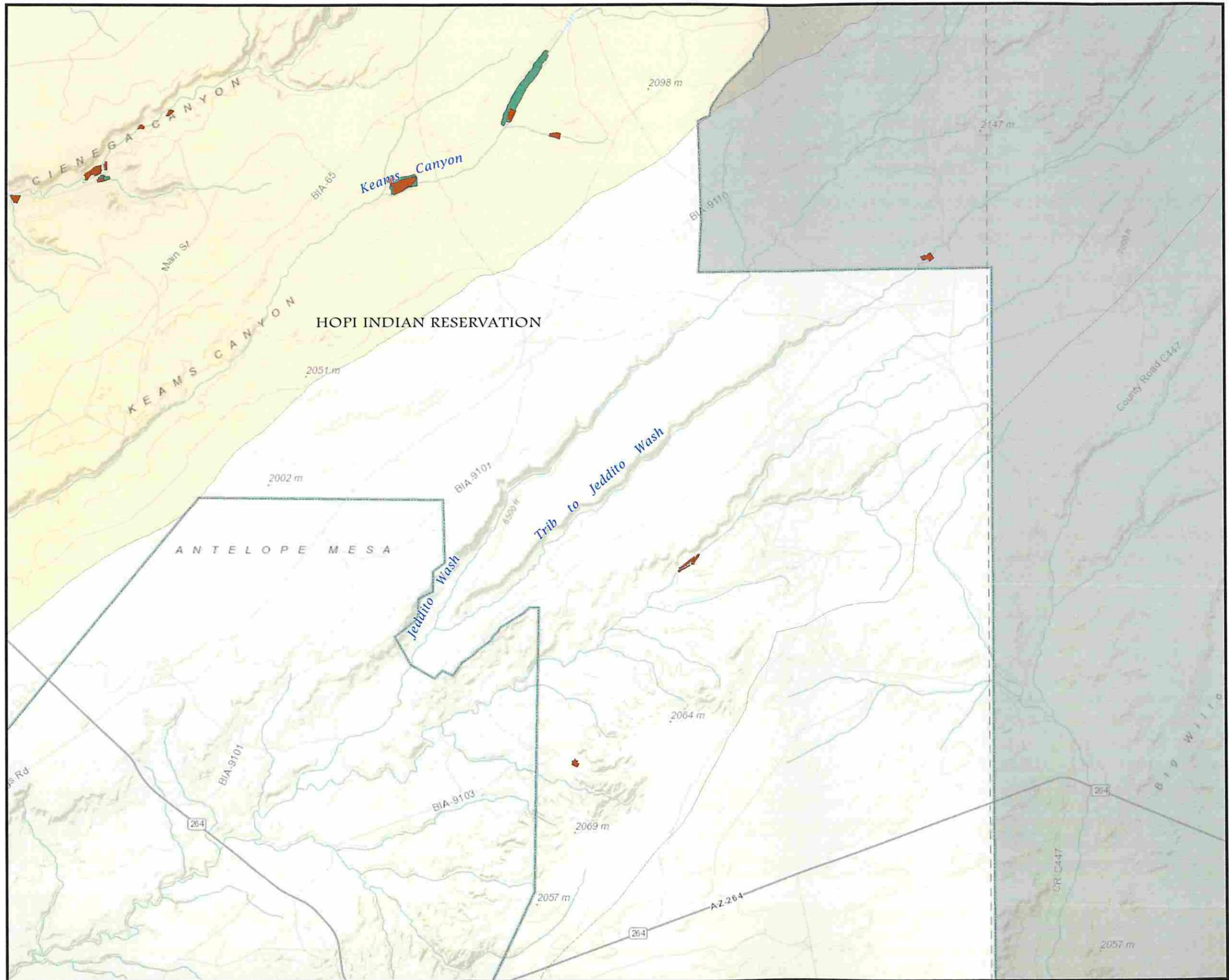
Hopi Reservation Boundary



E6

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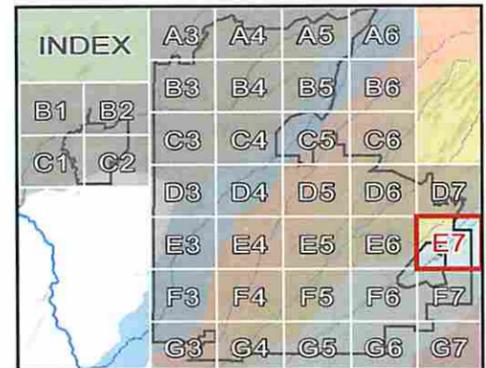
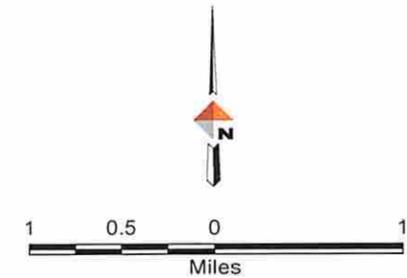
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Northern Wash Subbasins

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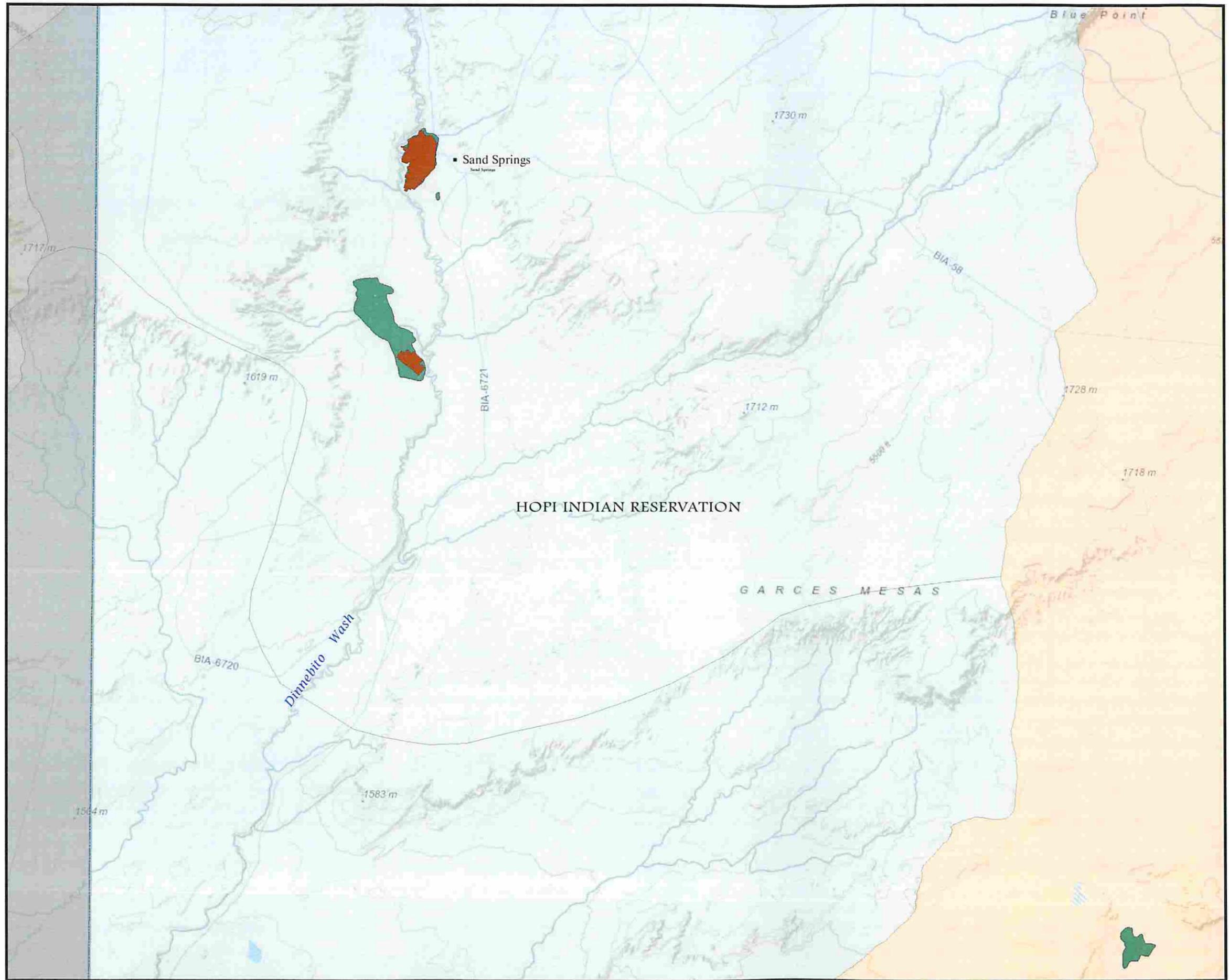
Hopi Reservation Boundary



E7

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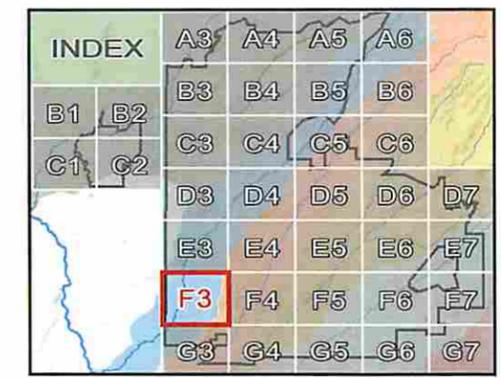
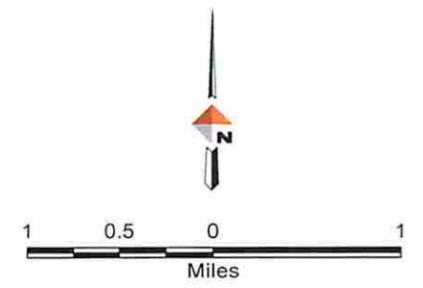
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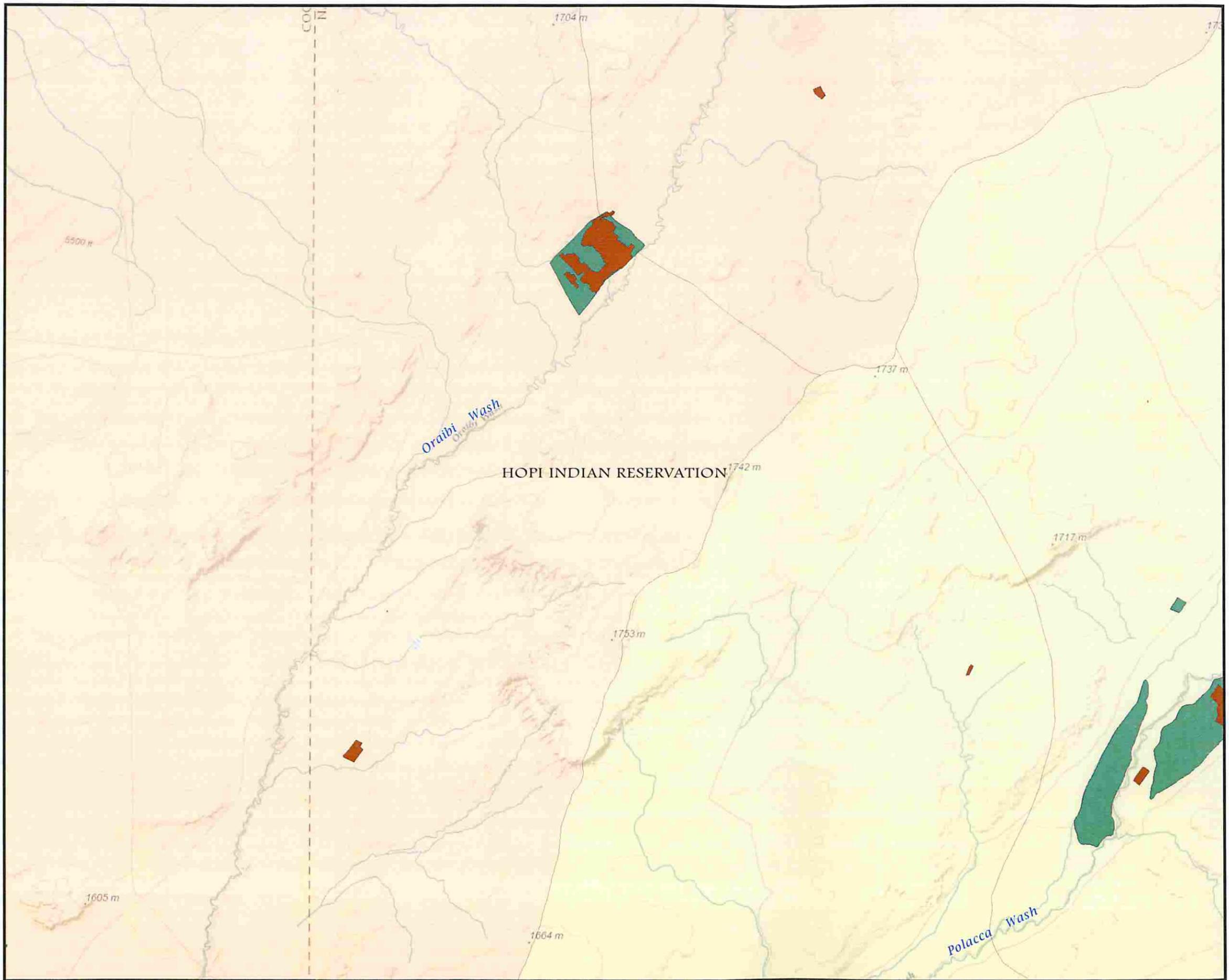
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 - Oraibi
 - Polacca
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F3

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HOPI INDIAN RESERVATION

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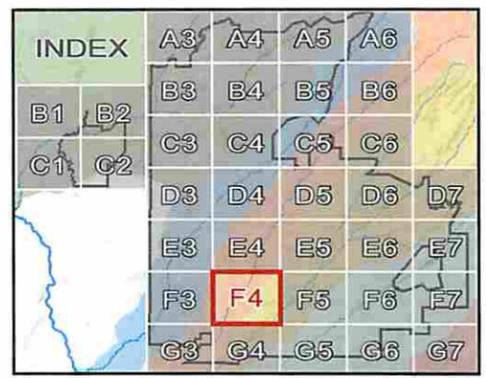
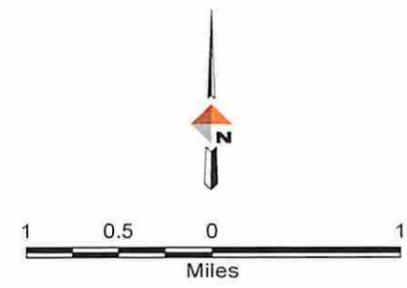
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Northern Wash Subbasins

- Moenkopi
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- Jeddito
- Cottonwood

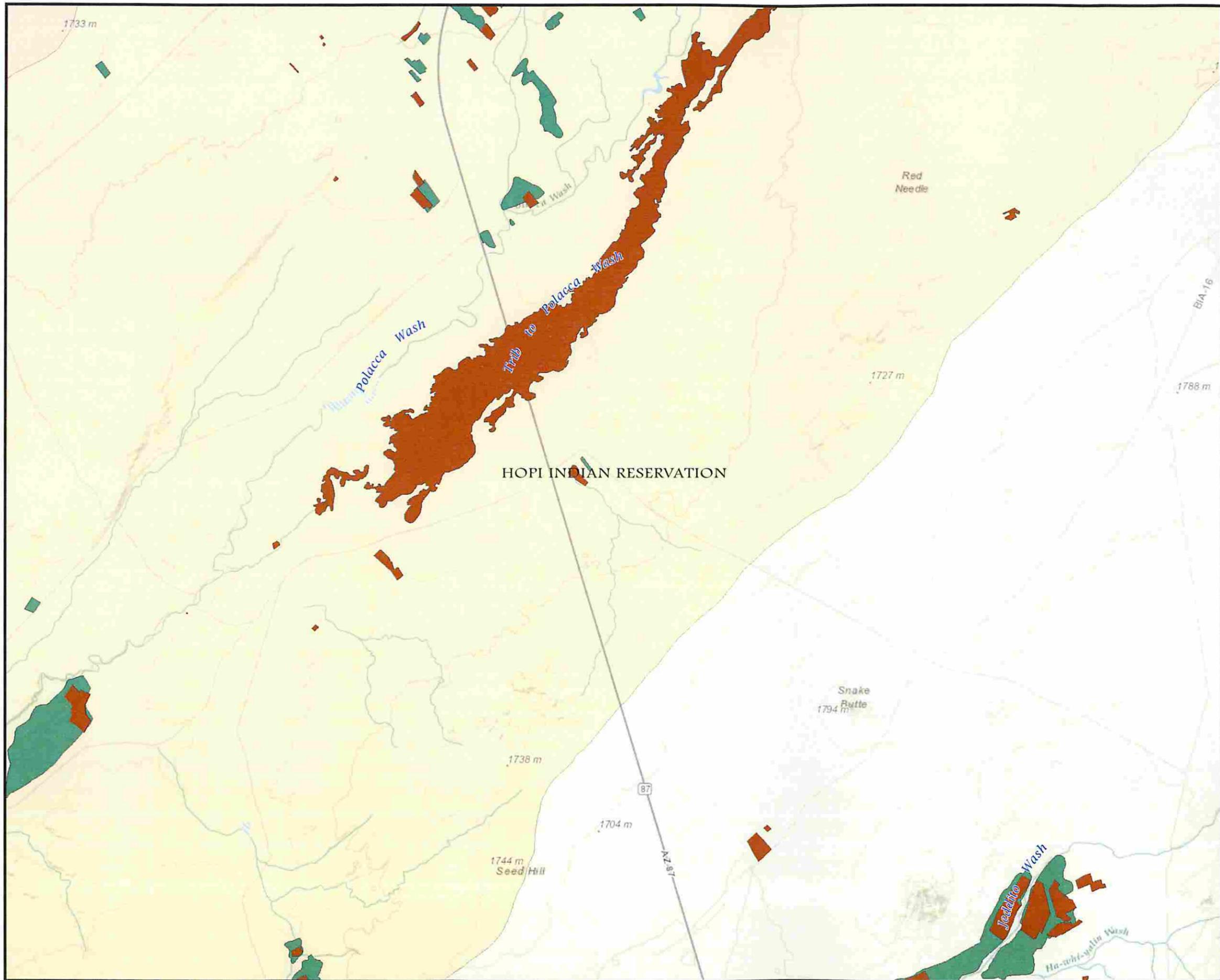
Hopi Reservation Boundary



F4

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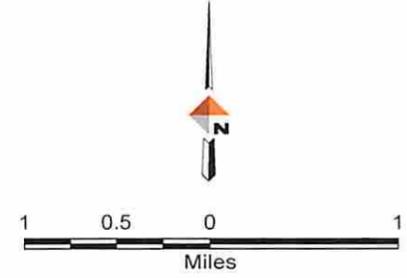


HOPI INDIAN RESERVATION

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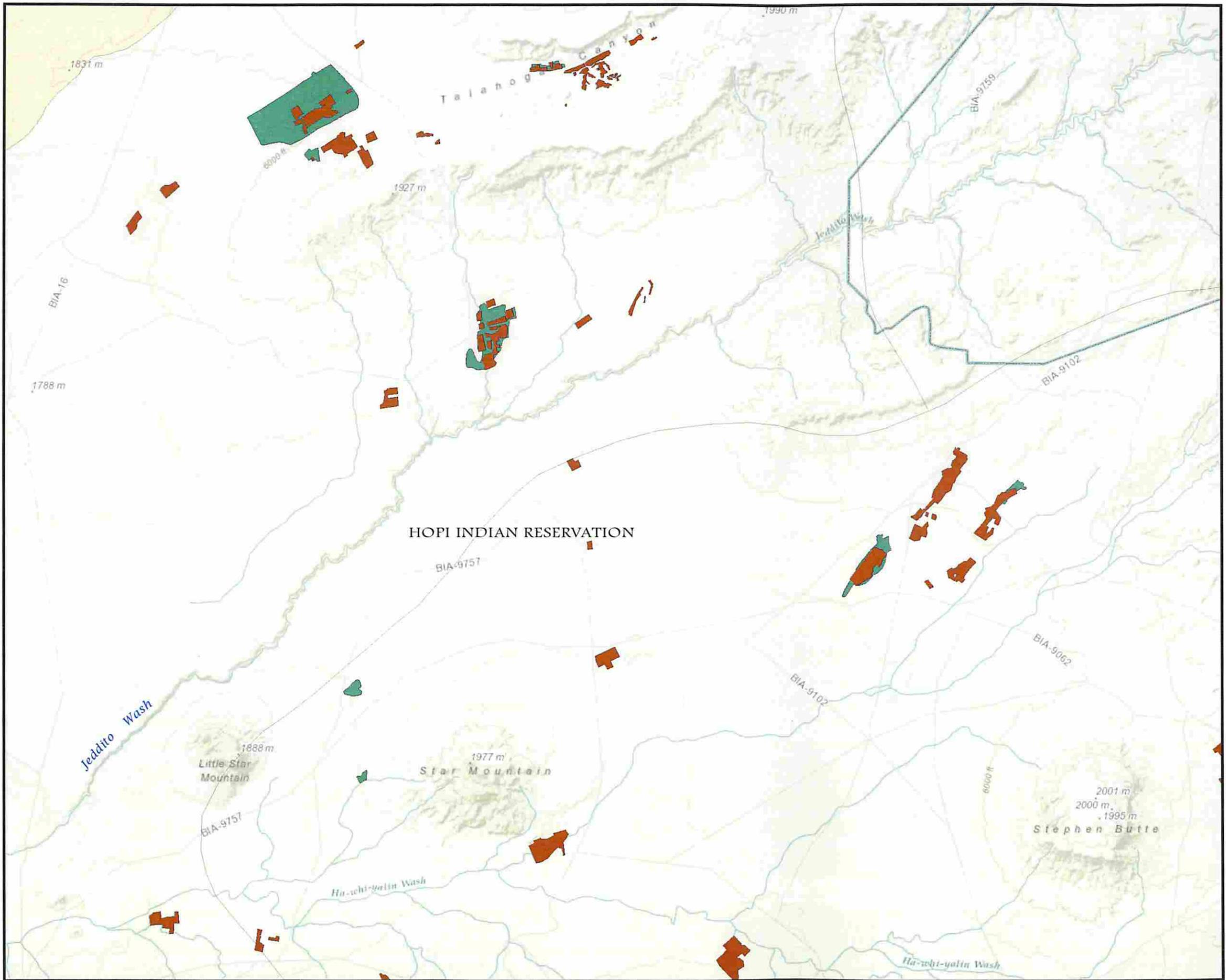
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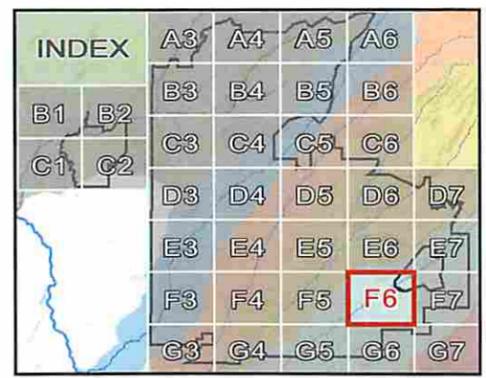
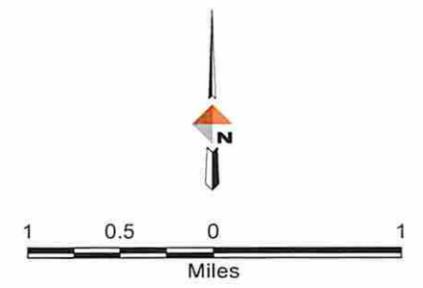
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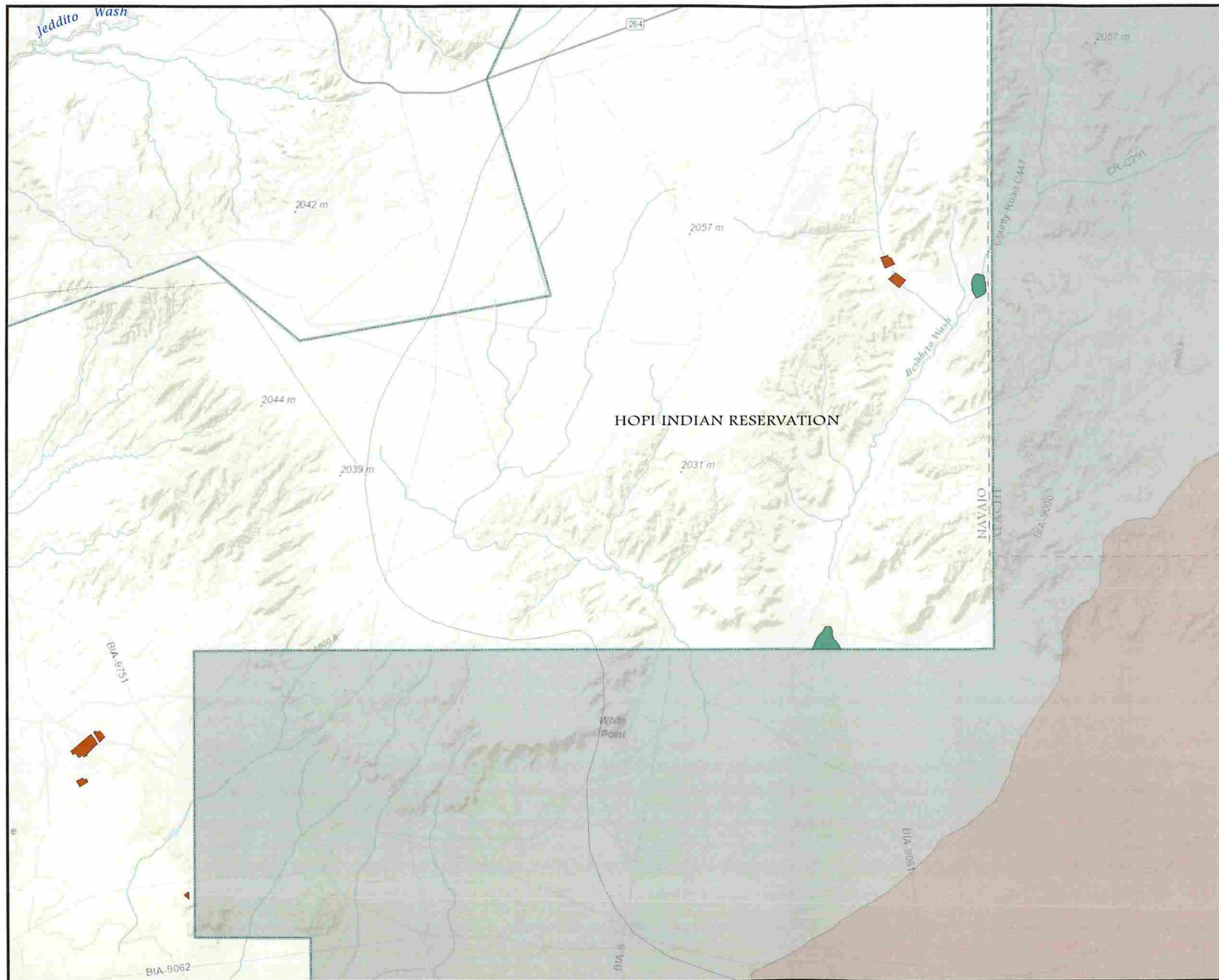
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F6

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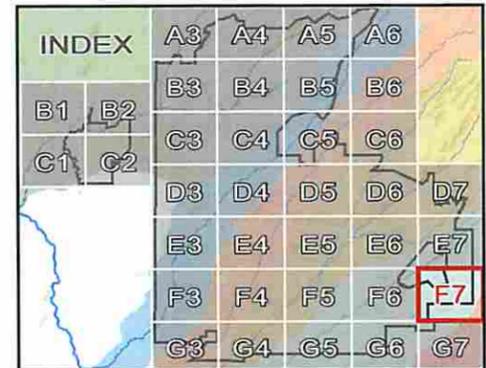
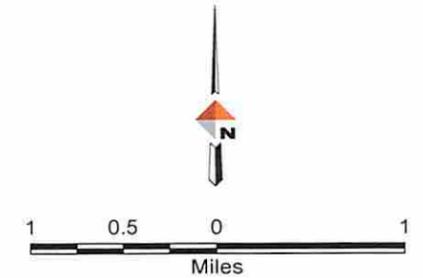


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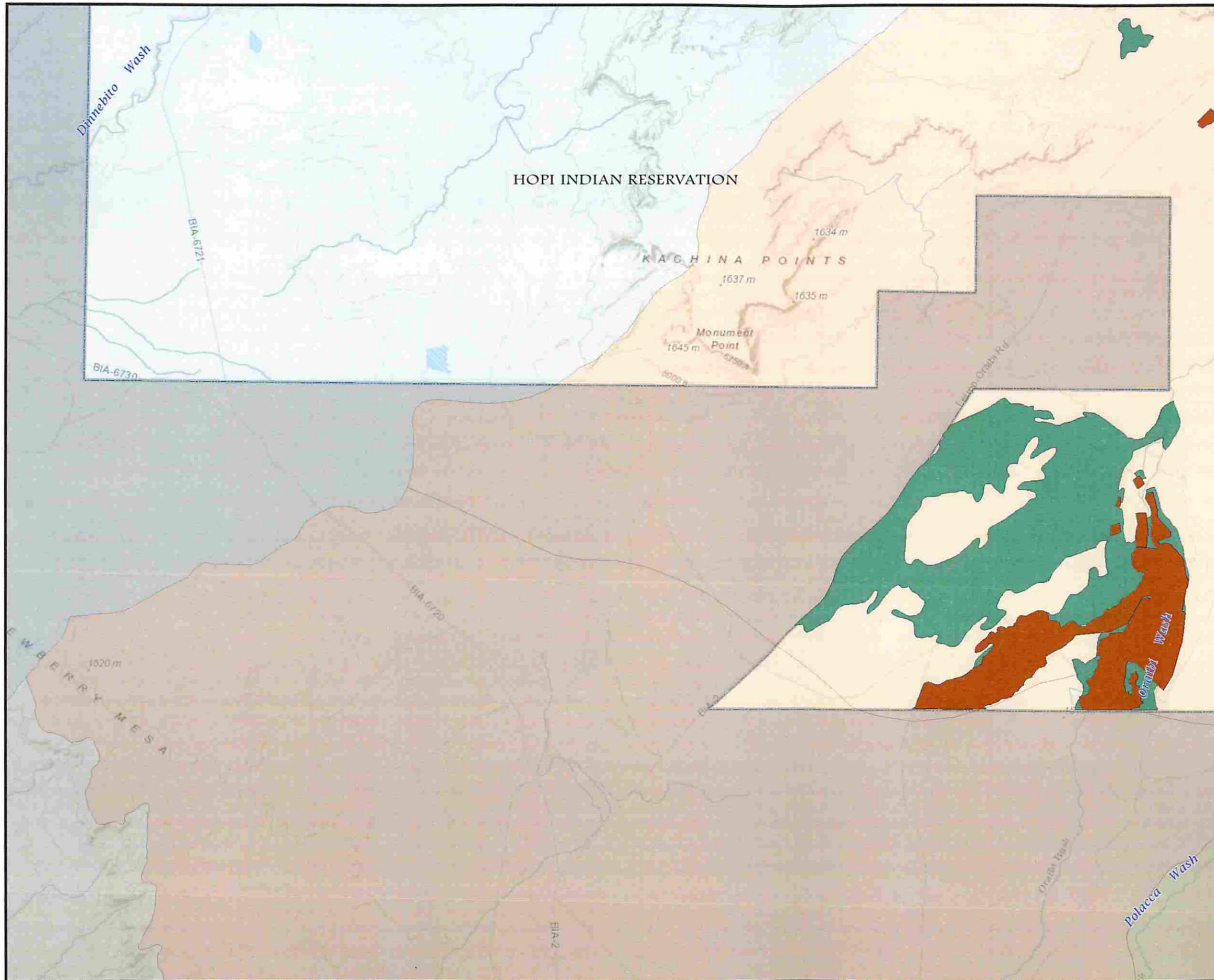
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F7

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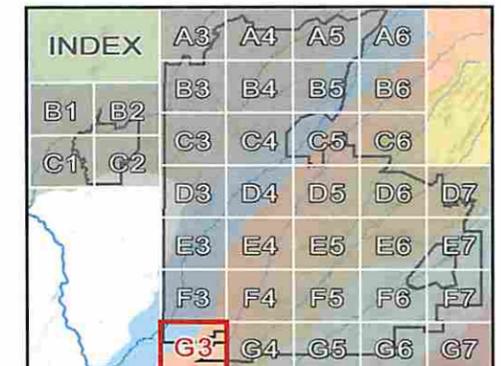
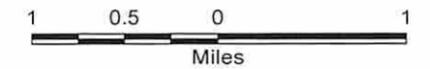
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Northern Wash Subbasins

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- Cottonwood

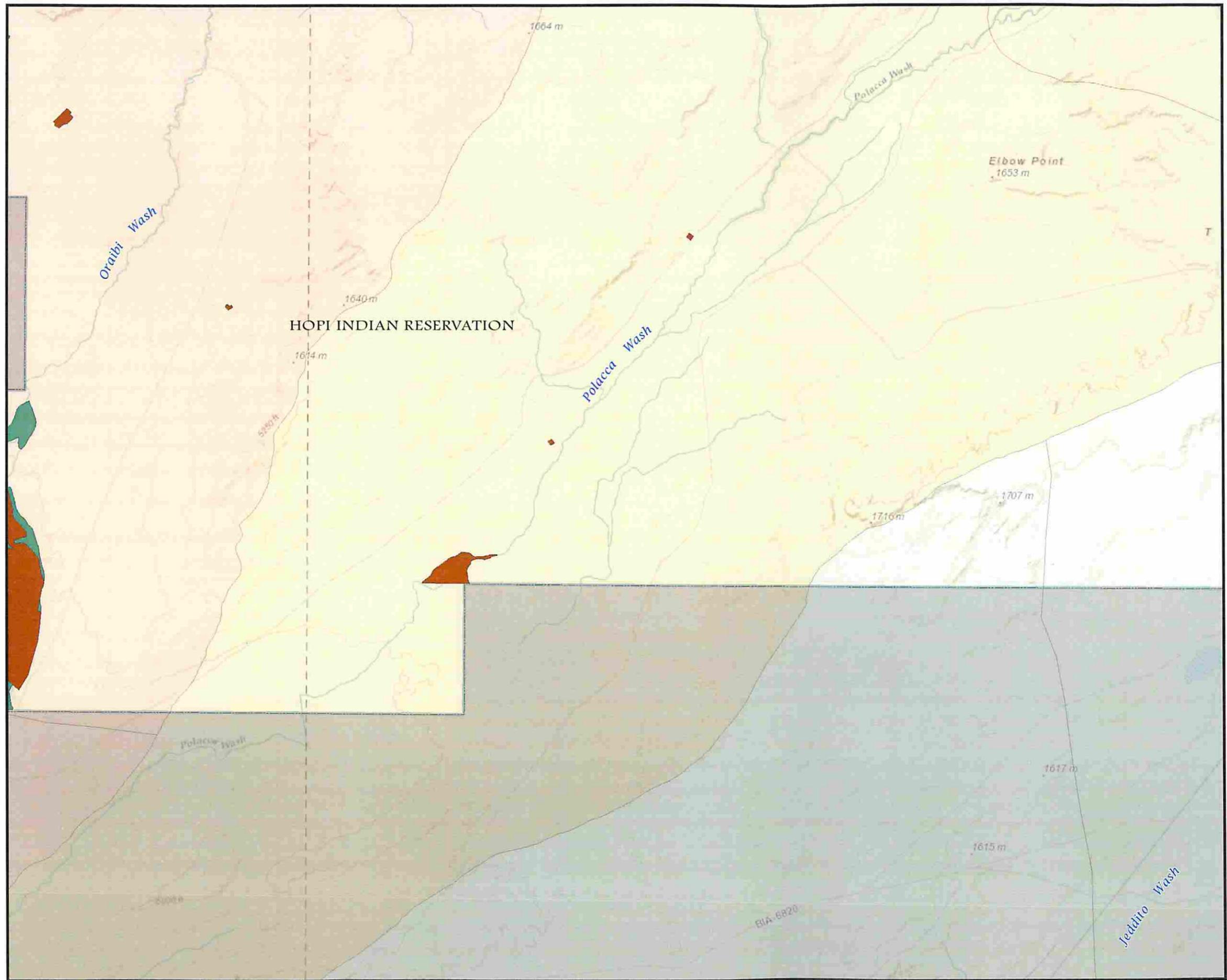
Hopi Reservation Boundary



G3

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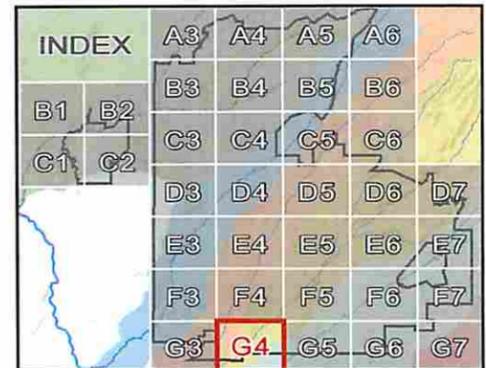
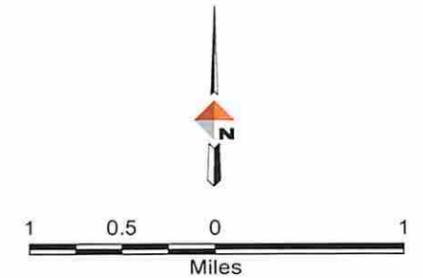
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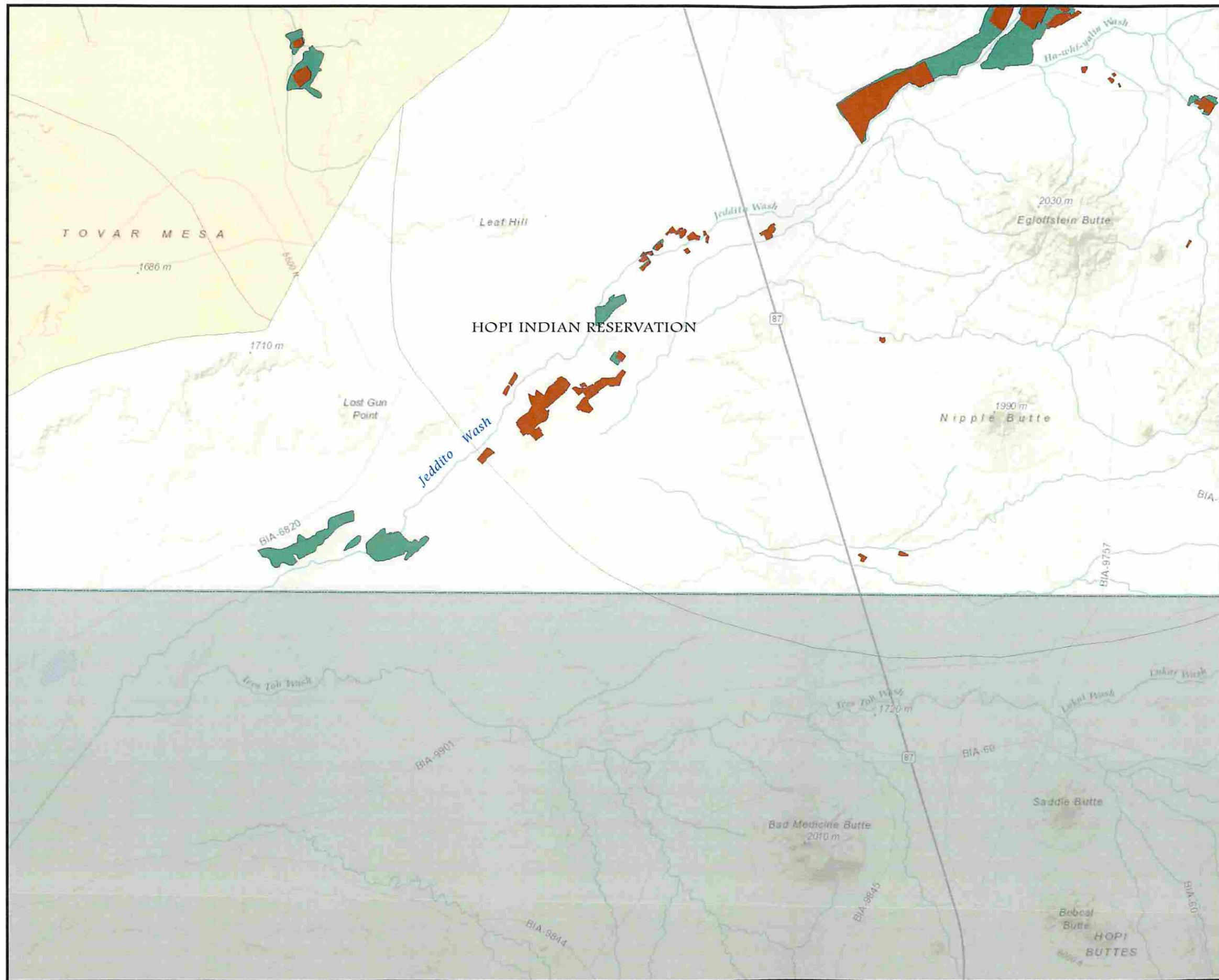
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G4

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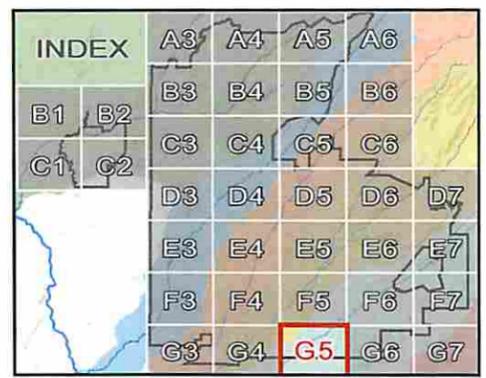
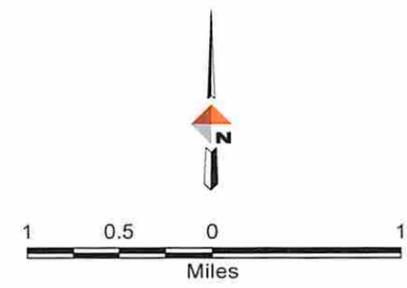
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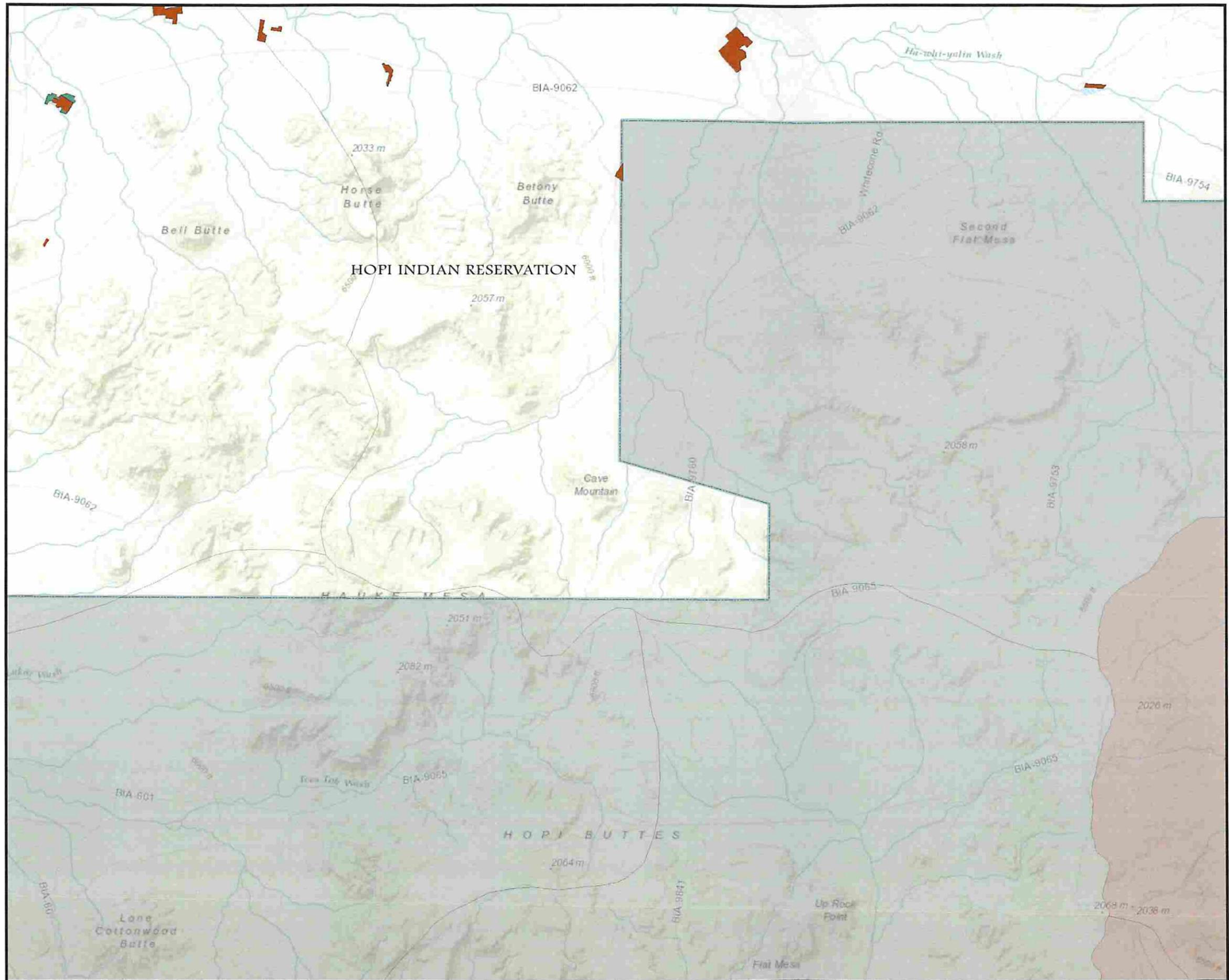
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G5

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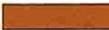
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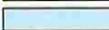
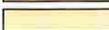
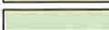
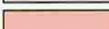
HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

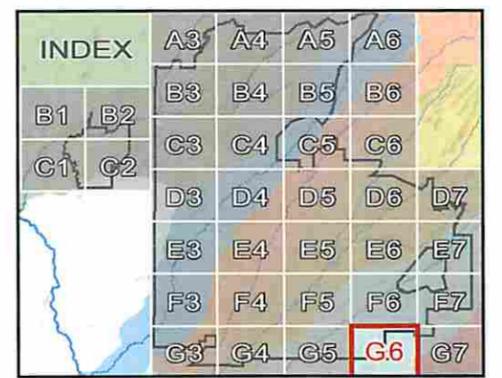
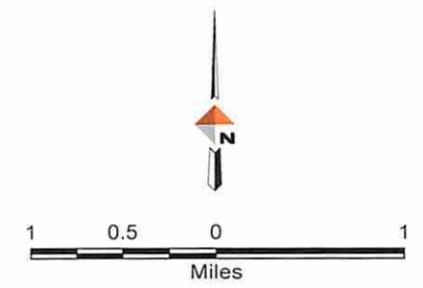
LEGEND

-  Federal - Historically Irrigated Acreage (HIA)
-  Additional ADWR Verified HIA
-  Previously Identified HIA; ADWR Did Not Attempt to Verify

Northern Wash Subbasins

-  Moenkopi
-  Dinnebito
-  Oraibi
-  Polacca
-  Jeddito
-  Cottonwood

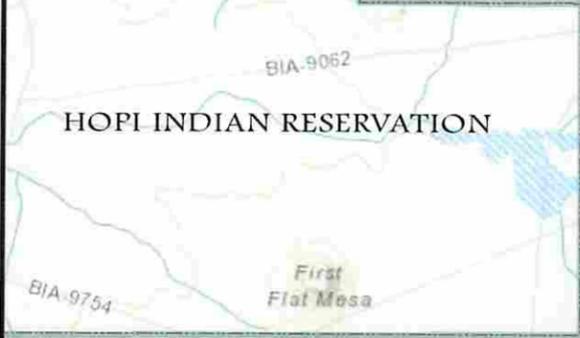
 Hopi Reservation Boundary



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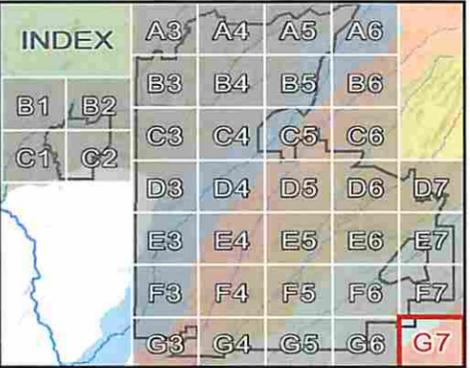
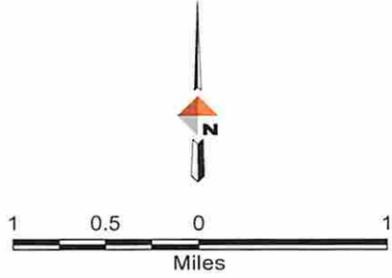


HOPI INDIAN RESERVATION

HISTORIC IRRIGATION

- LEGEND**
- Federal - Historically Irrigated Acreage (HIA)
 - Additional ADWR Verified HIA
 - Previously Identified HIA; ADWR Did Not Attempt to Verify

- Northern Wash Subbasins**
- Moenkopi
 - Dinnebito
 - Oraibi
 - Polacca
 - Jeddito
 - Cottonwood
- Hopi Reservation Boundary



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Appendix 2

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-1-2	9.30	1	514570	4013396
I-1-5	1.84	1	504868	4015016
I-1-6	2.30	1	519354	4026993
I-1-7	7.44	1	521003	4027275
I-1-9	11.71	1	517489	4013313
I-1-14	7.23	1	508255	4013233
I-1-15	2.75	1	505388	4016503
I-1-17	4.96	1	520461	4025432
I-1-18	3.40	1	503844	4013696
I-1-20	5.46	1	521594	4020465
I-1-21	5.17	1	517646	4024317
I-1-22	1.65	1	512693	4018762
I-1-24	3.10	1	519102	4019195
I-1-26	4.96	1	522018	4019823
I-1-27	2.75	1	522148	4018038
I-1-28	9.30	1	521660	4023117
I-1-29	4.50	1	520030	4017567
I-1-30	2.09	1	511800	4015300
I-1-31	7.35	1	520700	4019110
I-1-32	7.32	1	520593	4018677
I-1-33	5.17	1	517184	4017660
I-1-35	0.73	1	521713	4012579
I-1-36	2.75	1	514400	4012808
I-1-37	1.95	1	516208	4021008
I-1-280	4.41	1	521832	4014987
I-1-287	2.89	1	519761	4013440
I-1-548	0.83	1	502831	4011837
I-1-601	0.03	1	522327	4017621
I-2-291	3.31	2	525594	4024702
I-2-292	3.16	2	524980	4013420
I-2-293	9.76	2	522870	4016564
I-2-295	4.18	2	543718	4022434
I-2-296	1.10	2	523288	4018041
I-2-297	0.83	2	523495	4017953
I-2-298	3.37	2	525918	4024115
I-2-300	1.32	2	522643	4017573
I-2-301	6.43	2	525693	4024669
I-2-304	1.65	2	538759	4017697
I-2-305	4.11	2	524451	4013175
I-2-306	3.22	2	524165	4019152
I-2-307	2.51	2	524138	4019064
I-2-308	2.48	2	525744	4016539
I-2-309	4.41	2	523196	4015456
I-3-50	8.95	3	554866	4017661
I-3-54	2.30	3	551683	4012429

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-3-55	1.21	3	551654	4012772
I-3-87	4.13	3	550188	4020861
I-3-88	9.40	3	552182	4020573
I-3-89	1.11	3	552180	4020851
I-3-209	1.10	3	552488	4027874
I-3-210	1.45	3	556136	4029561
I-3-211	2.07	3	555758.6849	4029235.673
I-3-212	3.31	3	555365.1422	4029046.734
I-3-214	21.21	3	552516	4027752
I-3-215	3.86	3	556333	4029651
I-3-243	3.58	3	552460	4028029
I-3-262	1.45	3	555207	4023365
I-3-302	4.78	3	560582	4031066
I-3-602	2.25	3	554362	4025054
I-3-603	0.14	3	560787	4028366
I-3-604	0.80	3	552202	4027735
I-3-605	0.31	3	553255	4026713
I-3-606	1.92	3	553571	4028751
I-3-607	3.37	3	553675	4028612
I-3-608	1.78	3	553960	4028583
I-3-609	2.79	3	554224	4028575
I-3-610	0.60	3	554494	4028660
I-3-611	2.65	3	554694	4028738
I-4-559	0.10	4	476648	3989005
I-4-561	0.53	4	485025	3986863
I-4-612	0.21	4	485903	3987429
I-5-1	0.10	5	508932	4010006
I-5-3	6.61	5	508482	4011203
I-5-4	0.77	5	501869	4010645
I-5-8	0.28	5	502147	4011166
I-5-10	0.15	5	502221	4002970
I-5-11	1.72	5	501995	4010212
I-5-12	0.92	5	514099	4010290
I-5-13	10.12	5	512930	4010466
I-5-16	218.18	5	501375	4008271
I-5-19	2.75	5	508284	4011392
I-5-23	6.17	5	502821	4011044
I-5-25	7.70	5	508032	4011414
I-5-34	6.43	5	506867	4007908
I-5-213	4.41	5	500126	3983903
I-5-216	5.14	5	500702	3991822
I-5-217	44.08	5	504630	3988774
I-5-218	18.37	5	505458	3989539
I-5-223	6.06	5	516318	3985981
I-5-231	4.13	5	507617	4003128

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-5-234	2.20	5	515145	3997315
I-5-238	0.46	5	519142	3988549
I-5-239	3.31	5	516446	3985216
I-5-240	6.43	5	515922	3985703
I-5-241	4.41	5	519919	3987719
I-5-242	3.31	5	520171	3987775
I-5-245	8.95	5	516473	3985427
I-5-246	5.30	5	512490	3985454
I-5-247	12.49	5	521144	3987844
I-5-248	2.61	5	502630	3988529
I-5-249	2.89	5	511755	3995612
I-5-250	5.79	5	513206	3994539
I-5-251	3.79	5	517231	3993658
I-5-252	1.79	5	513957	3992078
I-5-254	1.65	5	519017	3988238
I-5-255	9.64	5	518946	3987617
I-5-256	5.11	5	518596	3987162
I-5-257	2.39	5	517894	3986506
I-5-259	45.91	5	516191	3986902
I-5-261	2.02	5	520596	3987255
I-5-271	6.20	5	518402	4006261
I-5-272	2.89	5	519498	4006629
I-5-273	7.23	5	521474	4007554
I-5-274	12.50	5	518721	4008358
I-5-276	9.50	5	511536	4004485
I-5-278	1.93	5	518483	4006294
I-5-279	16.41	5	517855	4005794
I-5-281	1.16	5	509061	4007078
I-5-282	4.13	5	506195	4004735
I-5-283	6.61	5	506841	4006022
I-5-284	8.95	5	507667	4007875
I-5-285	1.03	5	508711	4006212
I-5-286	4.41	5	508837	4006490
I-5-288	5.97	5	509246	4001710
I-5-289	2.75	5	508570	4003251
I-5-290	5.51	5	511339	4004208
I-5-299	3.36	5	516775	4010750
I-5-549	0.70	5	509528	4001959
I-5-550	0.70	5	509745	4001531
I-5-551	4.00	5	510523	4001742
I-5-557	1.50	5	520765	4010815
I-5-614	6.50	5	514540	3985580
I-5-615	1.38	5	514630	3987680
I-5-616	0.28	5	515260	3985900
I-5-617	9.00	5	512672	4001655

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-5-613	4.96	5	508666	3988847
I-6-82	12.90	6	536835	3988351
I-6-83	13.49	6	530710	3985621
I-6-98	0.41	6	529400	3989432
I-6-113	1.01	6	541879	4001683
I-6-115	4.41	6	522627	3985563
I-6-224	6.89	6	538027	4002220
I-6-225	6.24	6	536862	4005454
I-6-226	2.39	6	535838	3998673
I-6-227	3.58	6	541517	4007760
I-6-228	8.82	6	539468	4003768
I-6-229	11.02	6	535727	4001600
I-6-230	1.38	6	525430	4004115
I-6-232	4.78	6	530497	4010454
I-6-235	14.46	6	525841	3989642
I-6-236	13.50	6	530131	3994093
I-6-237	4.50	6	524513	3991180
I-6-258	8.82	6	532958	4001190
I-6-260	4.50	6	522966	4010886
I-6-265	4.68	6	527102	4004309
I-6-267	8.08	6	536409	3999751
I-6-316	4.41	6	544030	3985433
I-6-322	0.73	6	543704	3985709
I-6-323	15.43	6	539356	3984668
I-6-324	4.85	6	544558	3984327
I-6-618	0.22	6	530379	4000147
I-7-94	1.10	7	548650.0183	4001372.142
I-7-95	1.10	7	545823	4000938
I-7-103	1.10	7	548411.5214	4001944.611
I-7-105	2.20	7	546905	4000389
I-7-112	37.19	7	547510	4000115
I-7-117	1.10	7	549291.2743	4001687.775
I-7-120	1.63	7	546901	4001254
I-7-123	22.38	7	549409	4003109
I-7-130	1.19	7	550584	4003648
I-7-134	1.38	7	548933	4004648
I-7-135	3.94	7	548879	4004648
I-7-136	1.49	7	548432	4004124
I-7-311	5.17	7	554108	3987830
I-7-314	8.26	7	551059	3990030
I-7-315	6.43	7	552572	3988653
I-7-317	0.96	7	551170	3989565
I-7-319	8.95	7	549488	3989189
I-7-320	2.89	7	546999	3987878
I-7-321	13.77	7	551811	3986308

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-7-325	5.14	7	547514	3984276
I-7-326	3.66	7	546225	3987752
I-7-327	4.50	7	547687	3985730
I-7-329	12.12	7	549940	3985709
I-7-330	0.80	7	550283	3990270
I-7-331	3.94	7	547666	3989578
I-7-536	3.31	7	556228	3984605
I-7-556	6.40	7	548523	3985562
I-7-619	0.77	7	545291	3989325
I-8-48	44.00	8	520228	3982629
I-8-49	2.48	8	519684	3971725
I-8-51	5.14	8	517534	3977455
I-8-52	3.31	8	519909	3979955
I-8-53	2.48	8	518916	3976371
I-8-56	5.50	8	518735	3980906
I-8-57	0.55	8	519008	3971224
I-8-58	1.93	8	518030	3982036
I-8-59	8.03	8	515665	3973259
I-8-60	5.51	8	520885	3983030
I-8-61	4.48	8	520785	3983285
I-8-62	29.40	8	520154	3983283
I-8-63	11.20	8	521532	3983708
I-8-64	27.55	8	514685	3960281
I-8-65	0.92	8	516031	3980624
I-8-66	6.89	8	517244	3973594
I-8-67	0.18	8	519081	3971047
I-8-68	2.89	8	517806	3981359
I-8-79	8.50	8	518348	3971933
I-8-81	3.86	8	517754	3970945
I-8-84	22.00	8	501600	3976000
I-8-85	123.97	8	507092	3974512
I-8-86	5.14	8	514515	3970173
I-8-90	3.94	8	515497	3971218
I-8-91	0.46	8	512080.5677	3970839.519
I-8-104	9.85	8	513329	3960345
I-8-106	48.48	8	513177	3959324
I-8-107	4.13	8	515495	3956988
I-8-108	8.82	8	510991	3965765
I-8-109	6.89	8	509331	3963878
I-8-110	6.89	8	507680	3961414
I-8-111	1.72	8	507628	3958985
I-8-116	2.87	8	520611	3968921
I-8-118	4.41	8	517352	3969191
I-8-119	4.50	8	521748	3965541
I-8-121	5.80	8	512216	3968040

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-8-124	1.86	8	512700	3964193
I-8-125	0.25	8	513132	3959202
I-8-126	8.30	8	511546	3963115
I-8-129	3.44	8	517144	3959797
I-8-131	12.88	8	515643	3960593
I-8-132	4.70	8	514938	3960348
I-8-137	7.90	8	512042	3963205
I-8-207	9.64	8	501552	3975430
I-8-208	2.75	8	506259	3978205
I-8-220	15.61	8	512120	3979353
I-8-221	3.31	8	514906.4432	3981994.271
I-8-222	6.20	8	511523	3980273
I-8-233	9.92	8	512698	3978422
I-8-244	1.38	8	512020	3979508
I-8-253	13.22	8	512171	3981327
I-8-263	21.85	8	509922	3976666
I-8-264	8.93	8	507438	3981067
I-8-266	6.10	8	506058	3982608
I-8-268	48.21	8	505129	3982918
I-8-269	7.71	8	503424.8314	3982736.731
I-8-270	4.41	8	501253	3982916
I-8-275	4.96	8	511195	3983079
I-8-277	11.36	8	506690	3980856
I-8-294	17.05	8	505562	3982330
I-8-303	0.92	8	515364	3975232
I-8-391	3.31	8	521170	3957987
I-8-392	9.64	8	521137	3960515
I-8-395	2.75	8	520242	3956598
I-8-558	5.14	8	516159	3978650
I-8-620	1.38	8	507300	3979407
I-8-621	3.20	8	518167	3978201
I-8-622	2.90	8	522500	3970744
I-8-623	3.60	8	511707	3957131
I-9-96	3.94	9	522863	3971023
I-9-127	2.20	9	524414	3981164
I-9-128	2.89	9	524509	3982862
I-9-310	1.82	9	537408	3982785
I-9-312	7.58	9	538417	3974837
I-9-313	15.43	9	537896	3974158
I-9-318	4.41	9	540939	3977710
I-9-328	5.14	9	541771	3977226
I-9-332	0.99	9	533612	3959567
I-9-338	8.36	9	535803	3958500
I-9-339	4.48	9	523243	3960454
I-9-340	3.41	9	526206	3960684

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-9-342	2.98	9	523015	3961163
I-9-343	5.06	9	530157	3965621
I-9-344	19.83	9	533002	3963014
I-9-345	2.65	9	533570	3965756
I-9-346	23.42	9	531387	3957341
I-9-347	11.02	9	530959	3958171
I-9-349	2.69	9	535187	3956678
I-9-367	3.90	9	529506	3957611
I-9-369	0.46	9	543812	3978522
I-9-370	1.84	9	524151	3958826
I-9-378	5.51	9	538018	3975146
I-9-380	0.46	9	543414	3978709
I-9-381	160.00	9	542792	3982310
I-9-382	17.91	9	542745	3982809
I-9-383	2.30	9	544195	3972246
I-9-384	6.75	9	544194	3972402
I-9-385	2.75	9	540561	3983198
I-9-386	9.64	9	540989	3982457
I-9-389	21.36	9	523260	3964092
I-9-390	8.90	9	529482	3956657
I-9-398	12.00	9	541622	3981906
I-9-511	1.84	9	538719	3957281
I-9-512	1.47	9	538493	3957280
I-9-530	0.21	9	544790.2783	3972285.942
I-9-554	4.40	9	538157	3973668
I-9-624	4.40	9	542578	3983755
I-9-625	7.40	9	542621	3983249
I-9-626	0.64	9	543741	3971316
I-9-627	1.60	9	534561	3968338
I-9-628	0.55	9	539129	3958269
I-10-140	5.97	10	562025	3957380
I-10-185	2.07	10	563542	3956404
I-10-371	9.03	10	551050	3983774
I-10-372	16.53	10	548577	3982773
I-10-373	8.40	10	545924	3981561
I-10-374	6.43	10	548631	3981143
I-10-375	1.55	10	547548	3978120
I-10-376	7.58	10	547415.4688	3977755.827
I-10-387	10.28	10	545358	3975946
I-10-396	1.26	10	545207	3975579
I-10-414	3.86	10	561552	3968124
I-10-426	1.65	10	563648	3969348
I-10-427	6.43	10	563999	3969406
I-10-428	8.26	10	564525	3969166
I-10-429	1.86	10	567470	3964130

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-10-430	1.38	10	567674	3967060
I-10-432	1.65	10	567314	3969276
I-10-441	1.03	10	567107	3969219
I-10-461	0.83	10	567015	3962252
I-10-490	2.20	10	557797	3966557
I-10-491	3.44	10	564056	3978957
I-10-492	6.27	10	566501	3980029
I-10-493	4.96	10	561514	3976266
I-10-494	10.33	10	565239	3975083
I-10-495	0.83	10	566200	3973271
I-10-496	1.86	10	563512	3970634
I-10-498	2.21	10	551594	3958633
I-10-499	5.14	10	562487	3970017
I-10-500	2.20	10	563662	3963647
I-10-501	2.69	10	558645	3959886
I-10-502	7.23	10	560429	3959432
I-10-503	14.46	10	560838	3961742
I-10-506	3.74	10	560580	3959866
I-10-507	1.10	10	559475	3966879
I-10-508	4.05	10	558342	3963333
I-10-509	7.16	10	553573	3960153
I-10-510	45.91	10	553534	3957657
I-10-517	0.92	10	551367	3980504
I-10-518	10.45	10	553783	3974640
I-10-519	22.00	10	555309	3978864
I-10-520	10.12	10	546446	3973334
I-10-521	172.26	10	553880	3975073
I-10-522	5.68	10	552174	3979744
I-10-523	11.36	10	550986	3977829
I-10-524	13.30	10	552665	3977528
I-10-525	34.70	10	549552	3974582
I-10-526	2.82	10	563676	3982870
I-10-527	2.75	10	548374	3973810
I-10-528	3.58	10	548911	3971406
I-10-529	4.13	10	546191	3970282
I-10-531	8.95	10	551418	3976412
I-10-532	0.92	10	566107	3982122
I-10-533	10.93	10	552954	3962490
I-10-534	1.03	10	553694	3963859
I-10-535	3.86	10	553080	3967027
I-10-538	3.31	10	559053	3977225
I-10-539	6.61	10	557789	3976085
I-10-540	1.86	10	545500	3972963
I-10-541	3.31	10	565528	3982395
I-10-542	3.27	10	563877	3982505

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-10-543	31.50	10	558428	3981790
I-10-544	5.51	10	558810	3975815
I-10-545	1.70	10	557897	3974755
I-10-546	1.67	10	557107	3972753
I-10-632	2.30	10	546260	3959560
I-10-633	2.86	10	546700	3959900
I-10-629	2.90	10	566823	3983983
I-10-630	0.70	10	565443	3972799
I-10-631	5.05	10	566927	3965204
I-11-38	0.32	11	589911	3961590
I-11-39	5.42	11	588246	3959998
I-11-138	12.88	11	588348	3965179
I-11-141	3.37	11	584957	3956982
I-11-142	0.83	11	588375	3964226
I-11-143	59.68	11	589653	3967378
I-11-144	18.40	11	586581	3962910
I-11-145	13.77	11	586355	3962908
I-11-146	102.21	11	585094	3961631
I-11-147	51.42	11	587039	3967818
I-11-406	0.15	11	577819	3971891
I-11-407	92.56	11	577357	3964866
I-11-408	7.44	11	574888	3962959
I-11-409	1.29	11	574408	3963110
I-11-410	1.93	11	573402	3963567
I-11-411	2.75	11	572296	3963924
I-11-412	0.93	11	573258	3962335
I-11-413	11.57	11	576052	3964200
I-11-415	22.00	11	577103	3964919
I-11-416	1.65	11	571393	3967333
I-11-417	11.02	11	577177	3964764
I-11-418	8.30	11	577526	3968217
I-11-419	2.63	11	577030	3970187
I-11-420	5.17	11	569662	3959988
I-11-421	7.71	11	575687	3966814
I-11-422	1.15	11	577110	3967204
I-11-423	2.02	11	574054	3969829
I-11-424	6.20	11	568052	3963735
I-11-425	8.26	11	573015	3976475
I-11-433	2.75	11	569262	3969601
I-11-434	2.57	11	568198	3964690
I-11-435	2.20	11	571177	3959268
I-11-436	1.10	11	570746	3960152
I-11-437	6.61	11	569399	3962393
I-11-438	1.38	11	569966	3962674
I-11-439	1.89	11	570094	3962487

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-11-440	6.20	11	579123	3969318
I-11-443	1.10	11	573467	3962182
I-11-462	4.78	11	584064	3969109
I-11-468	2.20	11	582149	3967249
I-11-477	5.10	11	575324	3973378
I-11-478	3.67	11	569589	3979587
I-11-479	2.64	11	569105	3973416
I-11-480	6.20	11	571490	3973157
I-11-481	0.31	11	577071	3971696
I-11-482	0.22	11	577468	3971733
I-11-483	8.68	11	577975	3982741
I-11-484	1.65	11	578846	3972111
I-11-485	0.18	11	578945	3972090
I-11-486	15.70	11	580794	3970321
I-11-487	1.00	11	575092	3974086
I-11-488	4.48	11	574744	3971432
I-11-489	4.60	11	571012	3976459
I-11-497	0.44	11	574899	3973441
I-11-504	7.90	11	583103	3970553
I-11-505	8.26	11	571369	3975785
I-11-513	15.64	11	584018	3973956
I-11-514	4.60	11	581915	3974025
I-11-515	4.14	11	580806	3971918
I-11-516	61.73	11	583299	3970832
I-11-537	3.03	11	567755	3983543
I-11-547	6.63	11	567930	3982990
I-11-552	0.26	11	576097	3965141
I-11-634	0.60	11	575447	3973150
I-11-635	0.96	11	570792	3968334
I-12-69	10.28	12	513918	3954124
I-12-70	3.58	12	510852	3954120
I-12-71	10.33	12	505028	3954480
I-12-72	8.36	12	504450	3952417
I-12-73	8.10	12	500932	3948468
I-12-74	32.16	12	504071	3950232
I-12-75	67.49	12	506733	3947550
I-12-76	8.82	12	507168	3946996
I-12-77	34.71	12	506164	3946407
I-12-78	6.61	12	500525	3946106
I-12-80	45.50	12	511518	3942875
I-12-92	6.89	12	513990	3954213
I-12-93	18.80	12	513147	3931043
I-12-97	8.80	12	500680	3934050
I-12-99	13.20	12	502663	3939352
I-12-100	5.14	12	505490	3937845

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-12-101	11.90	12	507094	3938090
I-12-102	5.40	12	510895	3940866
I-12-114	0.46	12	513521	3935669
I-12-122	56.40	12	505692	3933963
I-12-350	27.55	12	522462	3951269
I-12-351	4.96	12	519589	3945318
I-12-352	2.48	12	519815	3945418
I-12-353	5.14	12	519294	3952093
I-12-354	3.73	12	519732	3950220
I-12-355	6.51	12	520104	3949733
I-12-356	3.37	12	519375	3952193
I-12-357	5.14	12	520023	3953825
I-12-359	2.75	12	517581	3953731
I-12-361	0.92	12	521276	3955525
I-12-362	8.40	12	516919	3945345
I-12-368	7.71	12	518836	3954776
I-12-388	1.84	12	516457	3940664
I-12-393	5.79	12	510819	3936774
I-12-394	5.40	12	517739	3928745
I-12-397	9.50	12	520740	3937069
I-12-399	16.10	12	516701	3940875
I-12-400	6.61	12	521270	3935162
I-12-401	0.59	12	518671	3938384
I-12-402	0.73	12	520888	3939564
I-12-403	2.48	12	511861	3938162
I-12-404	3.13	12	521450	3943204
I-12-405	5.20	12	520840	3937002
I-12-636	2.20	12	522124	3945804
I-13-174	4.80	13	542365	3935726
I-13-175	25.71	13	544307	3935181
I-13-176	3.57	13	545032	3935217
I-13-177	7.35	13	544407	3935303
I-13-178	1.15	13	542065	3936090
I-13-198	2.94	13	542562	3936226
I-13-333	1.10	13	526239	3949715
I-13-334	2.32	13	530188	3948430
I-13-335	12.40	13	528415	3953726
I-13-336	1.79	13	527044	3949618
I-13-337	6.06	13	529619	3953419
I-13-341	27.52	13	524696	3954547
I-13-348	4.68	13	524977	3941605
I-13-358	3.86	13	524627	3949988
I-13-360	6.61	13	524587	3948080
I-13-363	5.79	13	533302	3943295
I-13-364	57.82	13	523841	3942833

Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-13-365	4.40	13	524343	3944686
I-13-366	5.51	13	524538	3946472
I-13-377	17.35	13	524850	3941704
I-13-379	7.44	13	522809	3935621
I-13-442	3.66	13	523973	3930855
I-13-445	2.69	13	531431	3932109
I-13-446	5.51	13	532402	3934264
I-13-447	6.40	13	531559	3936912
I-13-448	9.50	13	529962	3940356
I-13-450	2.89	13	527814	3934748
I-13-452	1.40	13	525624	3936771
I-13-453	0.92	13	537001	3935702
I-13-454	2.48	13	541150	3937938
I-13-455	9.64	13	541279	3937351
I-13-456	23.10	13	534287	3941325
I-13-457	12.10	13	540299	3941783
I-13-458	8.68	13	541146	3938803
I-13-459	4.34	13	525770	3936716
I-13-460	10.40	13	536719	3944640
I-13-463	2.98	13	544924	3942393
I-13-464	11.57	13	536792	3944607
I-13-465	9.64	13	537112	3946050
I-13-467	1.65	13	544636	3949201
I-13-469	3.67	13	541386	3945547
I-13-470	1.19	13	540848	3954362
I-13-471	5.14	13	535955	3945435
I-13-476	5.14	13	540089	3950255
I-13-553	6.90	13	543363	3947761
I-13-637	2.58	13	524277	3944880
I-13-638	0.29	13	522847	3943196
I-13-639	1.10	13	529852	3940893
I-13-640	0.07	13	544836	3949577
I-13-641	0.50	13	533905	3939801
I-14-148	3.31	14	560737	3955397
I-14-149	3.86	14	558549	3940198
I-14-150	3.58	14	559947	3941061
I-14-156	1.47	14	559743	3953937
I-14-157	8.00	14	561515	3940917
I-14-158	1.10	14	563197	3941272
I-14-159	5.17	14	562019	3940122
I-14-160	6.97	14	563325	3933476
I-14-162	4.48	14	561748	3954383
I-14-163	4.41	14	562250	3953622
I-14-164	5.22	14	564792	3949846
I-14-165	4.50	14	559890	3949535

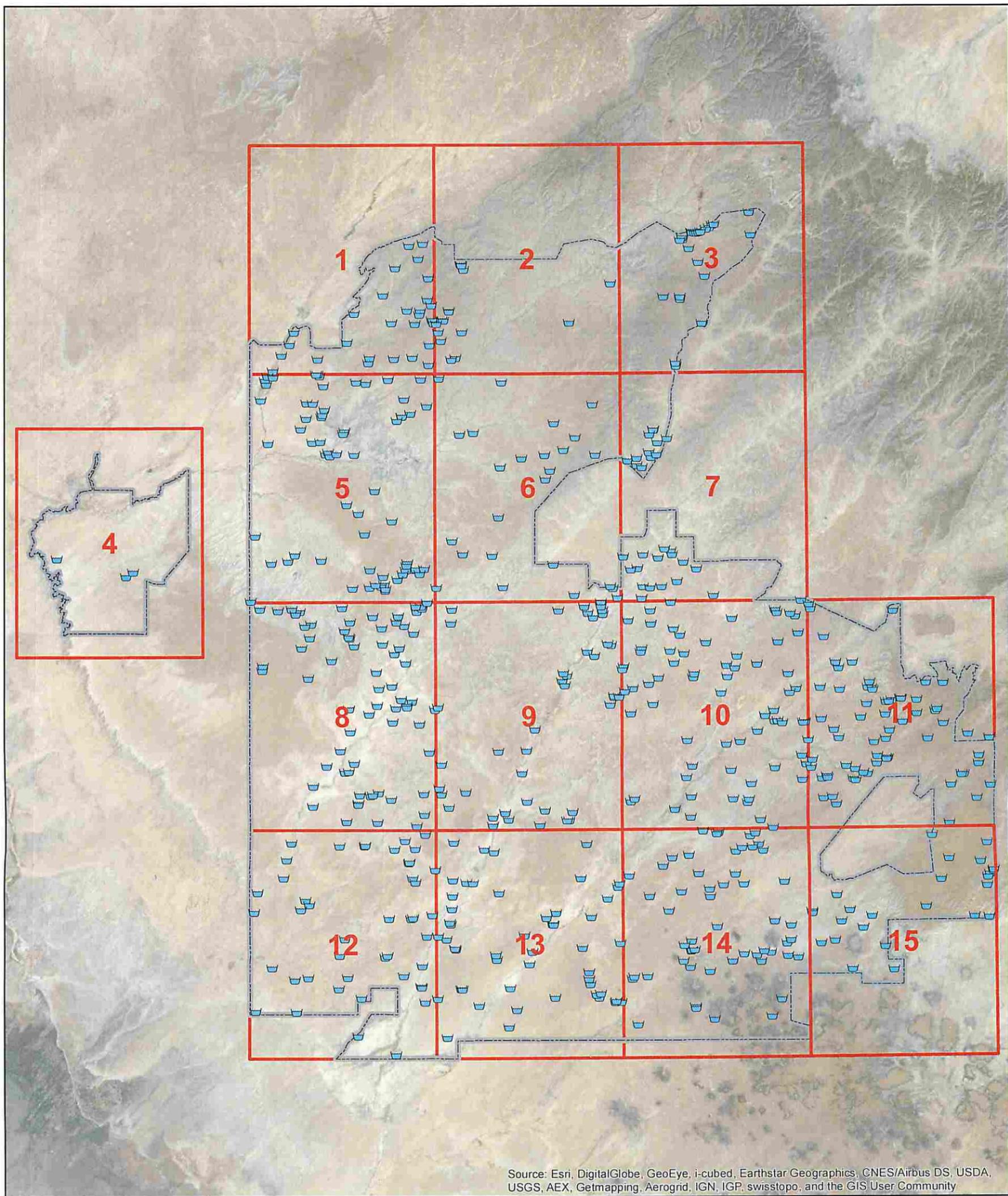
Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-14-166	5.14	14	558860	3950737
I-14-167	1.10	14	557430	3949430
I-14-168	5.51	14	558941	3953510
I-14-169	6.40	14	556684	3944367
I-14-170	1.65	14	553580	3942629
I-14-171	0.41	14	555749	3948953
I-14-172	2.40	14	565238	3940855
I-14-173	2.27	14	554099	3934647
I-14-179	9.64	14	547086	3932489
I-14-180	0.40	14	546432	3937997
I-14-181	1.91	14	546602	3938275
I-14-182	1.98	14	548242	3938317
I-14-183	7.58	14	554127	3934469
I-14-187	5.30	14	555812	3938938
I-14-188	7.40	14	553418	3939423
I-14-189	9.18	14	553533	3941398
I-14-190	9.18	14	553643	3941504
I-14-191	1.38	14	552722	3942103
I-14-192	12.40	14	556356	3933152
I-14-193	8.82	14	564516	3935548
I-14-194	9.50	14	566472	3940653
I-14-195	3.73	14	565173	3942363
I-14-197	2.94	14	563623	3945091
I-14-199	1.98	14	550842	3946306
I-14-200	0.96	14	554453	3950797
I-14-203	8.03	14	552331	3948622
I-14-204	3.44	14	565596	3942765
I-14-205	0.93	14	555810	3948000
I-14-444	2.07	14	556891	3955804
I-14-449	5.37	14	555000	3956003
I-14-451	5.14	14	553291	3953064
I-14-466	2.69	14	556684	3955647
I-14-472	6.43	14	548515	3948046
I-14-473	6.43	14	546013	3950561
I-14-474	5.14	14	550105	3951726
I-14-475	1.10	14	551257	3952719
I-14-555	1.25	14	553944	3941579
I-14-642	0.17	14	561333	3955750
I-14-643	0.64	14	560983	3954011
I-14-644	0.66	14	559744	3953965
I-14-645	0.18	14	565636	3944559
I-14-646	3.67	14	562379	3941406
I-14-647	0.69	14	552588	3940177
I-15-40	0.92	15	589410	3949383
I-15-41	4.59	15	589648	3945537

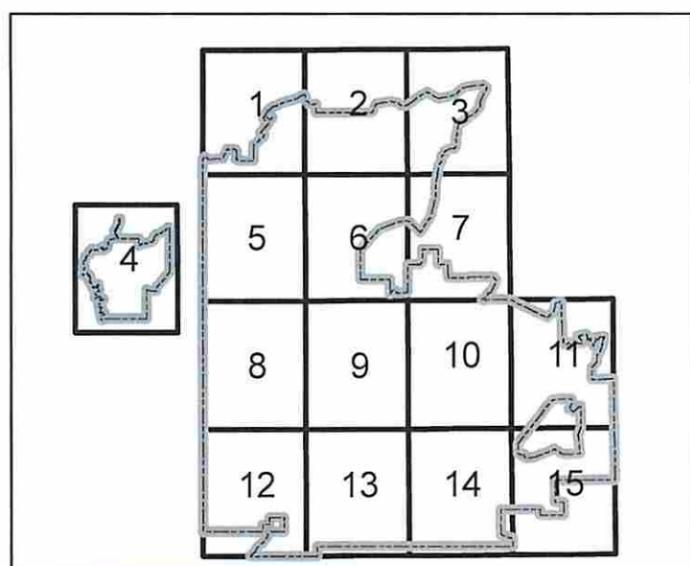
Hopi Tribe 3rd Amended Claim - Impoundments

Hopi ID	Capacity (Ac.-Ft.)	Plate No.	X Coordinate	Y Coordinate
I-15-42	2.48	15	589430	3954564
I-15-43	5.74	15	589722	3950773
I-15-44	42.30	15	587882	3945641
I-15-45	8.68	15	581968	3946783
I-15-46	1.97	15	589472	3950405
I-15-47	1.10	15	588621	3952271
I-15-139	5.14	15	569275	3942360
I-15-151	1.38	15	574367	3944254
I-15-152	1.10	15	571140	3948198
I-15-153	1.79	15	568168	3946234
I-15-154	3.10	15	568187	3946056
I-15-155	1.38	15	570930	3942684
I-15-161	1.79	15	582765	3955486
I-15-184	10.33	15	572738	3946403
I-15-186	9.00	15	583792	3950161
I-15-196	2.89	15	584746	3952632
I-15-201	10.50	15	573096	3939219
I-15-202	73.86	15	578106	3939172
I-15-206	5.90	15	577031	3942025
I-15-649	5.14	15	571720	3945000
I-15-650	5.10	15	590167	3951131
I-15-651	10.10	15	590207	3951255
I-15-648	0.68	15	575435	3945692
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Coordinates are in Universal Transverse Mercator (UTM) Zone 12 N.
North American Datum of 1927



Hopi Tribe 3rd Amended Claim - Impoundments



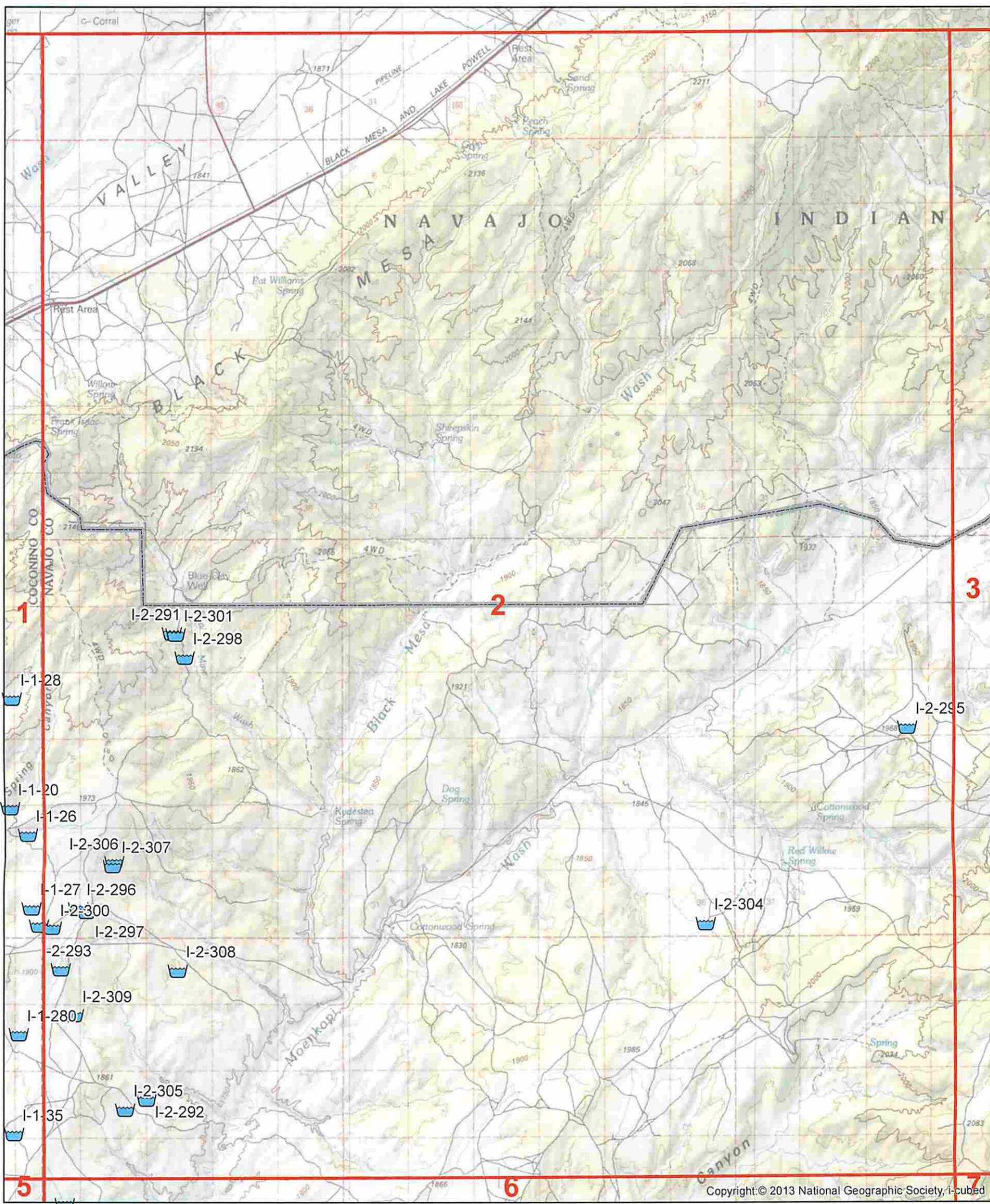
Overview



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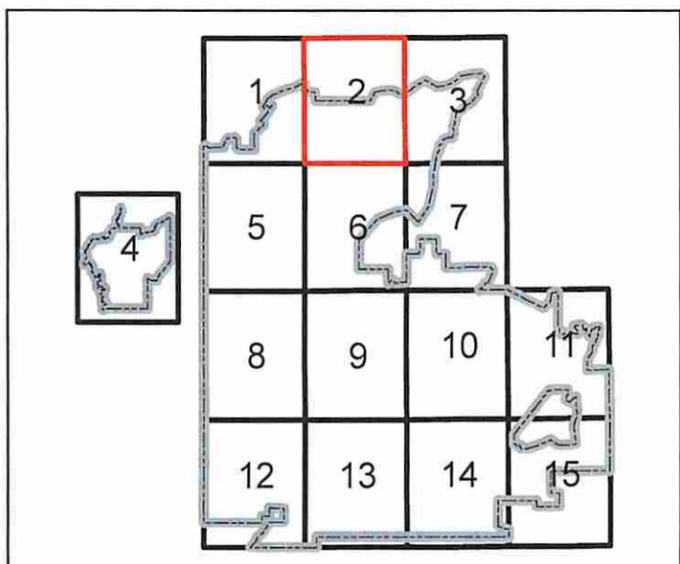
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-  Hopi Indian Reservation
-  Map Sheet Boundary





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Hopi Tribe 3rd Amended Claim - Impoundments

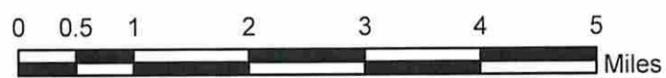


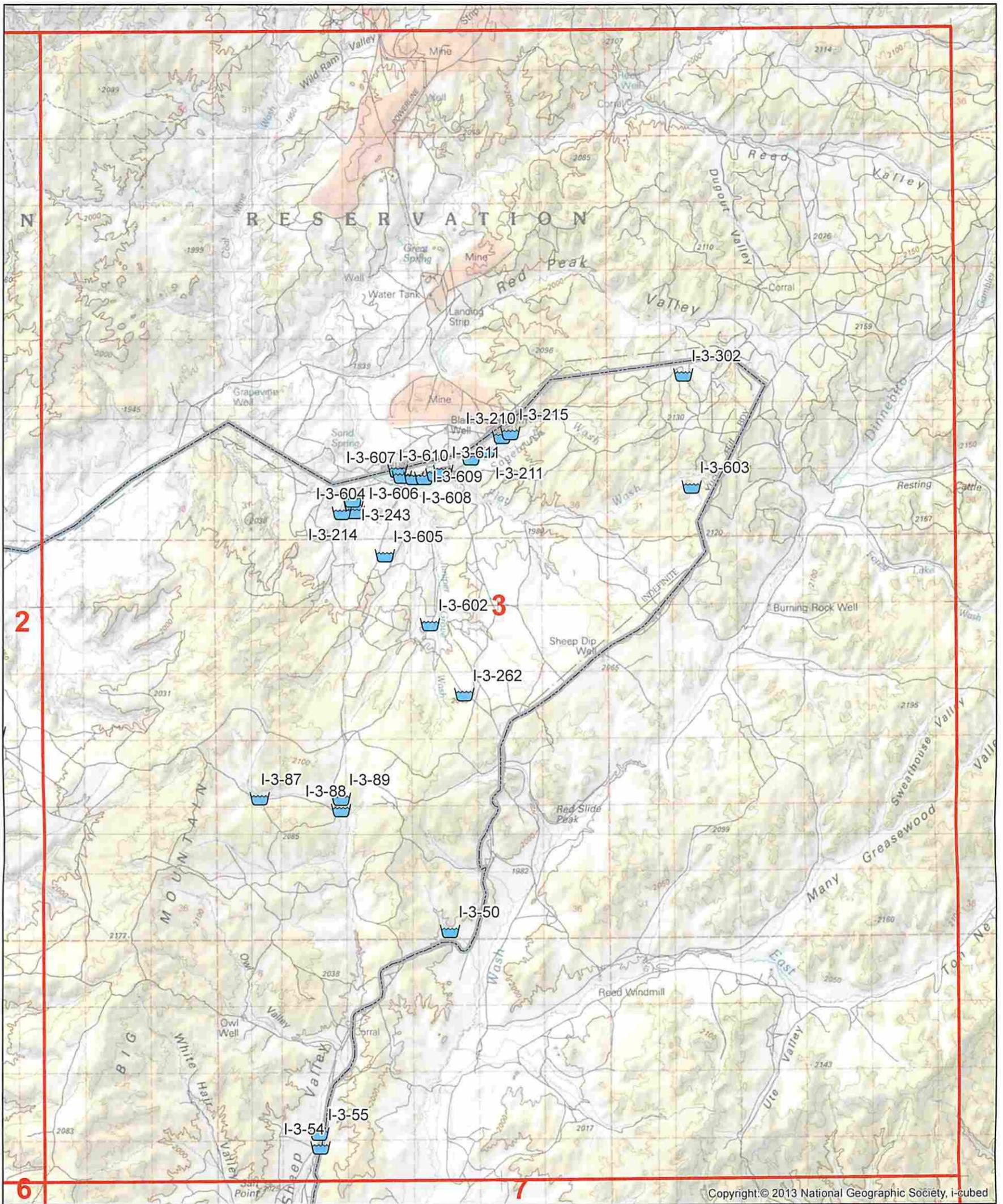
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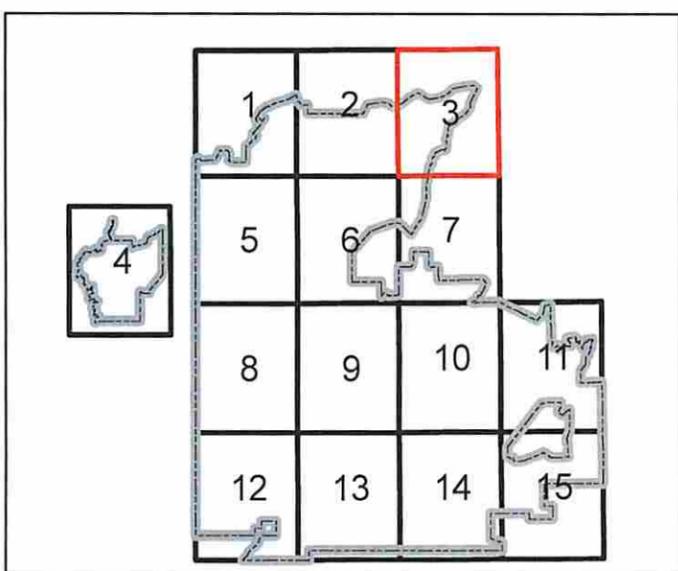
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-  Hopi Indian Reservation
-  Map Sheet Boundary





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Hopi Tribe 3rd Amended Claim - Impoundments

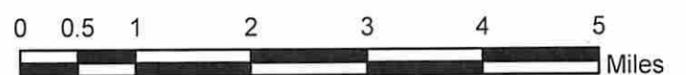


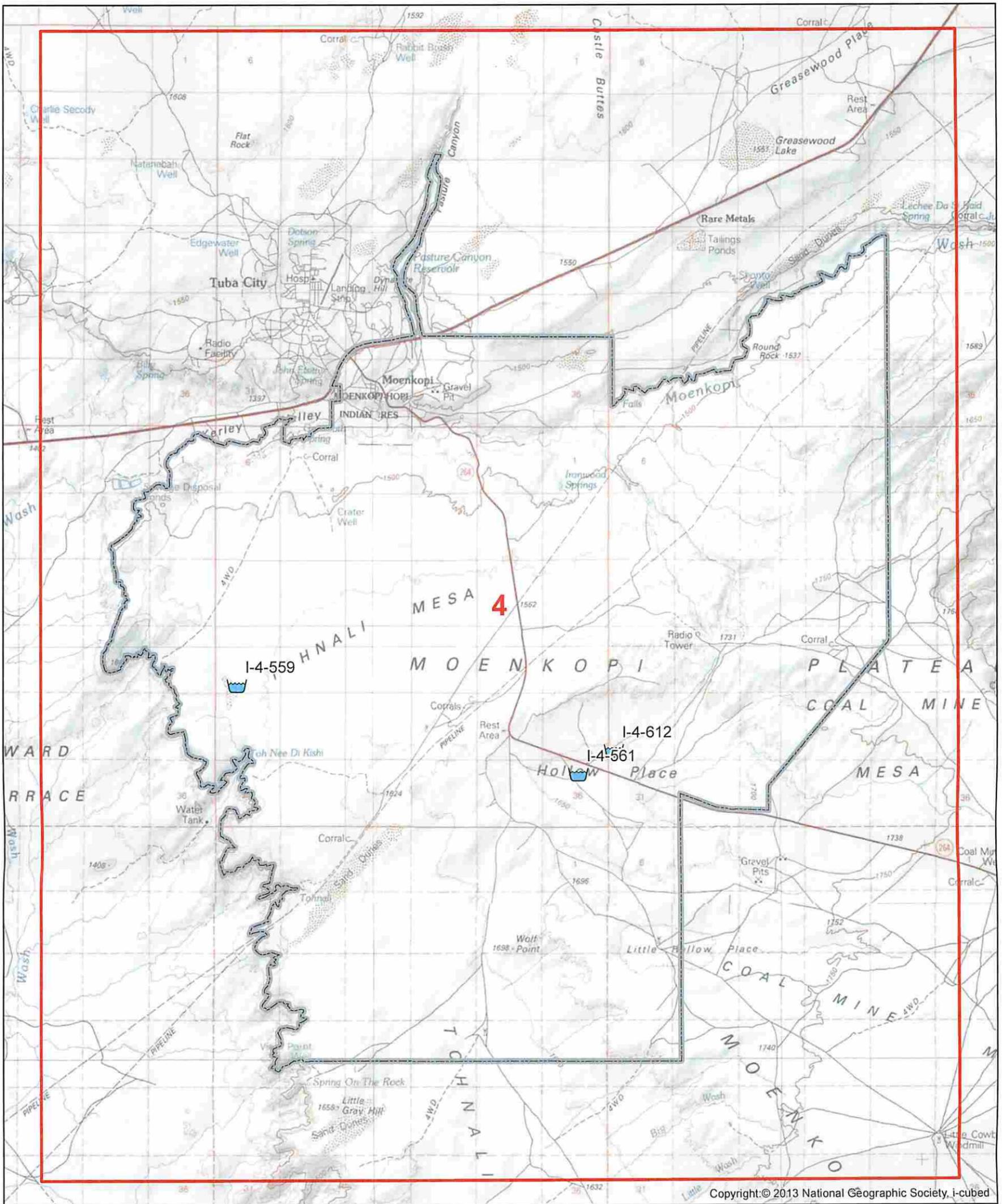
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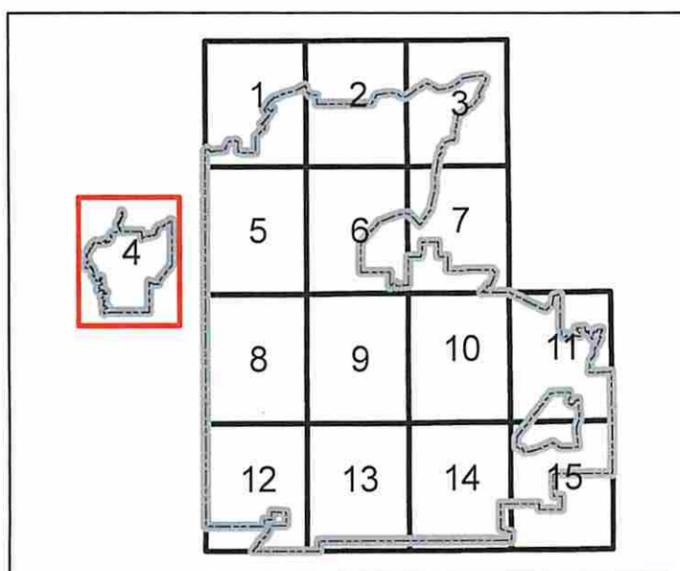
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-  Hopi Indian Reservation
-  Map Sheet Boundary





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Hopi Tribe 3rd Amended Claim - Impoundments

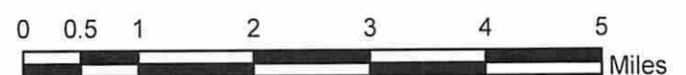


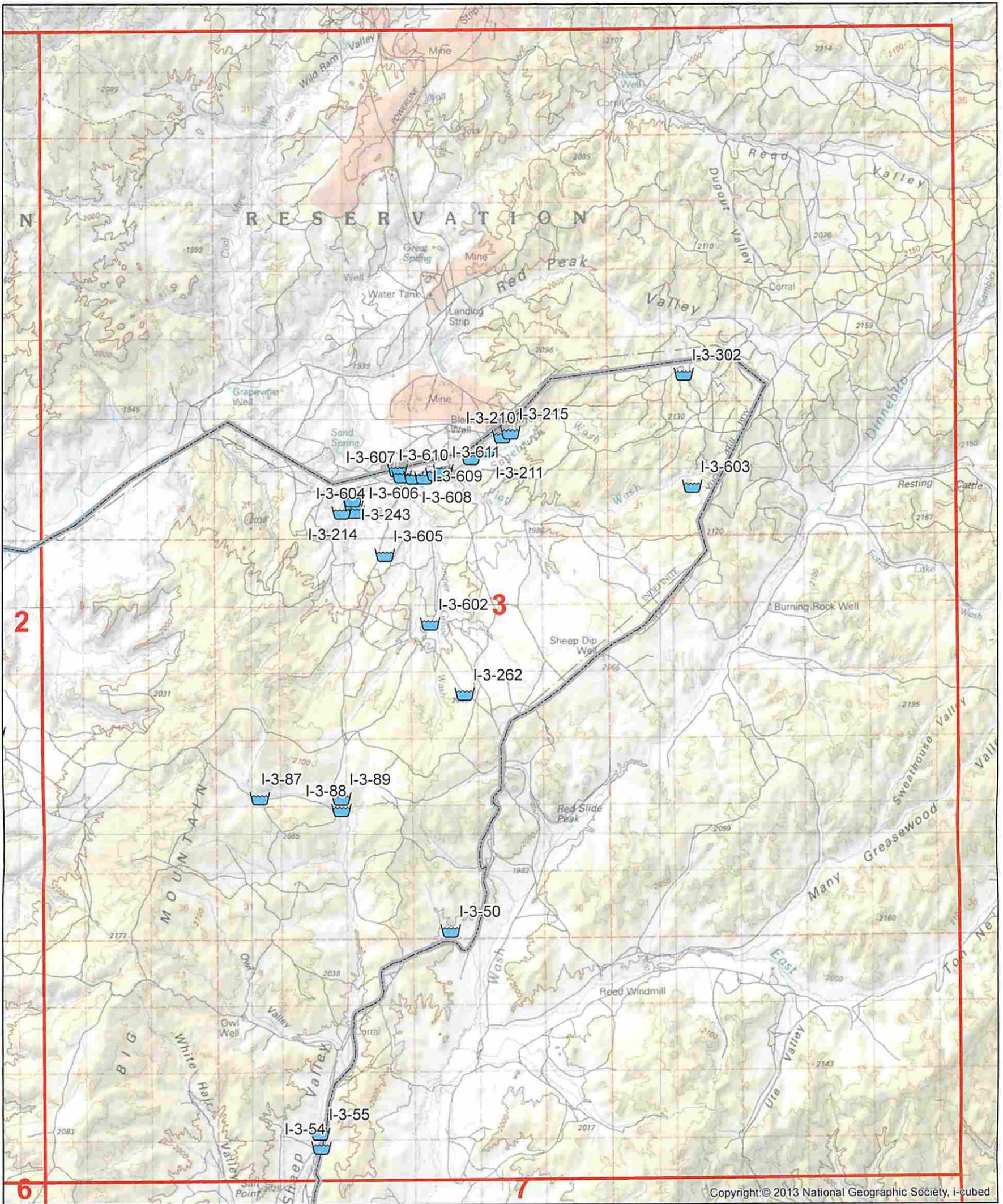
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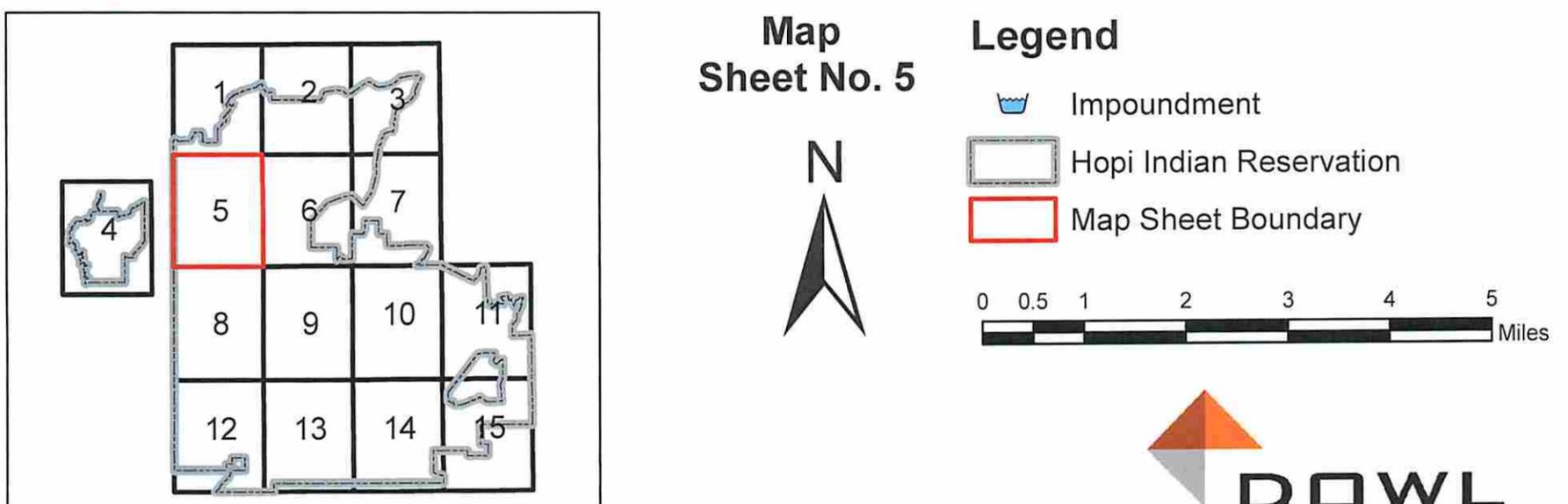
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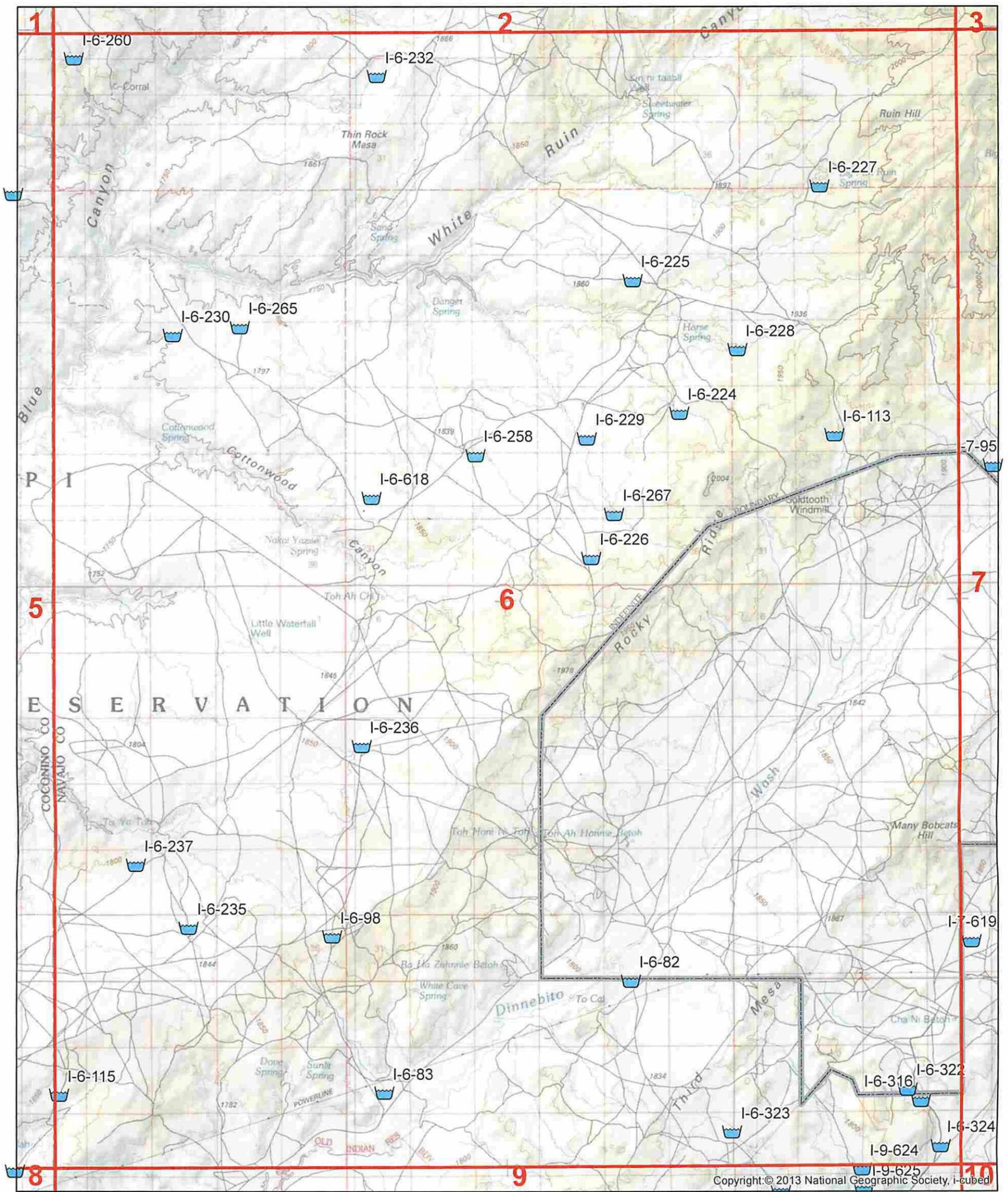
-  Impoundment
-  Hopi Indian Reservation
-  Map Sheet Boundary



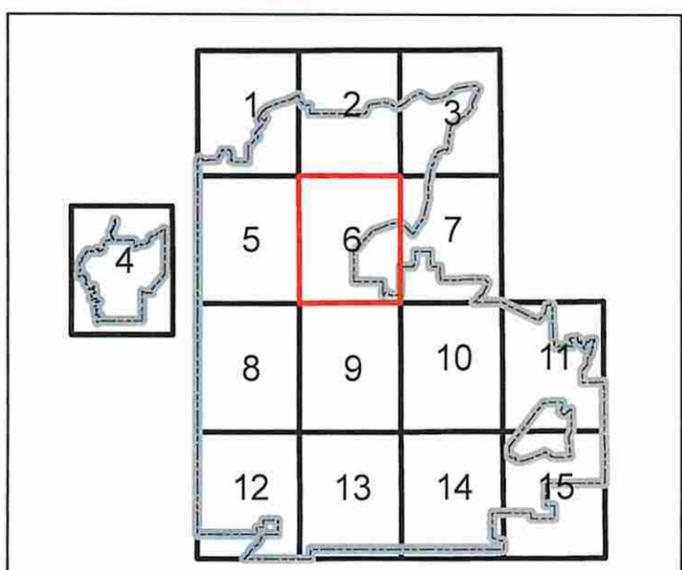


Hopi Tribe 3rd Amended Claim - Impoundments





Hopi Tribe 3rd Amended Claim - Impoundments

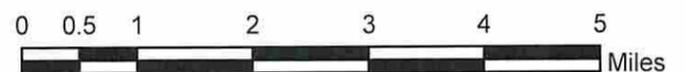


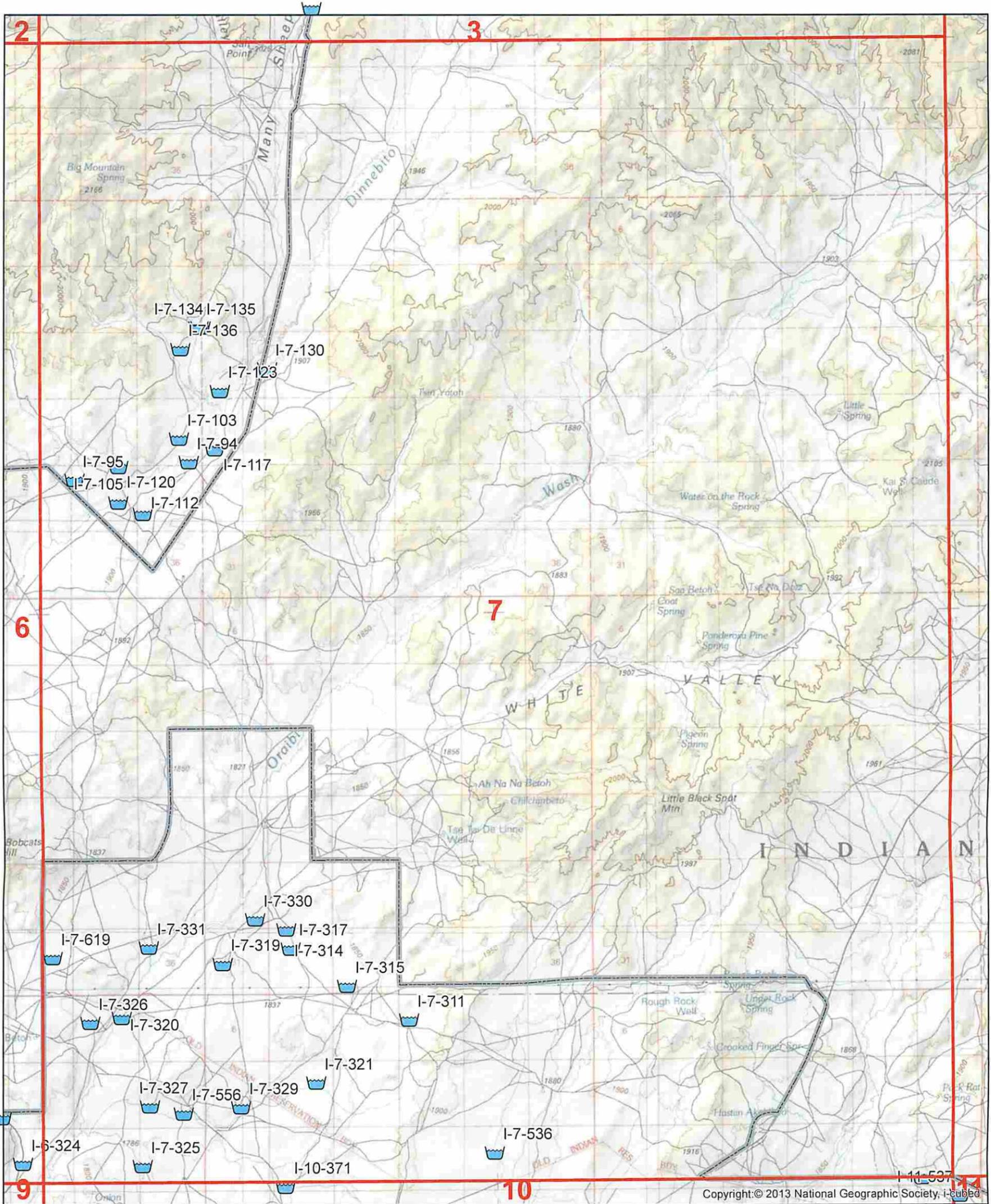
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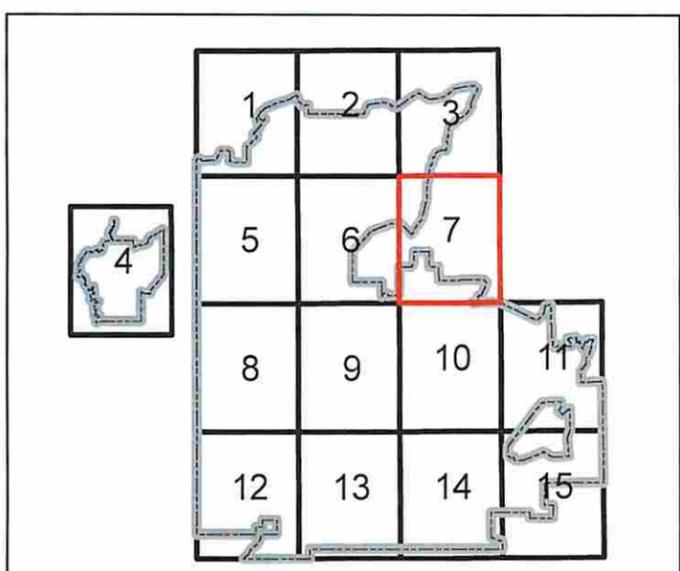
Legend

-  Impoundment
-  Hopi Indian Reservation
-  Map Sheet Boundary





Hopi Tribe 3rd Amended Claim - Impoundments

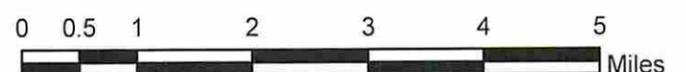


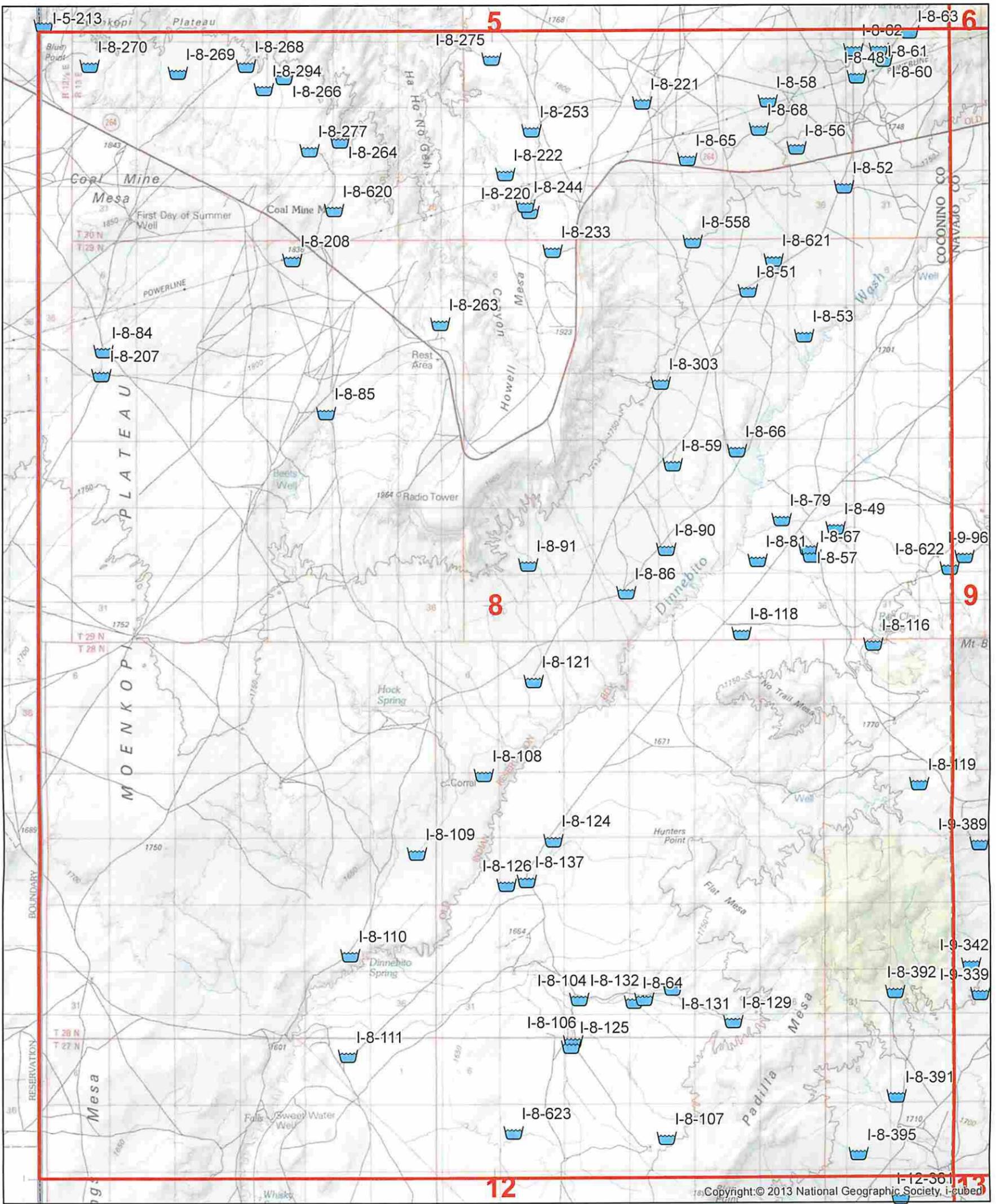
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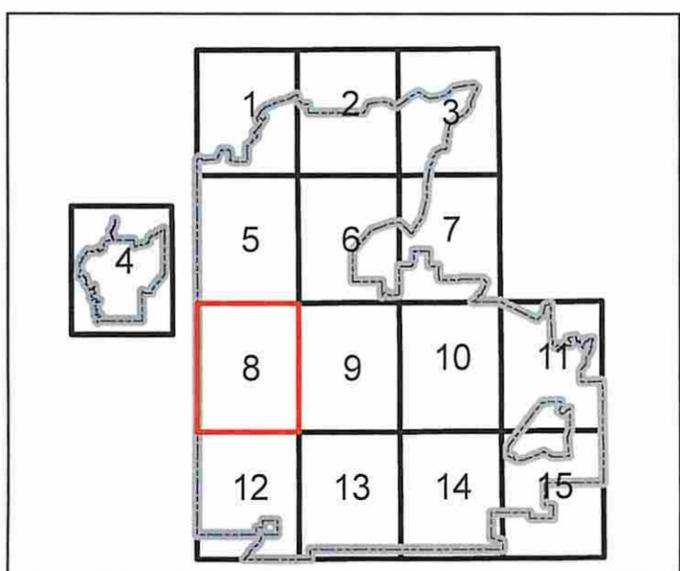
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-  Hopi Indian Reservation
-  Map Sheet Boundary





Hopi Tribe 3rd Amended Claim - Impoundments



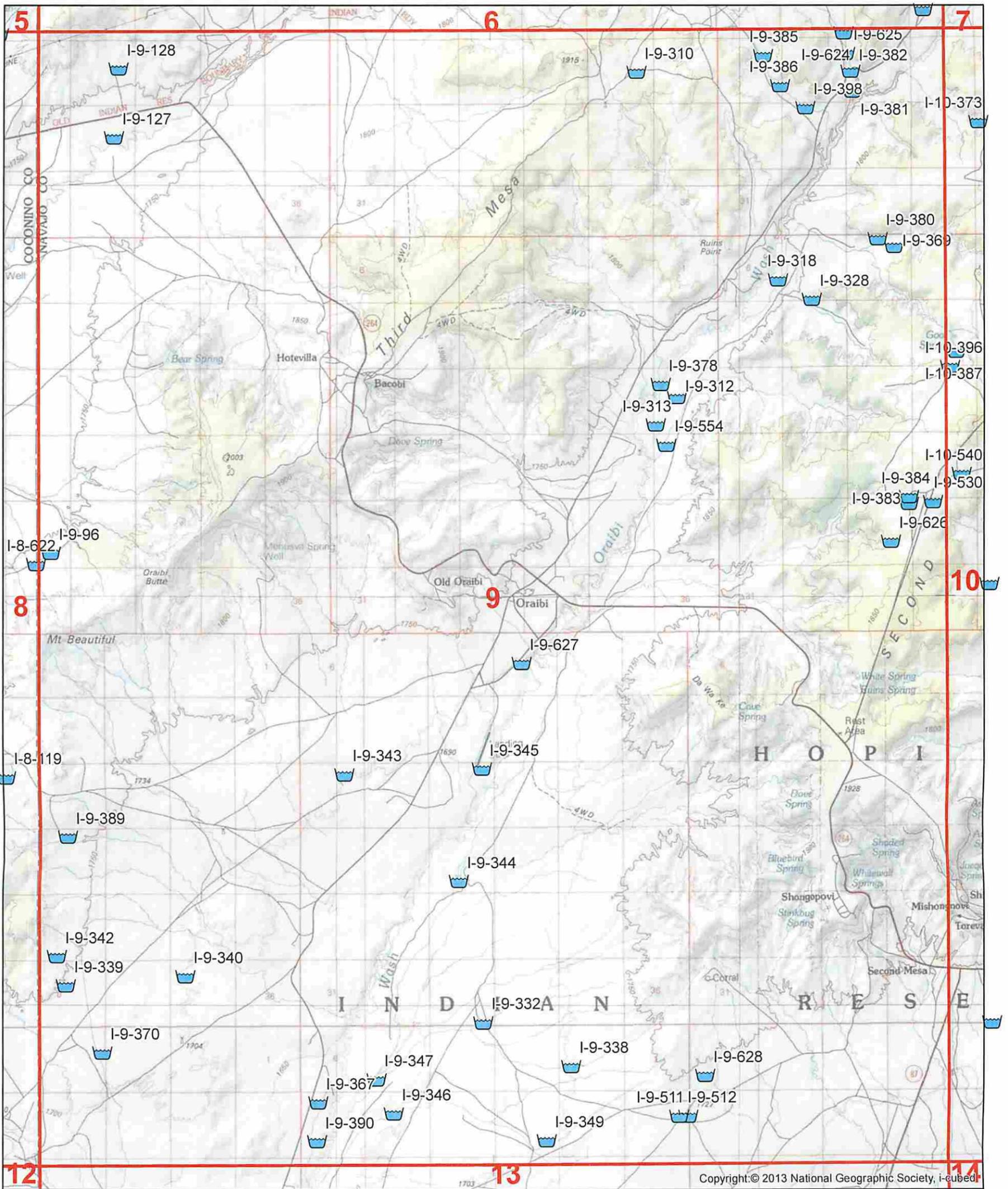
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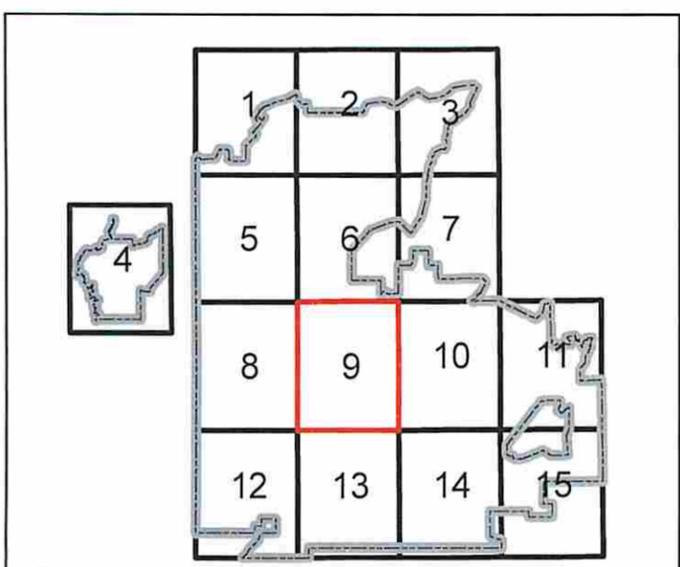
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Hopi Tribe 3rd Amended Claim - Impoundments



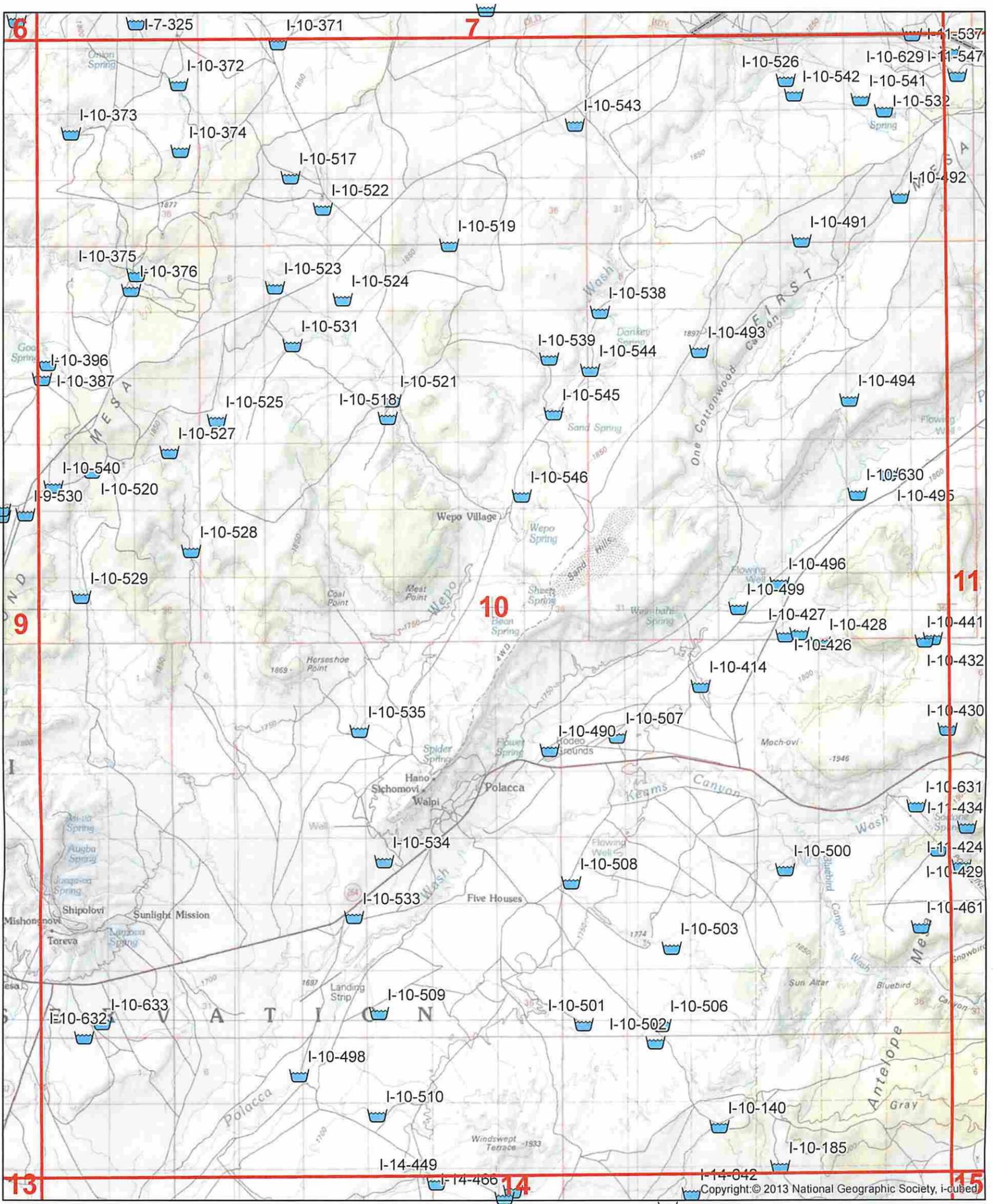
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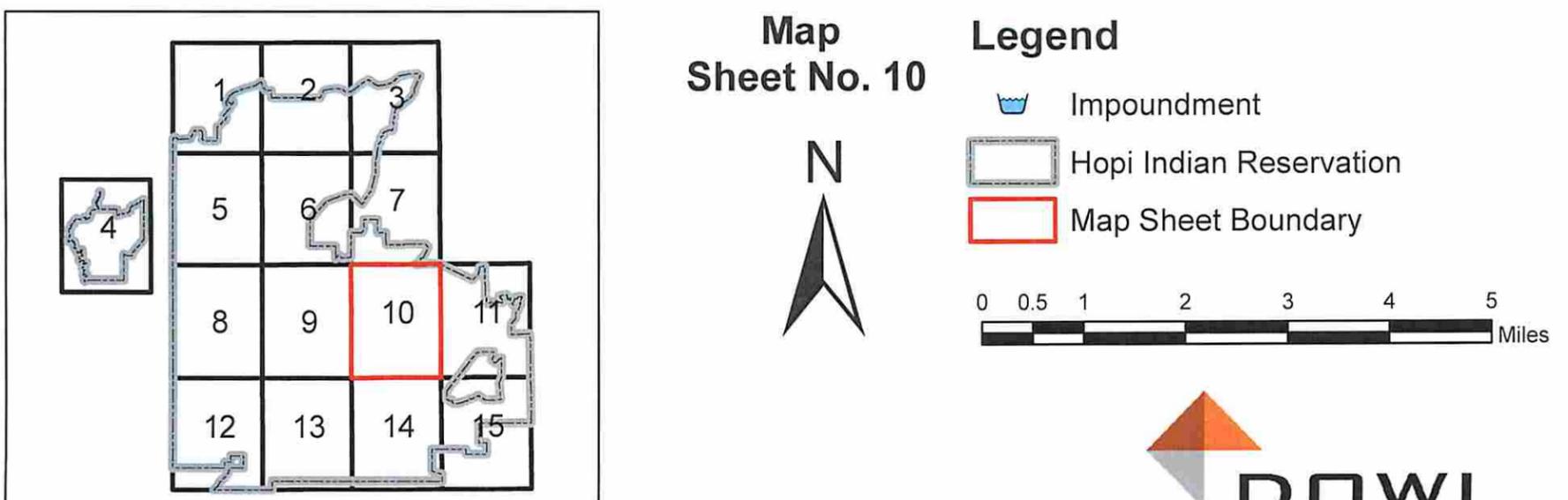
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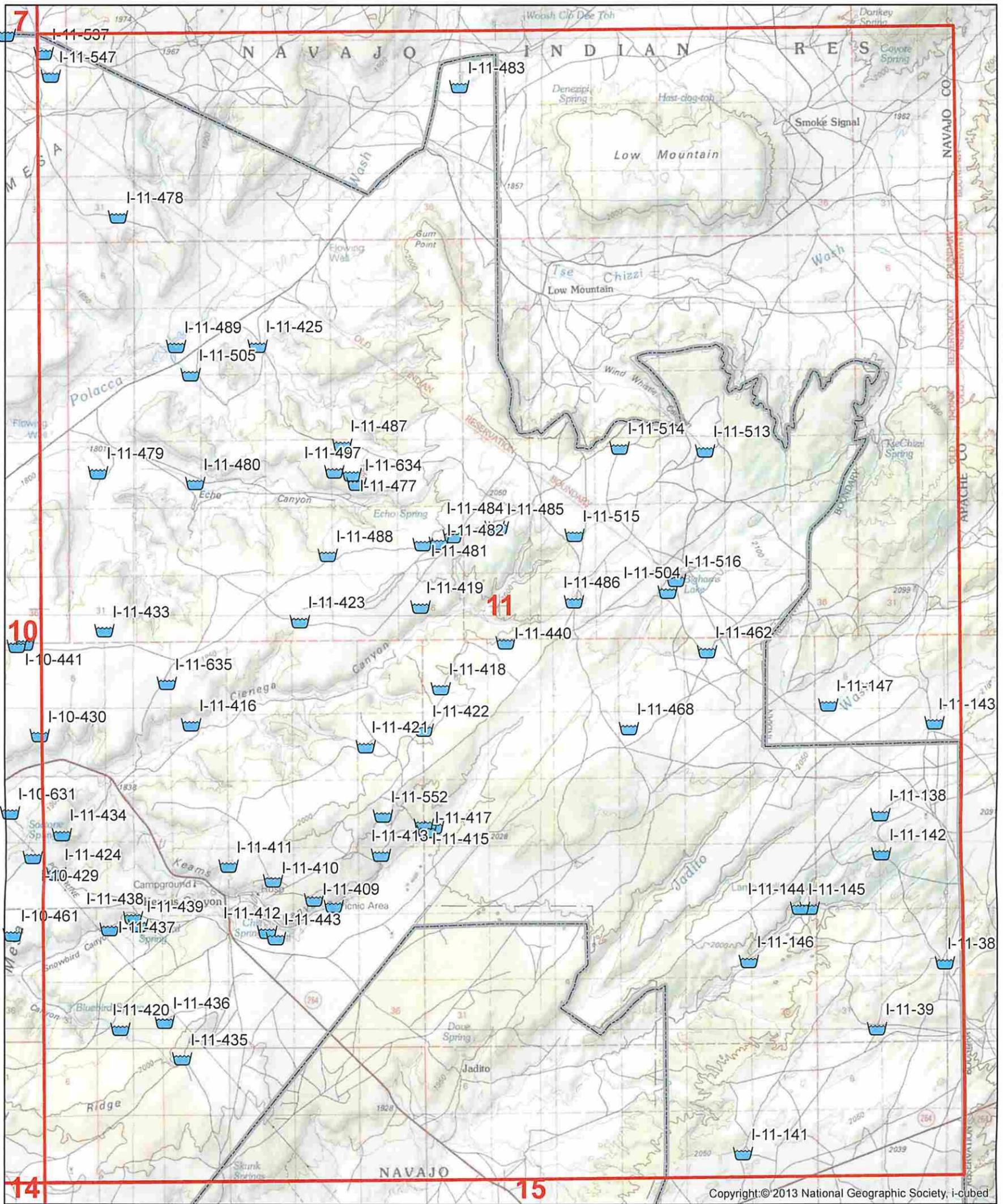
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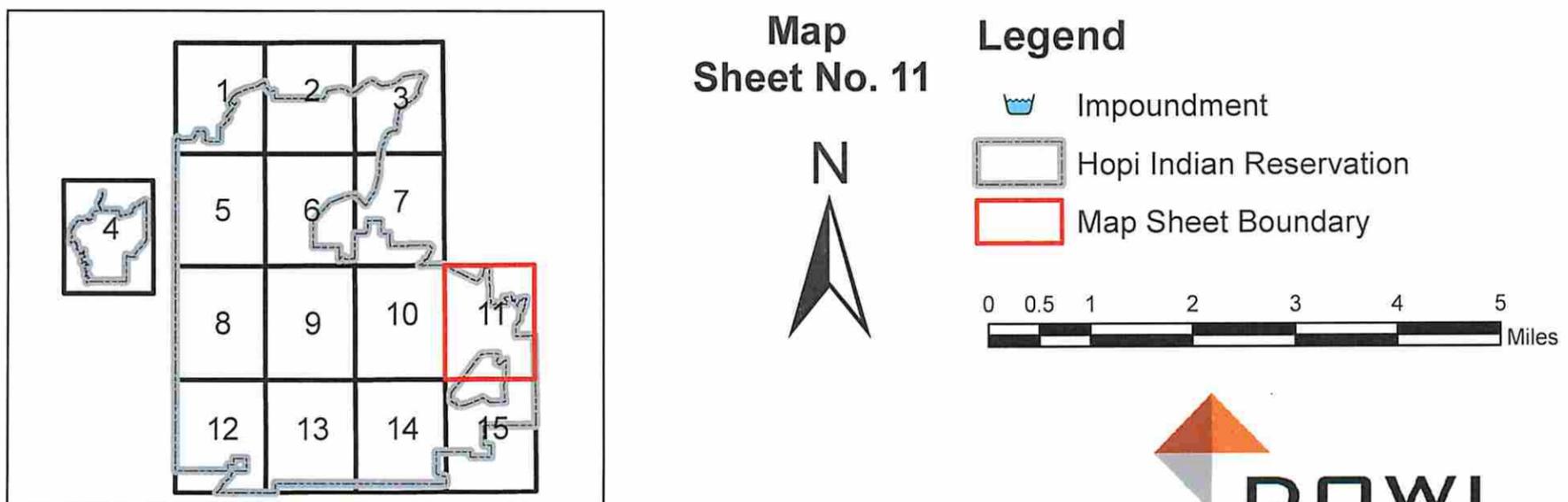


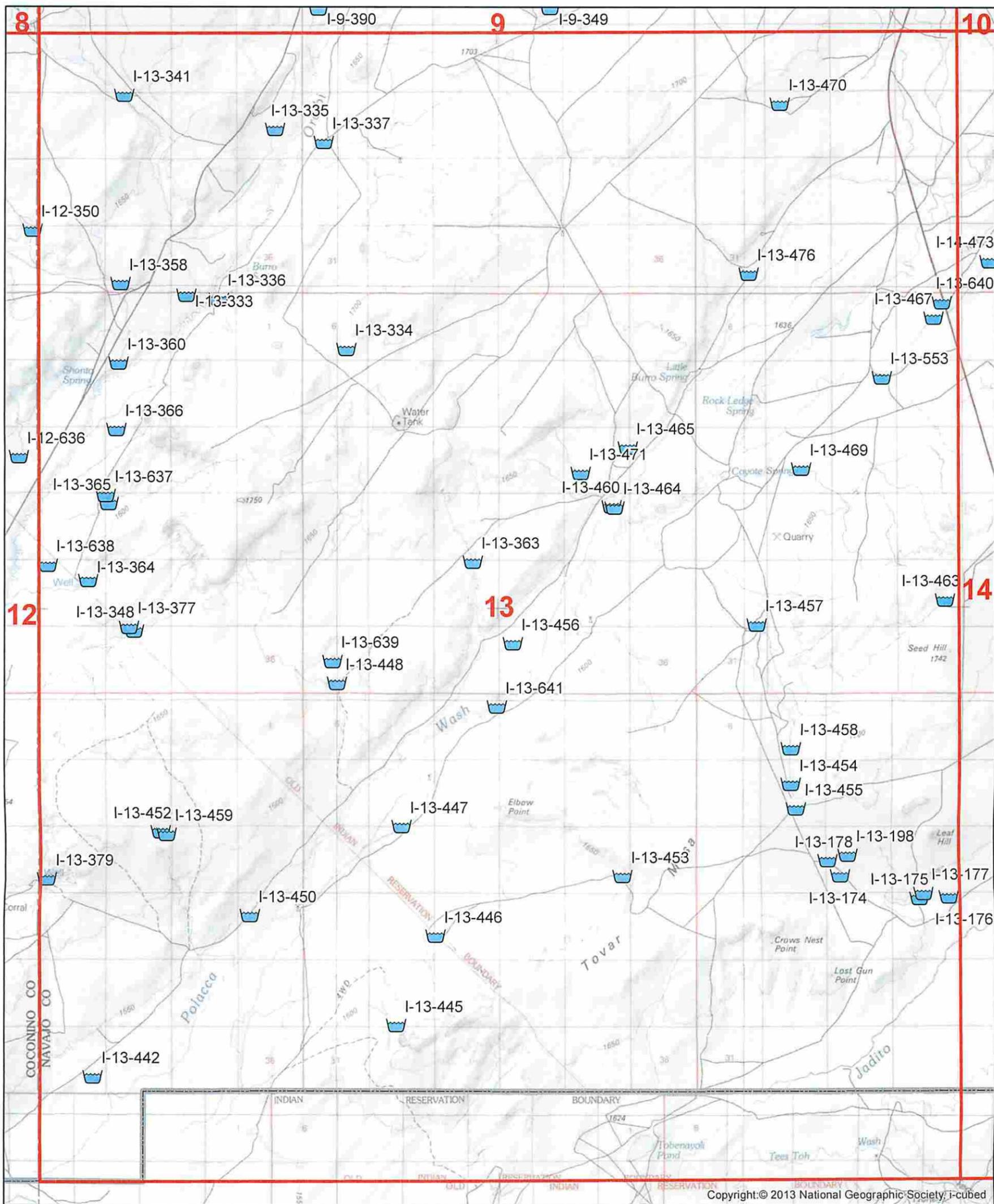
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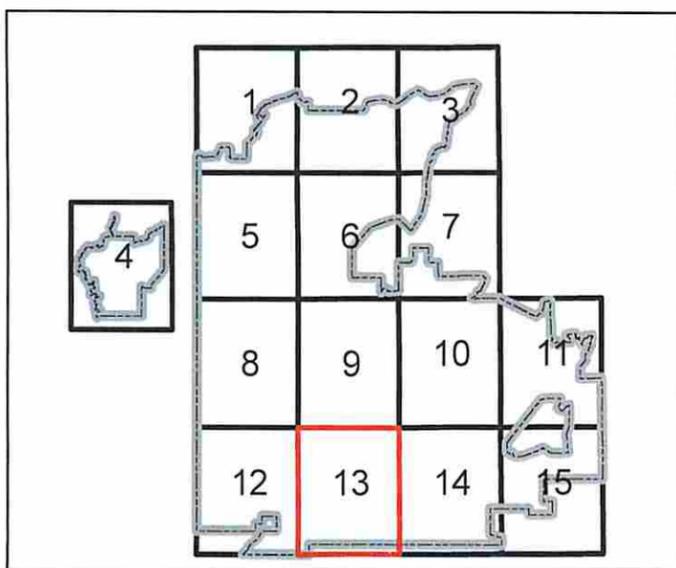


Hopi Tribe 3rd Amended Claim - Impoundments





Hopi Tribe 3rd Amended Claim - Impoundments



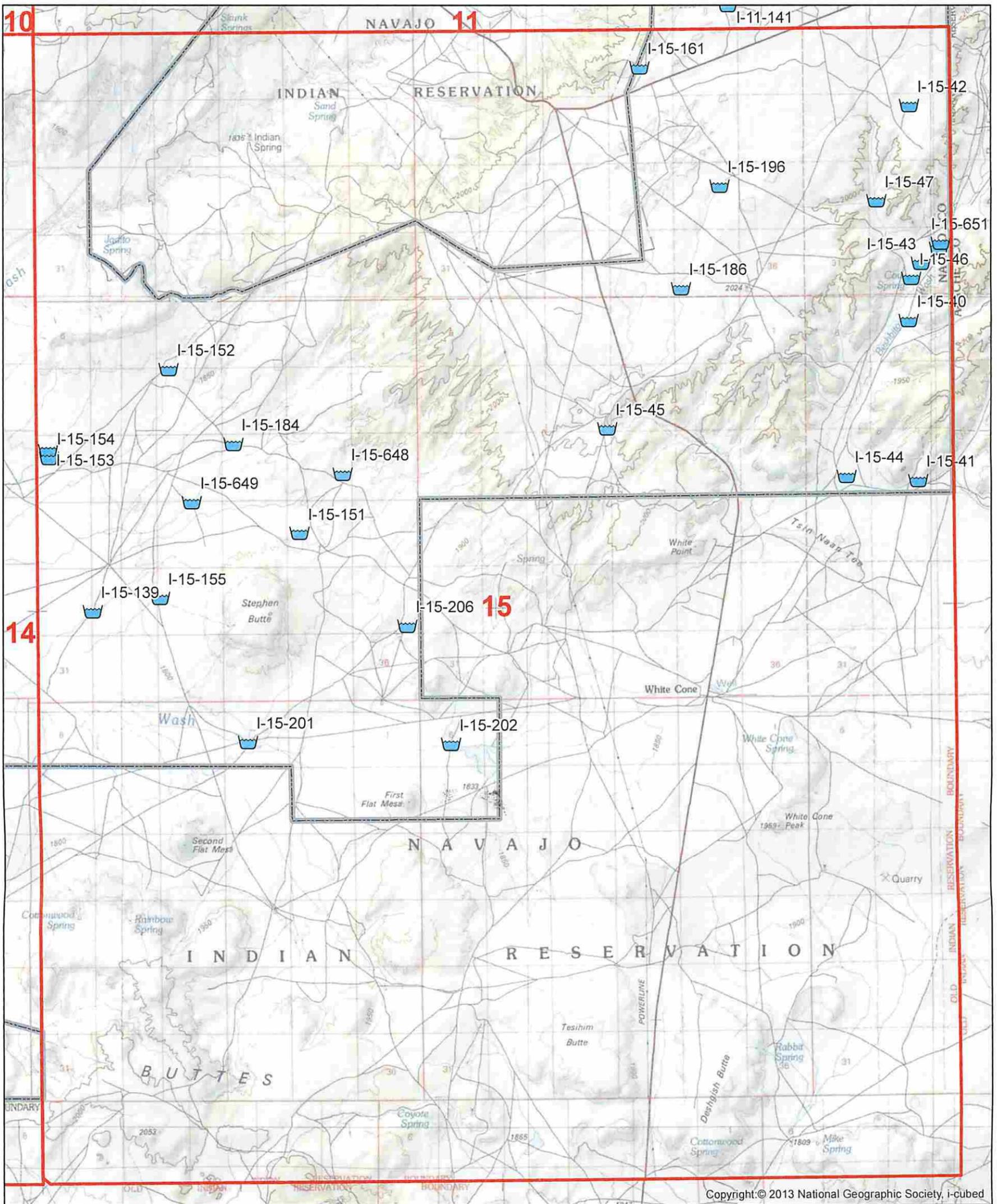
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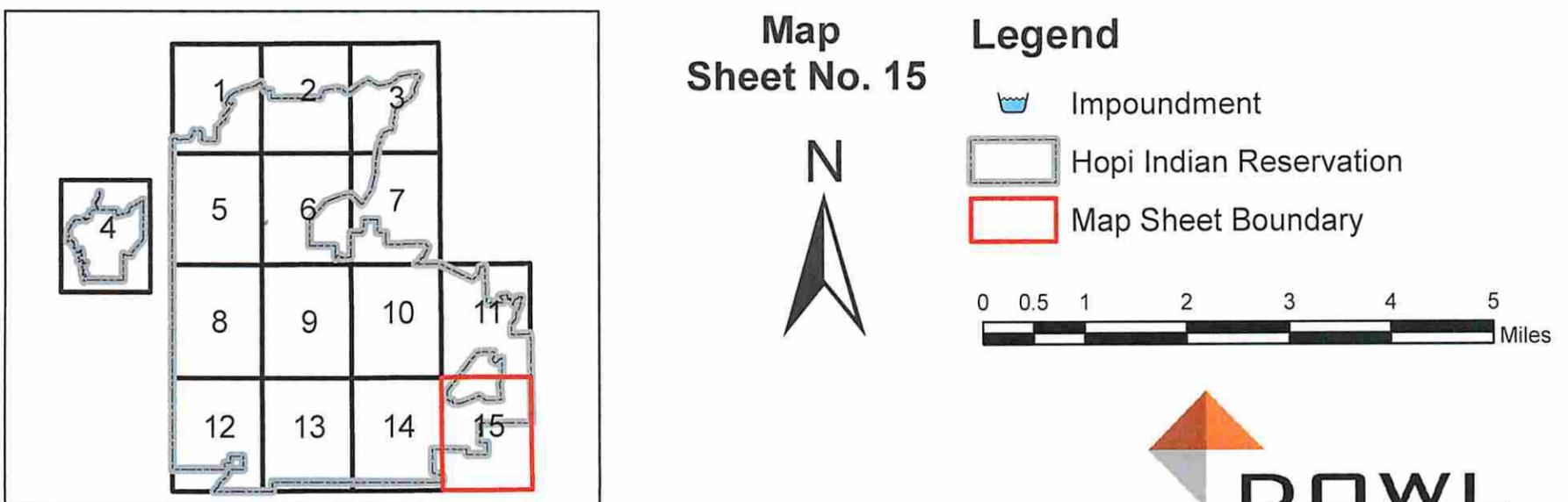
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-  Impoundment
-  Hopi Indian Reservation
-  Map Sheet Boundary





Hopi Tribe 3rd Amended Claim - Impoundments



Appendix 3

Hopi Indian Reservation Livestock Impoundments

Prepared for:

Hopi Tribe
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Prepared by:



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P.O. Box 31318
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May 29, 2015

Introduction and Background

The Hopi Tribe retained HKM (now DOWL) to prepare an inventory of domestic and livestock water uses. The work was undertaken in 1991 and 1992 and a final report, *Hopi Indian Reservation Domestic and Livestock Water Use Inventory*, was completed in December 1992. The inventory was subsequently reviewed and revised based on additional information and used to support the Hopi Tribe's 2004 and 2009 claims. The inventory and claims were reviewed and commented on by other entities including the Arizona Department of Water Resources (ADWR) and the Federal government's technical consultant, Natural Resources Consulting Engineers (NRCE).

The most recent review by NRCE, *Hopi Indian Reservation Updated Inventory of Wells, Springs and Impoundments*, was completed in March 2015. Table A6 of that report identified several impoundments from the 2009 Hopi claim to be dropped from the 2015 Federal claim. The document provides a description of the methods used to document the location and capacity of impoundments included in Appendix 4 of the Hopi Tribe's 2015 claim.

Methodology

Impoundments were identified and analyzed by the following procedure. To accommodate the development of a complete inventory, 1991 aerial photography was acquired by the Hopi Tribe for the entire study area. Black and white 1991 aerial photography, at a scale of 1:24,000, was the principal source of information used for mapping impoundments. The contact prints were examined under a Lietz 3x track stereoscope. The historic maximum controlled water level of the impoundment was determined, as were the corresponding surface area and depth of the facility. These parameters were based on the estimated original, as constructed condition. This information was supplemented by photo-interpretation of 1980 color infrared (CIR) aerial photography.

Immediately after receiving the 1991 aerials, an initial group of impoundments were evaluated and a field trip planned. The preliminary field investigation of sample impoundments was conducted in July 1991 to obtain ground verified information relative to size, depth, topography,

and other physical features. The field information was obtained in order to calibrate the physical parameters that would be subsequently identified during photo-interpretation.

After determining area and depth with the stereoscope, the location of the facility was superimposed on the respective 7.5' U.S. Geological Survey Quadrangle by means of a Kargl reflecting projector or a Bausch and Lomb Stereo Zoom Transfer Scope. This insured the accurate placement of each facility.

The capacity of the impoundment was calculated using the following formula:

$$A \times D \times 0.4 = C$$

where A = Area

D = Depth

0.4 = Volume conversion factor for water impoundments utilized by the Soil

Conservation Service (now Natural Resources Conservation Service) and the Montana Water Rights Claim Examination Manual

C = Capacity

The only exception to the utilization of a volume conversion factor of 0.4 was in the case where some pits were cone shaped. In those cases, a factor of 0.33 was utilized. The areas and capacities of the impoundments were calculated using an electronic spreadsheet. All pertinent data including calculated values were then transferred to a database for ease of data retrieval and manipulation.

The predominate impoundment type was a standard earthen structure with a dam and spillway. However, many facilities were earthen storage pits fed by a pipe from an upstream sediment retention pond. These pits were generally square in shape and up to 200 feet by 200 feet in size. The upstream earthen pond slows the inflowing water causing the sediment to be deposited above the pit. Water volume for these facilities is based on the capacity of both the pit and the sediment retention pond. The system could not effectively function without both components.

A unique identifier was assigned to each impoundment. The identifier was modified from the original 1992 inventory. An example of the current identifier follows.

I-8-141

Where I = impoundment

9 = plate number in Appendix 4 map set

141 = unique feature ID

Wilbur Talashoma, Jr., of the Hopi Tribe, conducted a review of water resource documents available from the Hopi Tribe and the Hopi Agency of the Bureau of Indian Affairs. Mr. Talashoma also accompanied HKM (now DOWL) personnel on field investigations and coordinated arrangements for village meetings along with Tribal representative Robert Charley. Field investigations were undertaken during December 1991 and March 1992. Of the 57 facilities which have maximum surface areas greater than two acres, a total of 53 were field measured. Of 497 smaller (< 2 surface acres) facilities, 39 or 7.8% were field investigated. Reservoir area was examined and depth was measured by rod and hand level techniques. The field measurements confirmed the accuracy of the photo-interpretation. Photo-interpretation accuracy varied between facilities, but the average depth of the field measured facilities was found to vary less than one foot from the photo-interpreted value. Based on the field work, no adjustment factor was required to be applied to the results developed from photo-interpretation.

Subsequent reviews and revisions were made based additional digital aerial imagery using the geographic information system (GIS) software, ArcGIS (various versions), from Environmental Research Systems Incorporated (ESRI) and as previously mentioned comments and information from NRCE and ADWR.

Impoundments Identified by NRCE to be Dropped

Table 1 is adapted from Table A6 of the March 2015 NRCE report and includes the NRCE and ADWR comments from that table and the results of DOWL's 2015 review. In summary, only one impoundment, I-12-133, was dropped from the list of impoundments included in the 2009 claim. In several instances the claimed location of the impoundment was revised. Figures 1 – 10 using recent aerial imagery in ArcGIS and showing the impounds identified by NRCE to be dropped are provided after Table 1.

Table 1: Hopi impoundments dropped by NRCE

Hopi Identifier	NRCE Comments	ADWR Comments	DOWL May 2015 Review
1-9-530	Very small wet spot next to road but very unlikely place for impoundment.		Keep. Small but functional in 1991. Visible on later imagery.
I-12-133	Location of a temporary or seasonal dam and impoundment	Impoundment not found; claimed location is in Dinnebito Wash where stream was flowing	Pond/sump for a pump. Temporary and seasonal. Drop.
1-8-91	Impoundment has filled with sediment	Impoundment not found	Keep.
1-3-212	Field visited Oct 2009, found well spill or erosion control.	PWCC sediment pond J7-K	Keep. This is a Good facility.
1-7-117	Field visited Oct 2009, found well spill or erosion control.	Berm breached	Idle but can be repaired and used.
1-8-208	Field visited Oct 2009, found well spill or erosion control.	Photo analysis suggests berm breached	Good facility. Keep.
1-8-221	Field visited Oct 2009, found well spill or erosion control.		Good facility. Keep.
1-8-269	Field visited Oct 2009, found well spill or erosion control.	Berm breached	Keep but needs repair.
I-10-376	Field visited Sep 2009, found well spill or erosion control.	Topo map shows pond	Good facility. Keep.
I-10-428	Inconsistent and deleted from claim according to Sep. 2010 memo.		Good facility. Keep.

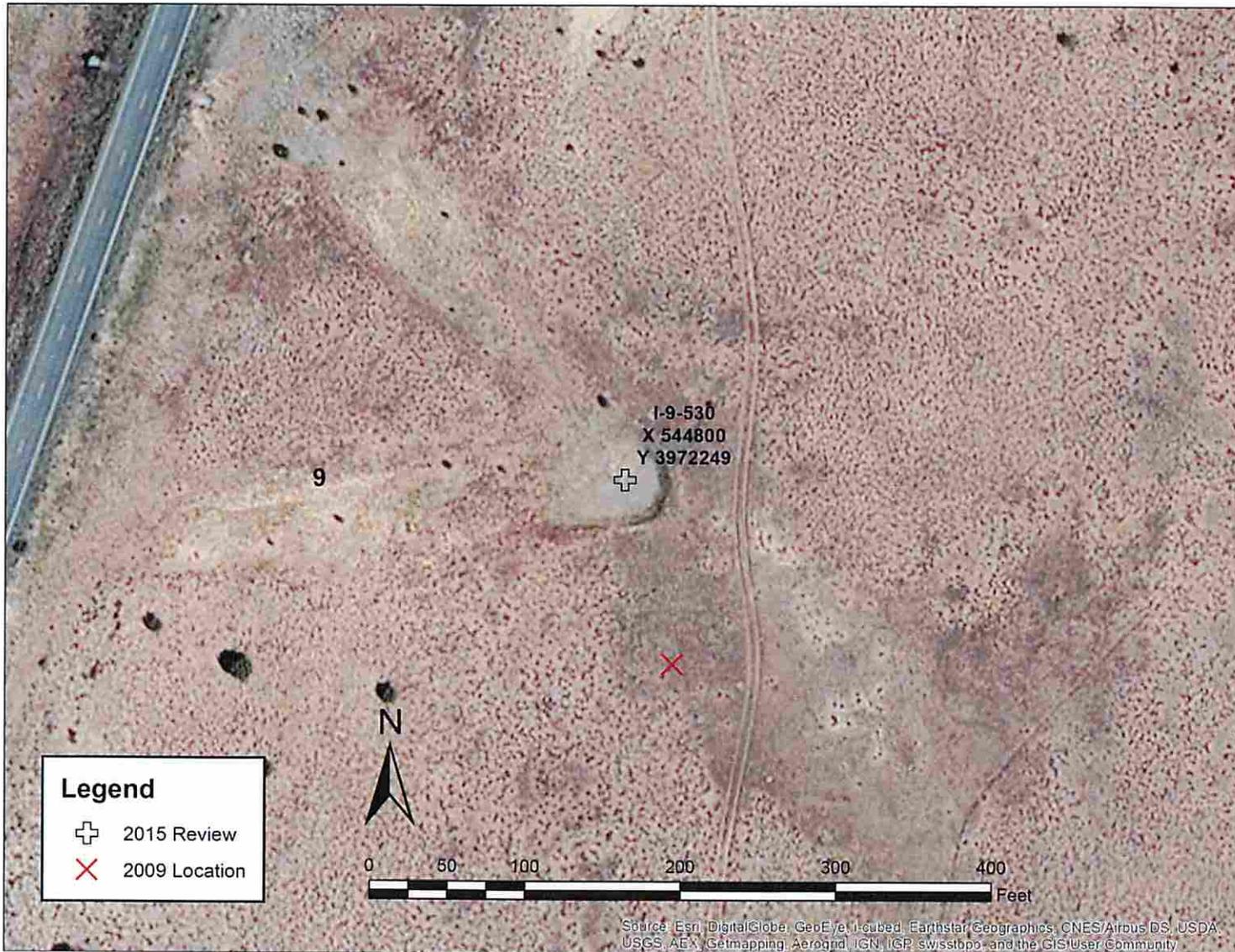


Figure 1: Evidence of I-9-530 is clearly visible.



Figure 2: 2009 location of I-12-133. Water was pumped from a temporary impoundment to irrigate field by North arrow.

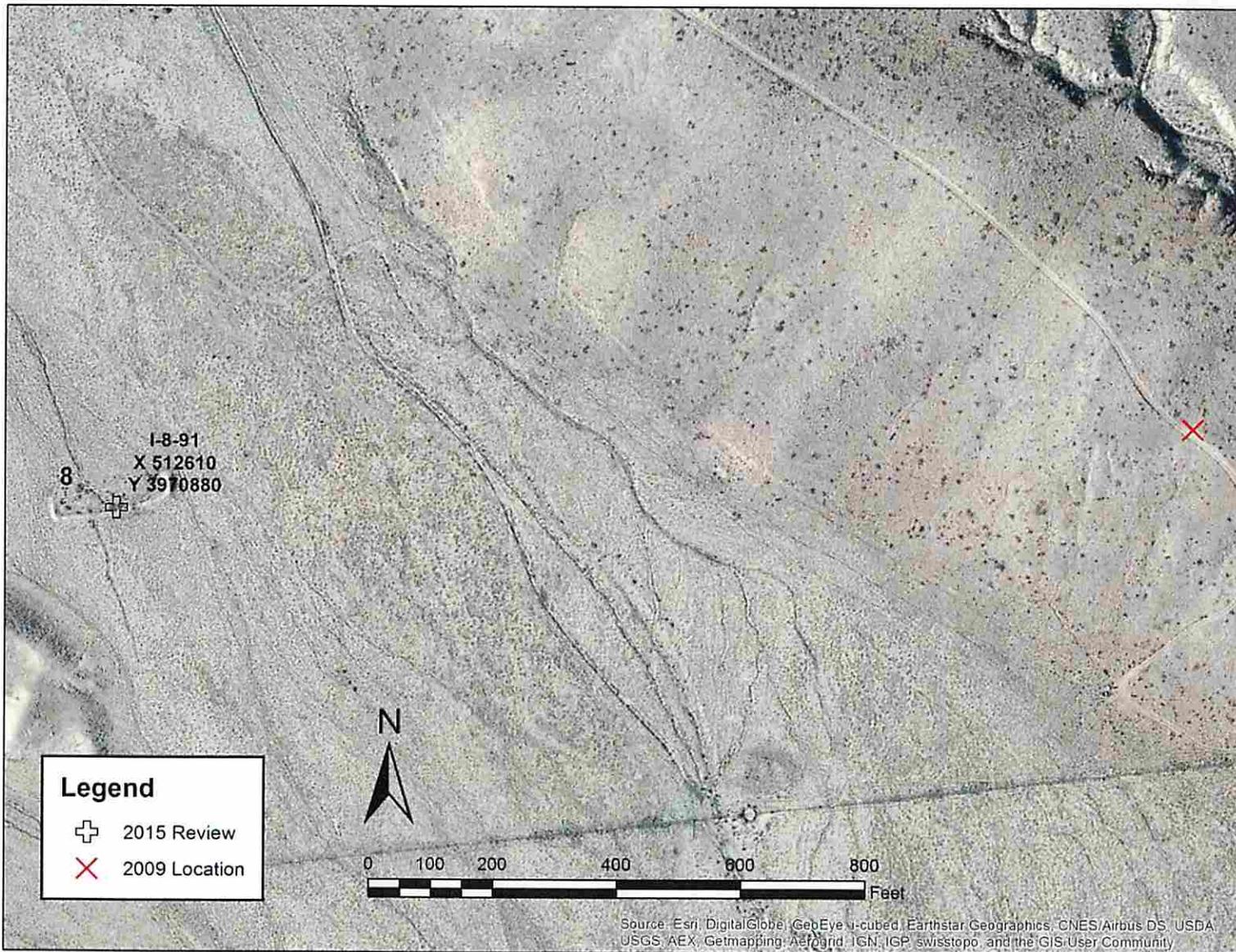


Figure 3: I-8-91 is actually about 530 meters west of where indicated in 2009.

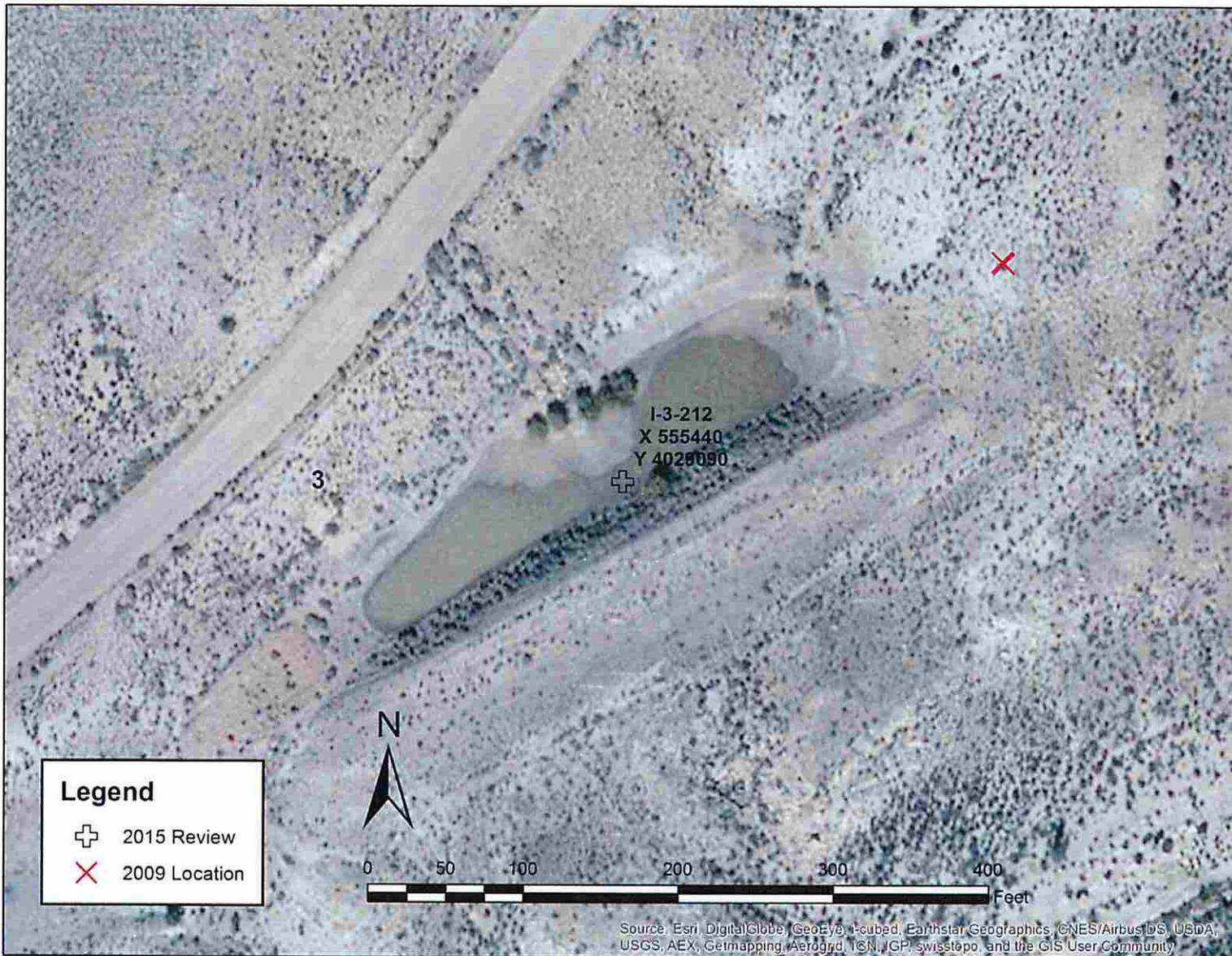


Figure 4: I-3-212 functions as more than just a sediment pond. 4

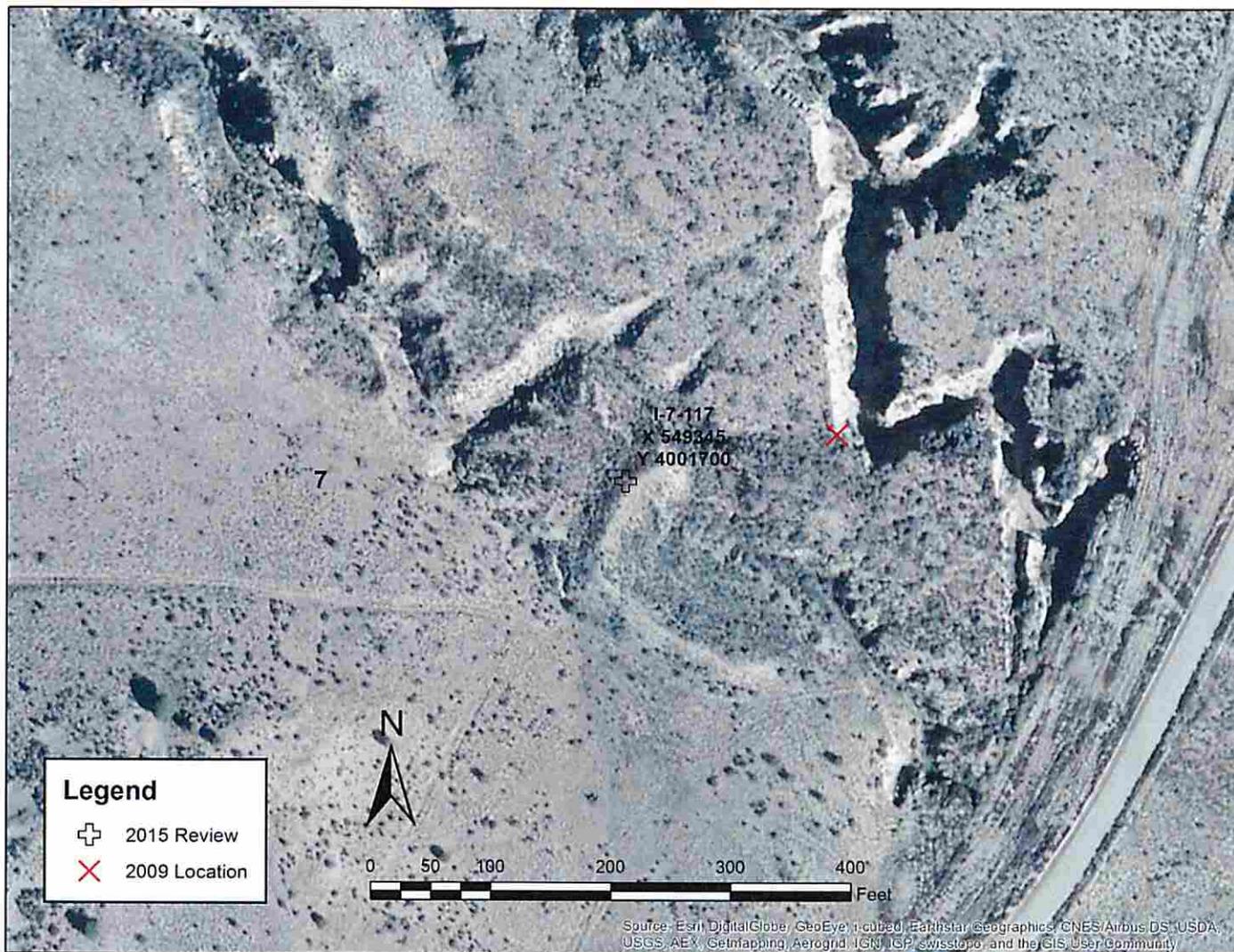


Figure 5: I-7-117 is idle but embankment visible and repairable.



Figure 6: I-8-208 is a very nice facility. Note evidence of recent impounded water to right near base of embankment.



Figure 7: I-8-221 is another example of a good impoundment.



Figure 8: I-8-269 still functions well to impound water for livestock.



Figure 9: I-10-376 was active and impounding water at the time the aerial photograph was taken.



Figure 10: I-10-428 is a little rough but has still recently impounded water for livestock.

Appendix 4

THE HOPI TRIBE



Housing



Economic Development



Tourism



Transportation

HOPI COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY

Revised July 31 2014



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HOPI TRIBAL COUNCIL 2014

Executive Branch

Herman G. Honanie, Hopi Tribal Chairman
Alfred Lomahquahu Jr., Hopi Tribal Vice Chairman
Robert Sumatzkuku, Tribal Treasurer
Vernita Selestewa, Tribal Secretary
Alfonso Sakeva, Sergeant at Arms

Village of Upper Moenkopi

Michael Elmer
Leroy Sumatzkuku
Danny Humetewa
Jonathon Phillips

Village of Bacavi

Davis F. Pecusa
Leroy G. Kewanimptewa
Lamar Keevama

Village of Kykotsmovi

Nada Talayumtewa
Alban Mooya Jr.
Norman Honanie
Caleb H. Johnson

Village of Sipaulovi

George Mase
Rosa Honani

Village of Mishongnovi

Annette F. Talayumtewa
Arthur Batala
Malinda Andrews
Mervin Yoyetewa



INTRODUCTION

The Hopi way is a living tradition that shapes every aspect of the lives of Hopi people. For a thousand plus years the Hopi people have looked to traditional beliefs and practices to guide their lives. The Hopi people are now looking for ways to balance the old and embrace the new, to plan for the future while respecting the past.

This 2014 Update of the Hopi Tribe's Comprehensive Economic Development Strategy was developed to bring together the plans, the policies and the projects of the last decade into one document that will help the Tribe meet these challenges. It guides how tribal lands and resources will be used and protected for the benefit of the Hopi people.

The Strategy is comprehensive because it addresses a broad range of needs, problems, and opportunities. It does not focus on any single issue. Rather, the plan weighs and balances conflicting needs and interests. The plan is concerned not only with development but also with the protection of culturally and environmentally sensitive areas.

The Strategy does not in itself guarantee that all recommended actions will take place. Some actions will depend on whether funding can be obtained or programs can be developed.

The Strategy recognizes village and clan authority. Within District Six, the plan will be a guide for village and clan leaders. Within the Hopi Partitioned Lands (HPL) the plan will guide decisions by the Tribal Council. In all matters that involve religious and cultural concerns, village and clan leaders will be consulted.

Villages are largely responsible for their own future growth and development. Each village has a section of the Strategy prepared by them and subject to their approval for inclusion in the Strategy. They will be responsible for annual updates and reporting on accomplishments.

The Hopi Comprehensive Economic Development Strategy is a guide, not only for tribal decisions, but also for federal, state, and local agencies that have responsibilities on the Hopi Reservation. The Strategy will be distributed to all appropriate government agencies for their references. Programs and projects enacted by these agencies should be consistent with the goals and policies listed in the Strategy.



HOPI TRIBAL ORGANIZATION

Contemporary Hopi society is unique in that three forms of government co-exist. One is traditional, another is a democratic form of government based on the Indian Reorganization Act of 1934 and the third form recently established is a new community incorporated by tribal resolution.

Hopi Traditional Government: Traditional Hopi government is based on the divine plan of life laid out by *Maasaw*, the guardian of the fourth world of the Hopi. Each village is a complete and independent government. The village *Kikmongwi* is the village leader, head of all religious and nonreligious authority. His power is limited as traditional Hopi decision-making is based on consensus. The *Kikmongwi* controls village and clan lands. Clans play a supporting role in the traditional village government. Clan Leaders interpret religious and cultural teachings that influence ceremonial events and the personal behavior of clan members. Clan leaders also have the primary responsibility for settling disputes in their clans.

Modern Hopi Government: In 1936, the U.S. Secretary of the Interior approved a constitution for the Hopi Tribe prepared by the government under the Indian Reorganization Act of 1934. A tribal council was created to form a more centralized government body that provided closer ties with the U.S. government and among the villages, but this creation violated the long-standing traditional independence of the Hopi villages. The constitution also introduced the "majority rule" which conflicted with the tradition of consensus decision-making. Even today, three of the villages and lower *Moencopi* refuse to participate on Tribal Council; *Oraibi* refuses to accept federal or tribal funding.

Communities: The traditional villages are becoming overcrowded due to population growth. Land ownership patterns further complicate the process of finding space for a home or a business. New Communities that emerge on the partitioned lands will be formed under the Tribal Government. Several areas are under study to become the towns of the future for the Hopi people. The exact nature of their relationship to tribal government, the traditional villages and to each other is evolving as Hopi people express their interest in living in communities as opposed to scattered housing and the opportunities presented by the partitioned land and new lands are realized.

Tribal Government: Under the Hopi Constitution, all governmental powers vest either in the villages or the Hopi Tribal Council. Thus functionally the Hopi Tribal government is divided into three separate branches: legislative, executive and judicial.

The Legislative Branch is the tribal council. It makes tribal law and policy and oversees the conduct of tribal business. The Tribal Council includes a chairman, vice chairman, secretary, treasurer and village representatives based on the population of the village.



The Tribal Council is assisted by task teams, which can include tribal program members not on the Tribal Council for technical assistance. The teams conduct research and advise the Tribal Council in their respective areas. The Tribal Council may also create other special committees to meet specific, short-term needs.

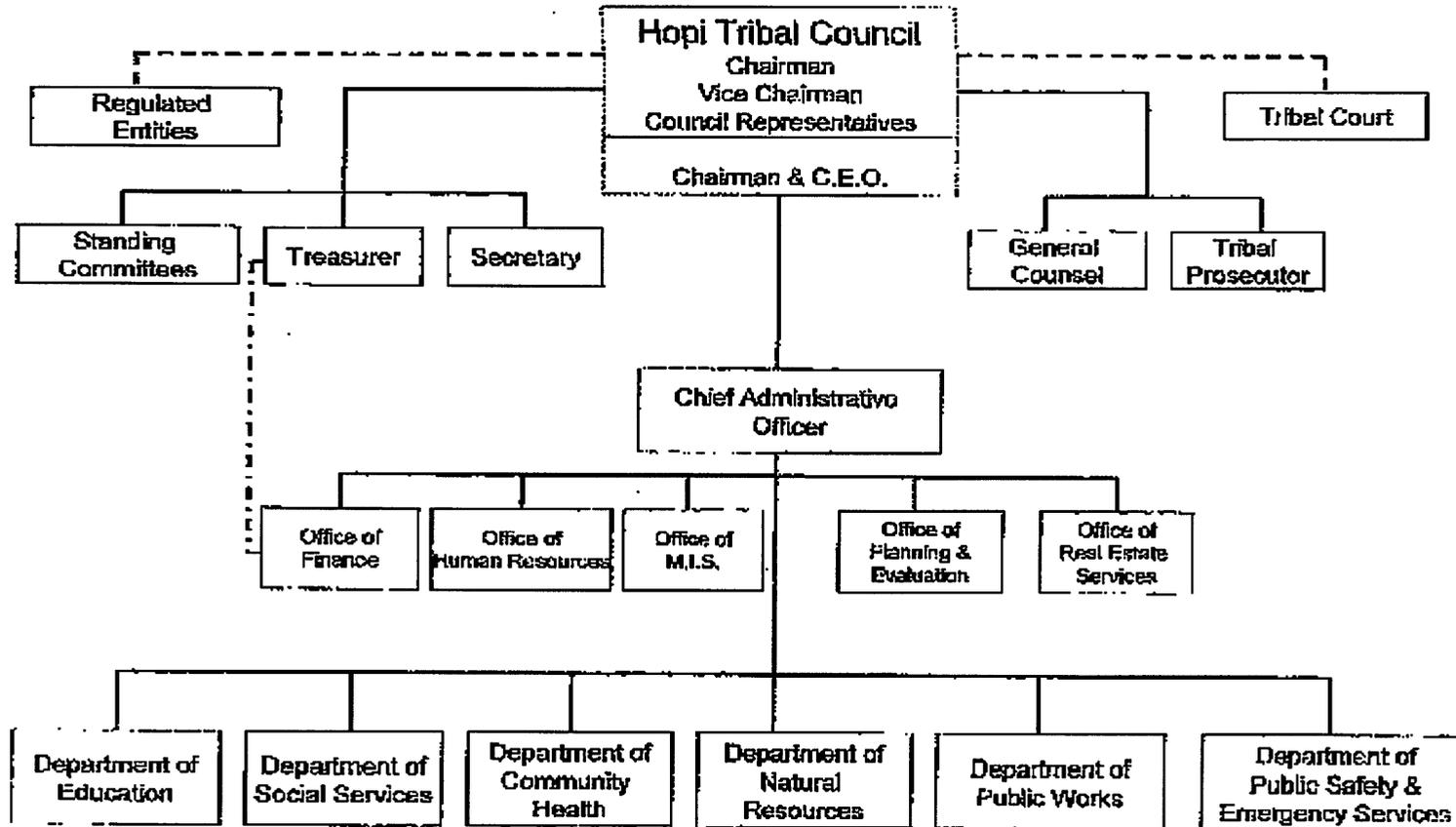
The Executive Branch is responsible for implementing the laws and policies adopted by the Tribal Council. It is headed by the chief executive officer or chairman. The executive branch includes programs and offices that are responsible for economic development, health, education, administrative services and support, natural resources and financial management.

The Judicial Branch or court system interprets and enforces ordinances/laws enacted by Tribal Council.



Hopi Tribal Government
Operations Chart

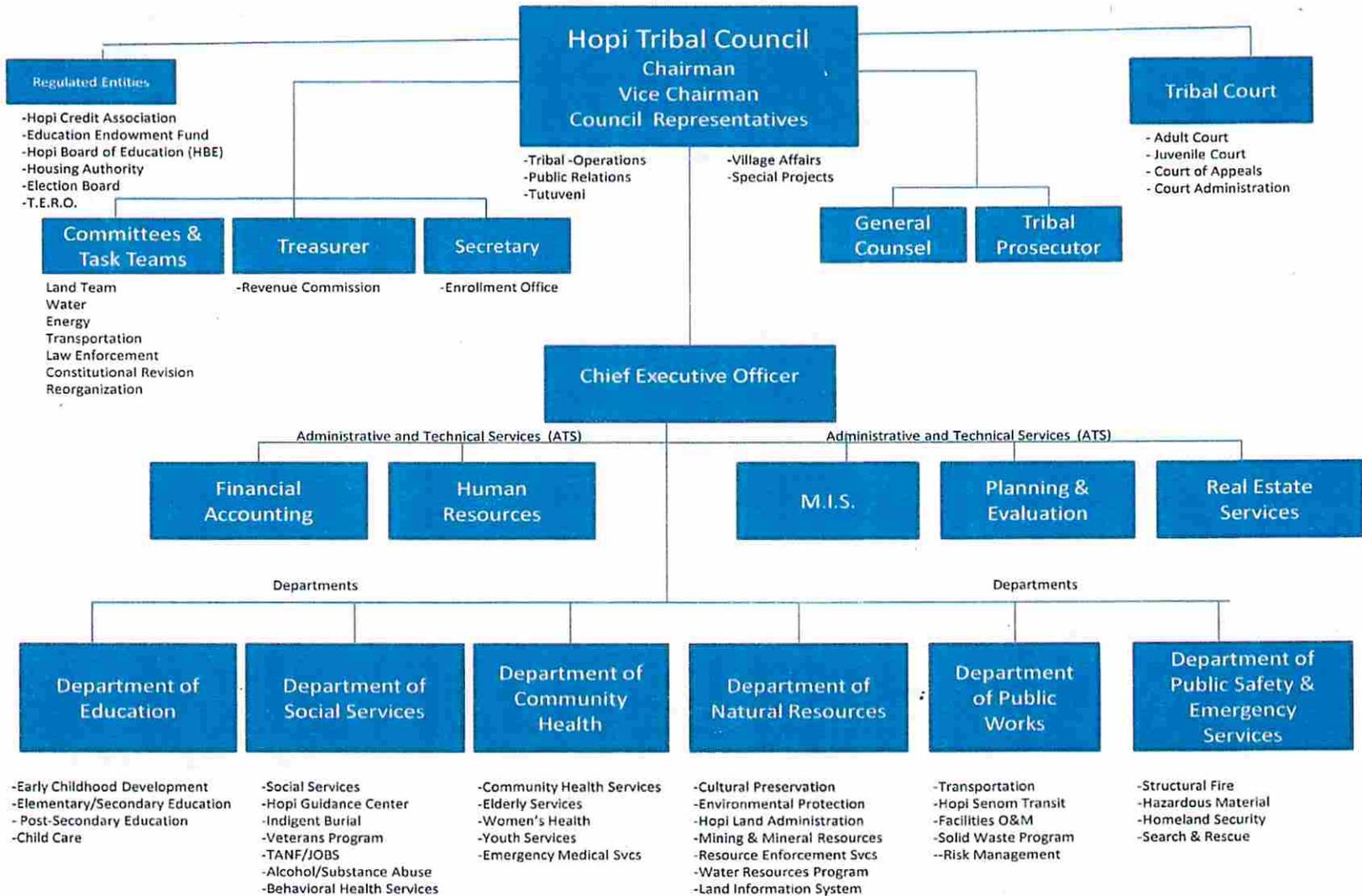
EXHIBIT "A"



Solid Line = Direct Line of Authority
Dash Line = Oversight by the Hopi Tribal Council
Dash Dot Line = Functional Authority
Hopi Tribal Council Resolution 11-032-2009



2014 UPDATED HOPI COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY





Village Government: The Hopi Constitution grants village authority in specific areas, including assignment of village lands for housing, agriculture and business development. There are 12 villages recognized by the Hopi Tribal Constitution. They are Moenkopi (Upper & Lower), Hotevilla, Bakabi, Oraibi, Kyakotsmovi, Shungopavi, Mishongnovi, Sipaulovi and First Mesa (consolidated villages Walpi, Shitchumovi and Tewa). There is also one approved planned community, Tawa'ovi and one recognized community, Yuwehloo Pahki (Spider Mound).

Each village may choose between a "traditional" or "constitutional" form of government. Villages that have taken the constitution form of government are Upper Moenkopi Village, Kykotsmovi and Bacavi. Each has village governors and boards of directors. The Upper Moenkopi is the only village with a written constitution. Kykotsmovi and Bacavi have adopted by-laws that regulate their governing bodies.

The villages at Mishongnovi, Shungopavi, Sipaulovi, Hotevilla, Oraibi, the Lower Moenkopi Village and the First Mesa Consolidated Villages are patterned after the traditional form of government. The Kikmongwi or village leader governs the more traditionally governed villages.

In most villages with a Kikmongwi, disputes are handled through traditional channels. A dispute within a clan is taken to the clan leader. If more than one clan is involved, the clan leaders meet and negotiate an agreement. In villages with a modern government, the village governor often mediates disputes indirectly, encouraging the parties to resolve issues among themselves. When this fails the board of directions may make a recommendation to the governor.



BACKGROUND

Introduction

Many of the factors influencing current and future economic conditions on the Hopi Reservation are directly attributable to its remote location and small population base. The main reservation occupies over 1.5 million acres or 2,400 square miles in east north-central Arizona, 60 miles north of Winslow in Navajo County and 90 miles northeast of Flagstaff, northern Arizona's largest city. Arizona Route 264 running east-to-west and Arizona Route 87 running from the south to end at 264 bisect the reservation and US Route 160 skirts its northwestern edge. Although the trade area population exceeds 23,000, the Hopi Reservation population of about 8,435 provides a small market and limited labor pool. The reservation's isolation is intensified by political and social factors since it is completely surrounded by the Navajo Reservation and most commercial functions are supplied by off-reservation communities.

Hopi cultural traditions and practices form an important facet of the reservation economic environment and create opportunities and constraints on the economy not typical off-reservation. Land tenure practices on the main reservation, for instance, mean that property that might otherwise be suitable for commercial development is not available. A consensus-based and distributed decision-making process means that change does not come easily or quickly. Due to these trade-offs the reservation experiences an unusual degree of underutilization of both assets and opportunities. Given these factors, the Hopi Reservation, its Villages and people continue to experience economic distress and dependence on income from relatively few sources in an economy that lacks diversity and opportunity.

Retail trade leakage contributes a further economic loss with a potential \$50 million per year¹ going off-reservation due to an under-developed commercial sector on the reservation. Aside from coal and water leases on the northern part of the reservation, there are only limited sources of basic income to bolster the Hopi economy. These leases, especially the water lease, have come under increasing concern due to the impact on the environment and the future water supply for the Mesas.

The Tribal Government has been dealing with remoteness and isolation by increasing the amount of Hopi tribally owned land with ranch land south of Winslow, where there is already a 200 acre branch of the reservation that contains a 150,000 square foot industrial building, and west of Springerville along with a farm in La Paz

¹ Estimated in 2013 Dollars



County, commercial properties near Winslow, Holbrook, in Flagstaff and Sedona. Most recent purchase of additional lands includes the Dobell Ranch containing 13,200 acres and located south of Holbrook and the Twin Arrows site containing 210 acres and located east of Flagstaff. These tribal assets may help improve and diversify tribal government revenues and increase Hopi influence in the region. Tribal Government is also looking for ways to increase the economic impact of visitors and is considering developing "new communities" with related infrastructure to allow more Hopis an opportunity to live in their homeland.

DEMOGRAPHICS

Information about the Hopi population and economy is incomplete, out-of-date and often contradictory. The Tribe, the U.S. Bureau of Indian Affairs, the US Bureau of the Census, Arizona Department of Commerce and others compile statistics on household income, unemployment, labor force and total economic activity. Census data, tribal enrollment records and the tribal database are all required to analyze the demographics of the reservation. However, differing definitions between sources, the challenges of gathering data on the reservation, the scale data is reported at, the desire for confidentiality and cultural practices make it difficult to arrive at a set of indicators that accurately portray reservation conditions. A database management program developed by Tribal Data Resources is used to contain, maintain and analyze tribal data. The Margin of Error formula and survey instruments used by public and private advanced research and statistical entities continue to report huge disparities in all disciplines of demographics. This updated database provides the most current and tribally acceptable data for the Hopi Reservation.

Population

Census data has always been problematic for Hopi. Census Bureau 2010² cites a total of 18,327 Hopi in the United States while Tribal Enrollment Office³ reported 13,270 Hopis in 2010. Between the two reporting entities there is a disparity of -5,057 individuals. Traditional Hopis in some villages refuse to participate in counts conducted by the U.S. Bureau of the Census or the Tribe. The Hopi concept of residence also complicates population counts. Off-Reservation Hopis maintain their village ties and consider themselves village residents even while living off the reservation, but may not be counted or meet U.S. Bureau of the Census residency qualifications for inclusion as part of the Hopi population.

² en.wikipedia.org/wiki/Hopi Census Bureau 2010

³ Hopi Enrollment Office/Hopi Tribal Council certified



Many Hopi work off-reservation for significant parts of the year, returning for ceremonies and family occasions.

The population is primarily clustered in 12 Hopi villages and one developed community of Yuwehloo Pahki, and other residential areas scattered across the central part of the Hopi Reservation along Highway 264 or in the villages of Upper and Lower Moenkopi. Scattered housing sites are becoming more common as people are unable to find home sites in the traditional population areas. Thirty-three low-income housing units are located on Hopi trust lands in Winslow.

According to the Tribal Enrollment Office, as of June 30, 2014, the following figures represent the population of each village as well as the number living off reservation due to employment opportunities, housing shortages and/or other opportunities available in Flagstaff, Winslow and Phoenix, Arizona and Albuquerque, New Mexico where most of the off-reservation tribal members live.

Population

Bacavi	679
Hotevilla	1,695
Kyakotsmovi	1,352
Mishongnovi	1,282
Moenkopi	2,216
Oraibi	499
Shungopavi	1,915
Shitchumovi	1,495
Sipaulovi	706
Tewa	1,435
Walpi	723

Total Hopi enrollment 13,999

Currently living ON HOPI	7,848
Currently living OFF HOPI	6,099

Population Change

As of December 31, 2013 Hopi Tribal Enrollment Office reports a total enrolled population of 13,947 members with 7,848 living on the reservation and 6,099 members living off. An additional 641 non-tribal members live and work on the reservation for a total population on the reservation of 14,605. The Office of Community Planning and Economic Development estimate a conservative growth rate of 2.5% to project Hopi population figures.



There are many reasons for tribal members to live off reservation. This may be attributed to the prevalence of television and the draw of the life that the media portrays outside the reservation borders. It may also be the difficulty of young families to establish themselves in homes on the reservation because of a general shortage of infrastructure such as water, plumbing and electricity. The difficulty obtaining a home site on which to build a home could also be a factor.

Article II of the Hopi Constitution governs tribal membership. Not all Hopi are enrolled. People, who have lived as Hopis in the villages all their lives, speak Hopi and are accepted as Hopi by their villages cannot always meet tribal requirements to document their parents and degree of Indian blood. Tribal membership determines an individual's eligibility for many tribal related programs and services. These include not only the social services, scholarships and employment with the tribe, but also land assignments and grazing privileges.

From 2010 to 2013 Arizona's population grew by 234,607 individuals or at a rate of 3.7%. The 2012 Arizona Native American population is 257,426 individuals.⁴ According to the State of Indian Country Arizona/Vol. 1, 2013. Total Enrolled Member Population for the 22 Tribes is 423,728.

POPULATION CHANGE			
	April 2010	April 2013	Change
ARIZONA	6,392,017	6,626,624	3.7%
Apache County	71,518	73,195	2.3%
Coconino County	134,420	136,011	1.2%
Navajo County	107,449	107,049	-0.3%
Flagstaff, AZ	65,870	67,468	2.4%
Holbrook, AZ	5,053	5,005	-0.9%
Winslow, AZ	9,655	9,409	-2.5%
Gallup, NM	21,678	22,000	1.6%
Hopi Reservation	13,270	13,768	1.8%

Source: data from US 2010 Census: 100%

⁴ US Census Bureau 2010



With net out-migration of -4.00 from Navajo County (which contains most of the Hopi Reservation and Coconino County to the west), the region not only lags the state in population growth, it is losing people relative to Arizona's population growth. Given the region's relatively poor economic performance and low income levels, it seems clear that lack of economic opportunity is driving this regional population loss.

Trade Area Population

The relatively small population base of the Hopi Reservation at about 7,857 persons, even with the additional 9,000+ population of Winslow, results in a fairly small local trade area and labor market. Since 2013 the northwestern regional trade area have increased with the inclusion of neighboring Navajo communities of Tuba City, Shonto, Coal Mine Mesa adjacent to Moencopi Village where the Moencopi Legacy Inn Hotel, Denny's restaurant and a convenient store is located at State Route 264 and US Route 160. Adding tourist, Flagstaff, Arizona and Gallup, New Mexico as well as bordering Navajo CDPs, the trade area remains roughly over 122 Thousand.

TRADE AREA POPULATION	
	July 2011
Hopi Reservation	7,857
Holbrook, AZ	5,053
Winslow, AZ	9,655
Flagstaff, AZ	65,870
Gallup, NM	21,678
Neighboring Places	
Dilkon CDP	1,184
Jeddito CDP	293
Piñon CDP	904
Tuba City CDP	8,611
Hard Rock/Dinnebito CDP	1,298
Total Trade Area	122,403

Source: 2011 5 year American Community Survey



Given the importance of family to the Hopi culture, for Hopis not living on their homelands and participating in their religious ceremonies, the human cost of these numbers far exceeds their economic impact. The greatest impact is on the children and grandchildren who cannot interact with their elders and are not exposed to the Hopi language or have the guidance to learn the Hopi ways.

Personal Income

The percentage of families living below poverty appears to be increasing as income levels rise. These figures do not include income derived through self-employment. Occasional sales of crafts generate approximately \$1.9 million, which is probably not only unreported but also unrecorded as it is used almost immediately to purchase needed items. This method of generating income adds an additional layer of complexity to the analysis on income levels that is not generally as prevalent in other communities.

The median household income for the Hopi Tribe is \$34,016, less than County @ \$39,774, and less than State @ \$51,310.⁵ Tribal members are more likely to have lower household incomes than both State and County. One-fourth or 28% of all households on Hopi have incomes of less than \$20,000 when compared to State @ 17% and County @ 25%. One fifth @ 21% of tribal members have incomes in excess of \$60,000.00.

Expenses such as mortgage payments, rental payments, utility and public service fees are not considered in determining poverty levels. Half the households are living in non-owner/non-rental housing or shelter. Of the owner occupied housing, 39% have no mortgage payments and only 3.1% are paying more than 25% of their income on mortgage payments.⁶ Tribal services are heavily subsidized.

Employment

The major employers on the Hopi Reservation are government agencies and government funded programs. Government jobs are the best paid and most secure employment on the reservation. They are also the largest source of wage and salary earnings located on the reservation. This includes the Hopi Tribe, the schools, the IHS Clinic and the BIA. The continuing declines of Tribal revenues have had a significant effect on the Tribal General Fund payroll. Federal Grant dollars and PL. 93-638 funds

⁵ ASC 5 yr estimate 2013

⁶ HTHA survey 2011



support a huge portion of Tribal payroll. Other employers with non-Hopi and non-Native individuals who live on the Hopi Reservation are:

Hopi Tribal Administration	491 employees
US Indian Health Service	261 employees
Moenkopi Legacy Inn/affiliates	113 employees
McGee's Trading Post/affiliates	50 employees
Hopi Cultural Center Hotel/Restaurant	49 employees
US –DOI Law Enforcement Services	43 employees
Kykotsmovi Village store	39 employees
US Bureau of Indian Affairs	20 employees
Hotevilla Co-op Store	14 employees

All Schools:

Keams Canyon Boarding, (BIA school)	20 employees
Hopi Jr-Sr High I (contract/grant school)	169 employees
Hopi Mission (parochial)	26 employees
Hopi Day (C/G school)	37 employees
First Mesa Elementary (BIA School)	30 employees
Second Mesa Day (C/G school)	58 employees
Hotevilla-Bacavi Community (C/G School)	26 employees
Moencopi Day (C/G School)	52 employees
Jeddito Public School (AZ)	48 employees

Private and allied business operations:

This portion includes approximately 35 individual owned operations representing 5% part time employment and 19% self-employed and does not include seasonal wildfire fighters.

According to the US Dept. of Interior 2010 Labor Force listed a total workforce of 6,000 plus actively seeking employment on the Hopi Reservation. The number of jobs located on the Hopi Reservation (in 2010) was less than the 2,000 employed residents counted in the 2000 census, indicating that some residents commute to work in other communities. Hopi Tribal Employment Rights Office currently list 161 plus individuals actively seeking employment. ⁷

⁷ TERO Office, personal conversation



The newest venture becoming operational in 2011 is the Moencopi Legacy Inn & Suites, Tuuvi Café and Travel center and Denny's restaurant. Employment peaked in 2012 at 128 employees and leveled out to 113 FTE's in 2013.

Private economic activity is largely the work of Artisans. This "industry" creates substantial self-employment in the manufacturing sector and a significant amount of wage and salary employment in the trade sector. Hopi small businesses, whether run solely by an individual or staffed by a proprietor and a few employees, are important contributors to the construction, trade and services sectors. Village and non-profit enterprises fill out the profile in the TCU, trade, services and finance, insurance and real estate (FIRE) sectors. Private sector employment on the Hopi Reservation was 90% less than state averages and the second lowest among the unincorporated areas. This further indicates the dependence on the federal government and the economies of surrounding areas.

The Arizona Department of Commerce listed a labor force of 2,591 with an unemployment rate of 13.5% for the Hopi Reservation in 2008. The Center for Economic Advancement at the Arizona Department of Commerce lists the following unemployment figures for the first quarter of 2010.

Moenkopi CDP	21.5%	Kykotsmovi CDP	20.9%
First Mesa CDP	16.0%	Shungopavi CDP	45.3%
Second Mesa CDP	24.7%	Keams Canyon CDP	18.6%
Hotevilla-Bacavi CDP	14.2%	Jeddito CDP	28.3%

There has been a significant loss of jobs on the Hopi Reservation due to the recession and government cutbacks. All of these CDP unemployment rates are well above the Navajo County less Native American population unemployment rate of 8.6%.

According to the Tribal database, only 35.6% of tribal members are employed full time; another 4.5% are employed part time. Self-employment represents 17.1% of tribal population. Another 2.1% is employed seasonally. Retirees account for 12.5% of the reservation population.

The Arizona Department of Economic Security reports a 15-18% unemployment rate over the past 5 years. Estimates prepared by The Center for Applied Research indicate a potential unemployment rate of 66-69%. By the tribal data base the current unemployment rate is 49.9%.



A comparison of the labor force and the unemployment rate shows a decreasing unemployment rate and an increasing labor force on the Hopi Reservation. This may indicate that people are leaving the reservation to seek work and/or that self-employment may be increasing. Interviews with business people revealed an increasing interest in improving the quality and image of Hopi arts and artisans so that more individuals will be able to make a living wage, support their family and participate in the ceremonies. Small groups are just beginning to form to teach and learn from each other, to share techniques and to create more modern and higher quality artwork.

Barriers to self-employment must be seriously examined. Opportunities are almost unlimited and Hopi entrepreneurship is widely demonstrated. The Office of Community Planning and Economic Development thru Northern Arizona University, College of Business interviews expressed a concern with uneven enforcement of the regulations and tribal interference in the operation of their businesses. They want a stable, predictable business environment and the ability to grow based on their own ability to operate their business. Without exception every businessperson expressed a desire to employ other Hopi people, to support the growth of entrepreneurship and to help their fellow Hopis improve their quality of life.

Education

There are 5 elementary schools and the Jr.-Sr. High School operated by the Hopi Tribe and one parochial school. Each has a local school board. They receive funding from the Bureau of Indian Education. One school in Keams Canyon is operated by the BIA. The Hopi Board of Education is a regulated entity that reports directly to the Hopi Tribal Council. Members represent each of the schools.

The Hopi Department of Education's mission is to improve Education Ordinance 36 the purpose is to develop a more consistent Hopi education policy. The existing ordinance was developed under the former Bureau of Indian Affairs, now the Bureau of Indian Education. The Department's goal is to structure the policy to meet the education needs of the Hopi students.

Education has been a high priority for the Hopi people. In 2000 the tribal council established a Hopi Tribe Education Endowment Fund of \$10 million. This was created by tribal ordinance, not resolution, to preserve and protect the fund from future raids. Many Hopi who wish to further their education are unable to because of lack of funds and this is the Hopi Tribe's intention to correct this. The Higher Education program works with graduating seniors and other tribal members who want to further their education.

Most vocational training programs are off-reservation in Flagstaff or Phoenix. The training options are limited to demand occupations where graduates can get jobs. Local training is provided by Northland Pioneer College. Since the construction of Hopi



Junior/Senior High School, Northland Pioneer College has moved into a permanent structure. It has issued Certificates of Proficiency in Restaurant Operations, accounting, EMT and Medical Assistant; all careers that are needed on Hopi.

According to the Tribal database, 68.2% of the Hopi population over the age of 18 is a high school graduates. Of these 27.7% have attended college and 18.6% have earned a college/university degree; 2.1% have attended business school and 12.7% have attended a vocational school.

INFRASTRUCTURE

Most villages have some type of public utilities – water, sewer, electricity and telephone. A few are more traditional in their beliefs and are reluctant to accept federal financial aid and modern services. Hotevilla, Shungopavy and Lower Moencopi have limited electricity, water and a sewer system that was completed in the late 1990s. Oraibi and Walpi do not have water or sewage systems and do not allow utilities within their village boundaries.

All water and sewer systems have been developed with federal assistance from the Department of Housing and Urban Development (HUD), the Indian Health Service (IHS) and the Bureau of Indian Affairs. To determine if future water and sewer infrastructure projects will meet local needs and desires, the IHS requested each village to identify and set priorities for its water and sanitation needs. Supplemental information, such as areas of planned village expansions, was also gathered to help plan future projects. The IHS plans, designs and constructs most water systems on Hopi.

Water/Wastewater:

Hopi villages have almost twice as many homes lacking indoor plumbing facilities as the rest of the Indian Reservations. The difficulty of bringing in water lines is shown by the percentage of homes having to get water from “some other source” which might be a village well, a spring or, more recently, the purchase of bottled water as the usual sources become too polluted to use for drinking and cooking purposes.



Hopi Infrastructure

Water from public system or private company	76.5%
Water from individual well	7.7%
Water from some other source	15.8%
Percent lacking complete kitchen facilities	30.6%
Percent lacking complete plumbing facilities	46.7%

Villages depend on groundwater from wells for their water supplies. Wells range from 200 to 1,800 feet deep and yield 10 to 100 gallons per minute. Villages that do not have water piped to individual homes rely on public water faucets. The Navajo Tribal Utility Authority provides water to homes located around Moenkopi. Other rural homes can be served by cistern or water hauled in by truck.

Keams Canyon's water supply is chlorinated. Water supplied to the villages of Upper Moenkopi, Kykotsmovi, Shungopavi, Mishongnovi, and Sipaulovi is fluoridated. Otherwise water supplies are not filtered or treated. The villages sample and test their water supply for quality. Of the 15 wells serving villages, three are threatened with contamination⁸ and three are contaminated.⁹ Village wells are often drilled too close together.

Most existing water and wastewater treatment systems were not built to accommodate growth of the local population or for economic development purposes. The operation of these systems tends to be heavily subsidized by village governments. Water use charges are usually billed as flat fees rather than by individual home usage, and do not cover system costs for maintenance and repairs. There is no separate charge for sewage system disposal. Most villages experience significant problems with their water infrastructure, including:

⁸ The wells threatened with contamination are the three Moenkopi wells, threatened by the gas plume from leaking underground storage tanks; the Low Mountain well, which has a collapsed casing.

⁹ The Mishongnovi new well is contaminated with sulphur reducing bacteria, which creates a rotten egg smell. This well is off-line, and not being used. The Spider Mound well has elevated fluoride levels, and is operating under a variance from the EPA. The IHS is working to mitigate the situation with water treatment, and a new well is planned. The Shungopavi well has been contaminated with shigella. It is still being used, but chlorination is occurring very regularly to prevent disease.



Broken pumps

Pumping for long periods of time without resting the equipment (i.e., water is hauled for livestock watering; systems were designed for domestic demand only).

Erratic pressure, small pipe diameters, and insufficient storage capacity inhibit fire suppression.

Unaccountable losses (leaks) are a vast drain on systems.

Arsenic contamination in eastern region, heaviest in eastern most communities.

Many Hopi villages have deficient sewage treatment systems while other villages have none at all. There are no tribal restrictions on construction of wastewater systems in floodplains. Existing village systems tend to be located in wash channels, using a gravity-fed line, which reduces the capital cost of systems, as well as maintenance costs. However, it also makes the systems vulnerable to erosion caused by flooding, with the potential for system failure and contamination of nearby streams or farmlands.¹⁰ The Indian Health Services is aware of these problems, and is working to remedy them.

Although there are functioning systems to be found across the reservation, wastewater management tends to be crisis driven and, therefore, is more expensive in the long run. Inadequate wastewater treatment facilities have degraded the environment. Environmental and groundwater contaminants exist in sewage lagoons, which depend in part on seepage into the alluvium for effective functioning. Wastewater treatment locations and facilities must be upgraded.

The new Tawa'ovi Community Development Project located 15 miles north of the Hopi Cultural Center currently have two well projects ongoing which will, when completed supply water to Tawa'ovi and replace the high arsenic content currently in the eastern most communities.

¹⁰ The Water Resources Program is developing a Hopi Wastewater Code at the time of writing the IRMP. The Preliminary Draft was received in January 2001. As of May 2014 the Code has still not been approved awaiting review by Office of Environmental Health of the Indian Health Service.



Solid Waste

In earlier days, Hopi threw their refuse off the sides of the mesas in village designated community dumps. Many dumps had poor physical characteristics that compounded problems. Several were located in natural washes contributing to surface water and ground water contamination. Other dumpsites were located close to the villages and have a steep, high dumping face. These sites were often visible from miles away. In a few villages, combustible refuse was burned in masonry incinerators or simply thrown over the side of the mesas.

The Hopi Solid Waste Management Plan provides a system of public refuse collection with a centralized sanitary landfill. The current Hopi Solid Waste Sanitary Landfill occupies 100 acres and is projected to serve the Tribe and villages' needs for 25 years based on IHS projections of population and generated waste

The Tribal government does not subsidize solid waste collection on the reservation. Residents must rent dumpsters as well as paying additional fees for collection of large items or dumping additional loads at the landfill. As a result, some individuals illegally dump their solid waste in remote locations, most often in washes, to bypass these fees.

The Hopi Solid Waste Program cleaned up all historic mesa-side dumps. However, since there was no education component to change people's disposal habits, some dumps are being re-used again. Even when villagers make an effort for proper disposal, other village residents who do not rent dumpsters dispose of their refuse in the rented dumpsters of others, over the side of the mesa, or into the wash.

The year-round presence, and healthy populations of crows and ravens, which are pest species, can be traced to this continuous source of food for these "garbage" birds. The improper disposal of trash in illegal dumpsites has the effect of increasing the populations of these undesirable birds, thereby threatening the success of farmer fields and harvest. There is also a concern that wildlife may be picking up diseases from litter as well as the possibility that illegal dumps near raptor nests attract crows to the vicinity, thereby increasing the chances of them stealing raptor nests. Crows are listed as a Federal Migratory species and are protected. Crows are the Hopi farmer's worst nightmare as they raid cornfields, watermelons, squash, pumpkins and know to destroy entire corn fields. Hopi's are farmers and "Corn is Life".

Electric Utilities

Arizona Public Service (APS) and the Navajo Tribal Authority (NTUA) provide electrical services on the Hopi reservation. Approximately 65% of the Hopi homes have electricity. Most homes and businesses with electricity are served by APS. A 69-kilovolt-transmission line



provides electrical service from Holbrook to a substation several miles east of Polacca. From the substation, two 21-kilovolt lines branch off east and west to serve Keams Canyon and the villages. The electrical lines within the villages usually range from 1.2 to 2.4 kilovolts. NTUA provides electrical service to 24 Hopi relocation families residing in Spider Mound Community eight miles south of Keams Canyon. NTUA has electric lines adjacent to the Hopi Reservation that could be extended as a power source for new development.

The cost of new service is dependent on the customer's location and power requirements. All extensions are considered on the basis of economic feasibility and each utility authority prepared separate cost estimates for each project. In 1999, APS and NTUA estimated an average cost of \$15,000 per mile for service that extends beyond present service areas. APS and NTUA did not have a current average cost in 2014 dollars.

Renewable Energy and Climate Change

The Hopi Tribal Renewable Energy Office has been tasked with President Obama's comprehensive climate change initiative to guide our transition from fossil fuel to renewable energy and build on the president's commitment to Indian Tribes.

Telephone

The landline service provider for the Hopi Reservation is Hopi Telecom Inc. Service is provided to most of the Hopi villages and outlying communities. The Hopi phone service only offers the most basic features and has not kept up with technology available in the rest of the country.

CellularOne of northeast Arizona serves the Hopi reservation and surrounding Navajo communities. It offers a competitive cellular phone service plan to reservation residents who previously were unable to obtain or afford cellular service. Major Cellular Phone providers like Verizon, AT&T, have limited reception within the reservation. With support from the Universal Service Fund, individuals who meet eligibility requirements¹¹ are able to receive basic cellular service for as little as \$1.00 per month. CellularOne was the first wireless company in the United States to provide this service. Due to our remote location and geography efficient reception remains spotty.

Internet

The tribe received a 5 year grant from the Economic Development Administration to create a wireless, satellite, broadband connection to the Internet at two initial sites. The

¹¹ Adult tribal members (18 years or older) who demonstrate their participation in one or more social or medical service programs operated by a Federal, State or Tribal Agency.



project has been delayed due to changes in personnel and tribal leadership. NEPA clearances took a full year. The transmitters and receiving towers have been completed and full service is available albeit with intermittent down time due to remote location.

The Hopi Police Department, Tribal Courts, Hopi Health Care Center, Hopi High School and Northland Pioneer College were the first to be connected. The Hopi Tribal offices are served but not without frequent downtime due to remoteness and power brownout and blackouts. One of the conditions of the grant is to partner with the Hopi Telecommunications Inc. who has over site responsibility.

This project showcases the power of instant, global communication and creates e-commerce for economic development and job training opportunities for all members of the Hopi Tribe. The fully operational system addresses the need for Internet access, which the Hopi need to carry out a wide range of activities.

Hopi is now able to utilize broadband, high speed Internet service compliments the implementation of e-commerce, distance learning and on-site educational programs. The proposal includes the training of local operators and the development of entrepreneurial training opportunities in the areas of medical transcribing, graphics, drafting and other jobs that can be done via a personal computer at home.

Access and Transportation:

There are over 3,500 miles of unpaved, non-system roads across the Hopi Reservation, 700 miles of system roads (both paved and unpaved), and 91 miles of paved, Arizona Department of Transport (ADOT) maintained roads. There are no Coconino or Navajo County constructed or maintained roads on the Hopi reservation. This is a total of 4,000+ miles of roads on the Hopi Reservation. Of these, approximately 800 miles belong to the Integrated Reservation Roads System, a multi-jurisdictional road system that incorporates the State of Arizona, Coconino County, the Bureau of Indian Affairs Hopi Agency, the Hopi Tribe and the Navajo Nation road maintenance agencies¹². The remaining roads, most of which are little better than tracks, are "non-system roads", and therefore are a Tribal responsibility to maintain or manage.

No U.S. highways pass through the main reservation. Arizona Highway 264 runs in an east-west direction and is the busiest highway on the reservation linking the villages. This primary east-west road begins at Tuba City/Moenkopi and ends at Ya-Ta-Hey, 8 miles north

¹² Personal communication with Michael Lomayaktewa, Hopi DOT Director and Fred Shupla, Planner for the Hopi Tribe, based on the results of the Hopi Roads Inventory project conducted by the Office of Community Planning & Economic Development. NOTE: Navajo County does not maintain any roads on the Hopi Reservation, but they are assisting with road maintenance by providing gravel and drainage culverts.



of Gallup, New Mexico. Arizona Highway 87 is a secondary road that begins at Second Mesa and connects with Interstate 40 near Winslow.

The Hopi ADOT maintains over 600 miles of roads on the reservation. Indian Route 2 (Leupp Road) and Indian Route 6 (Holbrook Road) are paved secondary roads. The majority of BIA roads are unpaved local roads. These local roads are dirt, fair-weather roads that are often impassable in the winter snows and summer thunderstorms. Indian Route 2 links Kykotsmovi with Flagstaff. Indian Route 6 begins 8 miles east of Keams Canyon and ends at Interstate 40 several miles east of Holbrook.

Interstate 40 and U.S. Highway 160 are major routes that influence traffic patterns throughout Northern

Arizona. Interstate 40 lies about 35 miles south of the reservation and is one of the principle east-west Interstate highways in the United States. The Hart Ranch, part of the Hopi Three Canyon Ranch lies on both sides of Interstate 40 that runs east/west through the northern edge of the ranch. The ranch is accessible from Interstate 40 by the Twin Arrows, Buffalo Range, Two Guns and Meter Crater interchanges. U.S. Highway 160 runs north/south on the western side of the Hopi Reservation adjacent to the communities of Upper and Lower Moenkopi.

Polacca Airstrip, located 2 miles west of Polacca, is available for charter or private usage. The primary use is medical evacuation and personal transportation. The airstrip consists of a 4,200-foot paved and lighted runway, a paved parking apron for 12 aircraft, a graded entrance road and a parking lot. Polacca Airstrip requires frequent maintenance because of local flooding and poor soils. The Hopi DOT is responsible for road grading and runway upkeep. The Hopi Tribe maintains runway lights.

The present airport facilities need numerous improvements to increase safety and accessibility. These include extending and resurfacing the runway, paving the entrance road, fencing the airport perimeter and upgrading the runway lights. A site study and master plan was prepared in 1977.¹³ It proposed improving the existing airport to meet immediate tribal needs and developing a new airport on Second Mesa. In 2005 the tribe obtained funding for planning of a new airport. This project is not complete and remains without regulation lighting, fencing and requires tarmac resurfacing.

¹³ PRC-R Dixon Speas Associates, 1977



Housing

The availability of affordable housing on the Hopi Reservation is an increasing problem as the population grows. Many Hopi people have been forced to move off reservation for employment and/or the lack housing. They cite not being able to build within the villages which are crowded to capacity, not being able to secure an uncontested land assignment on which to build, not being able to secure funding to build a home and not having opportunity to buy an existing home as the reasons. Many returning Hopi are unable to find a home site anywhere in District Six and must choose sites in the HPL without utilities or improved roads if they want to live on the Reservation. This further isolates them from family, from fully participating in the religious ceremonies and from needed tribal services.

The problem is not unique to Hopi families. Indian Health Service professionals and school teachers who work on the Hopi Reservation agree that lack of housing is a huge problem and often the number one deterrent in seeking employment on the Hopi Reservation.

The BIA and Indian Health Services provide rental housing at Keams Canyon. In addition, there are federal rentals for BIA teachers at the Hopi Junior/Senior High School and in Polacca, Second Mesa, Kykotsmovi and Hotevilla. A small amount (33 units) of low-income housing is available on Hopi trust lands in Winslow. The Walpi Housing Project added 83 town home rental units which are managed by the Hopi Tribal Economic Development Corporation. These are located on First Mesa and maintain a 99% occupancy rate.

The Hopi Tribal Housing Authority has developed a 10 year plan beginning in 2010. A study identified 208 housing units that need immediate work. The most serious problem is the roofs. Fifty units need complete replacement while 104 need repair. A total of 157 units need work on the building structure, stucco and other weatherization repairs. The HTHA now has a database of the condition of housing and the needs of people related to housing to use for future planning.

HTHA is moving into providing the infrastructure necessary to support housing and also to be used for economic development projects on land the villages set aside. The HTHA provided \$100,000 to bring natural gas into Moenkopi. Currently First Mesa has designated 30 acres, Sipaulovi set aside 15 acres, Hotevilla has 57 acres and Moenkopi has a large area in the expanded village area where the hotel and other commercial enterprises are located. HTHA will work with the villages to develop these areas for economic development.



ANALYSIS OF ECONOMIC DEVELOPMENT PROBLEMS AND OPPORTUNITIES

INTRODUCTION

The Hopi Tribe has made efforts to diversify its economic base and generate income by establishing a Hopi Economic Development Corporation to oversee and market Hopi, as well as creating jobs for Hopis on and off the reservation by venturing into the cattle business, acquiring new lands, purchasing a full service truck stop, 3 shopping centers and a motel as well as seeking ways to utilize the Winslow Industrial Park for economic purposes. Acquired properties include the Kachina Square, Continental Plaza and the Heritage Square in Flagstaff, the Kokopelli Hotel in Sedona, cattle ranches outside of Winslow and Springerville, the Hopi Truck Stop near Holbrook and the Cibola Farms in La Paz County. Also the Hopi Cultural Center on Second Mesa and a Home rental community on First Mesa are tribal enterprises. The latest property acquisition is a Marriott Hotel in Houston, Texas and the Dobell Ranch consisting of 13,200 acres and the Twin Arrows parcel of 210 acres. Ranch land along interstate 40 between Winslow and Flagstaff, Arizona is now in Tribal Trust status with an economic development feasibility study soon to be completed will provide a larger land base for many unmet needs.

The Hopi economy of the future must be built on a greater investment in physical, capital and an open market environment in which innovation and entrepreneurship can flourish. Also establishing a set of guidelines for outside companies to understand how to work with the Hopi development process is seen as a vital component in attracting new business to the reservation.

There is an on-going and increasing trend toward individual enterprise – sometimes in partnership with government or non-profit support, sometimes independent of public or non-profit funding – that is the locus of considerable potential for future economic development. The prime example of this is the work of Artisans, but there is also evidence of individual enterprise emerging in almost every economic sector of the Reservation economy, including restaurants, vehicle sales, construction companies and apparel manufacturing.

Encouraging private sector business development on Hopi has been difficult for many reasons: lack of access to capital, possibly due to unfavorable credit status, the remote and isolated location of the Hopi Reservation, a sparse Reservation population, underdeveloped infrastructure and the lack of office or commercial space. Another major and fundamental constraint on enterprise is the complex and largely rigid system of land tenure. Hopi entrepreneurship is encouraged and many have ventured into the business arena only to close their doors after a few months primarily due to lack of business



population with adequate funds. The cost of living is near doubled that of neighboring cities and any profits made by entrepreneurs are immediately spent for family and household subsistence.

THE STATE OF THE REGIONAL ECONOMY

The economy of the Hopi Reservation and its region has not enjoyed the growth that has characterized Arizona over the last decade. According to most indicators the region stayed flat or declined slightly over the last 10 years. Tribal per capita was \$6,906.00 according to the 2010 census. In 2005 Navajo County had a per capita personal income of \$18,380. It ranked 15th in the state and was only 61% of the state average of \$30,019.

Basic economic activities are virtually nonexistent on the Hopi Reservation. The area is heavily dependent on the federal government and on the economies of surrounding areas. The major economic driver of the Hopi economy is contracts and grants from the federal government. These funds, many of which have been acquired through P.L. 93-638 contracts (the Indian Education and Self-Determination Acts), have brought as much as \$50 million into the Tribal government's coffers each year.¹⁴

The opportunity for commercial development and entrepreneurial activity is almost unlimited on the Hopi Reservation as there are very few products or services available. Not only are the Hopi people forced to shop off-reservation for most of their needs, the surrounding Navajo communities virtually pass through Hopi on their way to regional commercial centers. Additional commercial and retail activity is warranted on the reservation to partially reduce the trade and services leakage. The Tawa'ovi Master Plan will improve economic growth.

In 2013 Hopi Artisans realized a noticeable growth on the Hopi Reservation in art items for retail, occasional or wholesale sales and all aspects of the Visitor Industry including Hopi led tours and cultural orientation. Business owners report an emerging trend of returning to the Reservation after establishing a reputation as an artisan or after retirement and bringing both the learned skills and a degree of financial security. This shows promise as the base for a variety of new businesses and employment opportunities. Rather than looking outside to attract businesses, the Tribe and the Village leadership should support these tribal entrepreneurs and work with them to reduce the barriers they face.

¹⁴ Hopi Treasurer's file 2010



Tourism and Travel

Tourism is important to the regional economy. The presence of many natural wonders in the region, including the Grand Canyon, Petrified Forest, Meteor Crater, etc. bring visitors to the region. I-40 brings additional travelers through the region. The cost of gasoline and the cost-of-living continues to have an impact on both in-state visitation and national/international tourism. The Hopi people have continually lived in a recessive state of economy while mainstream America has occasional activity. It could be expected to see gains, potentially taking several years to reach the highs of 2006/2007. Three service stations average \$4.80 per gallon of regular gas for the past five years.

The Grand Canyon had 4.6 million visitors in 2013 according to the National Parks Service register accounts for over 1/3rd of the visits to the region. Navajo National Monument attracted 76,000 visitors and Hubbell Trading Post attracted 59,000 in 2010. Homolovi Ruins State Park just north of I-40 on Highway 87 on the road to Second Mesa had 10 thousand visitors in 2011 versus 14 thousand in previous years and this was due primarily to road closure for construction going into the park. These numbers demonstrate considerable untapped market potential for the Hopi reservation. Homolovi has been closed since February, 2010, for an indefinite period by Arizona State Parks due to budget reductions. This creates an additional opportunity for the Hopi Tribal Government to consider purchasing Homolovi or taking over its operations. In 2000, NAU estimates that some 200,000 visitors reach the Hopi Reservation each year. That's an average of almost 550 per day, yet economic measures on the reservation do not reflect the economic benefit of this volume of activity. Even with today's somewhat recession recovery there are no more than 100 visitors per day.

Visitors have been generally welcome at some cultural events on the Hopi Reservation. Today, certain provisions are provided as non-intrusive information about the Hopi culture. Around the turn of the Century many non-native visitors would attend and witness Hopi sacred ceremonies and take photos and record songs then market items internationally, profiting substantially including illegal taking of ceremonial paraphernalia and selling at huge profits. The recent auction and sales of Hopi sacred religious items in London (2013-2014) is proof of total disrespect and ignorance and thus has led to resistance to allowing non-native people into village ceremonies.

There are 26 Hopi Tribal Tour establishments and 3 non-Hopi tour companies located in Northern Arizona who generally visit petroglyphs, Walpi village, Dawa Park and home visits to artisans. No tours are made during sacred ceremonies although most villages do welcome non-native guest of whom many are personal friends and they must adhere to public notice of ceremonial etiquette which are posted at the entrance of each village. There are several websites available identifying Hopi establishments, artisans, Tribal



Government, attractions, ceremonial etiquette, grocery stores, gas stations, post office service, vehicle repair shops, etc. One most popular is www.explorehopi.com

Purchase of the work of Hopi artisans includes silver and gold jewelry, turquoise jewelry, kachina carvings, sculptures, weaving and traditional design clothing, pottery, basketry, yucca plaques, paintings, moccasins, animal hides video production etc, glass blowing, pewter cast sculptures, glass engraving are fairly new innovations. The value of the Hopi arts & crafts industry to the Hopi economy continues to be estimated at \$11.2 million/year, of which \$7.6 million is sold for cash, and \$3.6 million is given away as part of Hopi social and ceremonial exchanges. Several galleries and artist studios have overcome the difficulty of finding a site or vacant space and appear to be prospering; with a significant part of their sales going to wholesale markets or internet sales. New creative influences are also coming into play. Several artisans or gallery managers noted that there is a resurgence of creativity and innovation among the silversmiths. Great interest has been expressed for maintaining and improving the quality of the "Hopi Brand" as expressed through silver work and design. Gallery owners are serving as mentors and purchasing supplies in large enough quantities to reduce the cost to the artisans who see their work through that gallery.

A Hopi "Brand" for work of Hopi artists appears to be strong. But with no central or systematic management, there isn't any way to manage the image in order to ensure quality. Other people have capitalized on the image without benefit to the Tribe. Better management of this distinctively Hopi work could leverage increased economic benefits to the individual artisans and the tribe.

There still seems to be significant un-met demand for gallery and artist work studio/production space. The Hopi Cultural Center is an underutilized asset that needs upgrading for better use. The building, owned by a non-profit organization, is deteriorating and in need of upgrading. Its location is ideal as it virtually shares a parking lot with the Hopi Cultural Center. There is ample space for workshops, demonstrations and training sessions. This highly underutilized asset needs to be analyzed to develop its full potential for the individual artisans who lack space and access to roadside locations to sell their work.

The Hopi Cultural Center Hotel and restaurant and the Moencopi Legacy Inn are locations for visitor information and education and a place for the Hopi artisans to gain greater exposure for their work. State Route 264 between Moencopi and Keams Canyon has been designated as the Hopi Arts Trail with a brochure identifying all businesses along the route. The museum at the Cultural Center is managed by the Hopi Arts and Crafts Guild Co-operative an independent entity and would be of exceptional service to visitors if they could keep later hours and kept regular hours. More opportunities to purchase goods and services from the reservation could be provided in the space around the inner plaza.



Meeting rooms need to be upgraded and expanded. These are all opportunities that would not take a lot of effort and would increase the value of existing facilities.

The Moenkopi Legacy Inn at the Village of Upper Moenkopi was completed in 2011. It features a conference center and an outdoor swimming pool with a replica of a Hopi house. The intent is to make the hotel a gateway to the villages and mesas with guided tours that will include visits to artisans and is the starting point for the Hopi Arts Trail. These tours will also provide information on appropriate behavior and respect for tribal customs. The Hopi Arts Trail was established to recognize 33 business sites along State Route 264 from Moenkopi to Kearns Canyon to give the visitor a guide for what is available along the route.

Hopi Industrial Park

The 223.86 acre Hopi Industrial Park is located on the western edge of Winslow, south of the Burlington Northern Santa-Fe Railroad and old Route-66, which now serves as an I-40 access road. The Hopi Housing Authority currently leases 25 acres on the western portion of the property, in Coconino County, and has constructed 33 multi-family units on ten acres of its site. A vacant 113,764 square foot industrial building with 12 – 18 foot ceiling heights occupies 18.3 acre site south of the housing and west of non-reservation multi-family housing that borders the Hopi property to the south. This mostly pre-engineered steel building was constructed in 1968 for the Western Superior Corporation, makers of BVD underwear, who occupied the building until 1974. The building was vacant until 1986 when the Young An Hat Company of Korea leased it, leaving in 1995. The building has been vacant since. Currently, a plan to renovate the building to generate income and provide a user-friendly building for public attractions and to find a suitable tenant to occupy the building is being discussed.

Current estimates are that the building requires over \$1,420,000 - \$1,702,500 million in rehabilitation cost work. A second option under consideration is the demolition option at an approximate cost estimate of demolition at \$1,274,300 and a third option and probably the less cost effective is the abandonment of the structure.

- Approximate cost per square footage for Light Industrial building type construction: \$120.80 per SF
- Approximate cost per square footage for Warehouse building type construction: \$99.60 per SF

To match existing square footage of 113,764 SF:

- Approximate cost for new Light Industrial building: \$13,742,596.00
- Approximate cost estimate for new Warehouse building: \$11,330,895.00



Problems with limited domestic water availability to the building due to lack of pressure and no water available for the fire suppression system also need to be resolved. An annual operating cost on current conditions to the Hopi Tribe of \$65,000 of which \$30,000 is maintenance and the rest loss of value¹⁵. The University of Arizona study evaluates housing, tourism and industrial use as options for the future use of the property and references opportunities in conjunction with Hopi Tribal land purchases south of Winslow.

As possibly the only existing large industrial building in northern Arizona with I-40 access and the potential for rail service, this building is a fairly unique asset and should be able to produce income for the tribe. The condition is structurally sound¹⁶ but would require some renovations. Its lease-only availability offers many unknowns for potential tenants, including a no-tax base operation, conversely potential employer concerns over lack of trained and available work-force, the presence of housing adjacent to the site and lack of police protection to property and life could hinder potential tenants. While these factors can be managed, they must be addressed in a systematic and comprehensive fashion because any one of them by itself can sink a potential lease.

Opportunities that make this property valuable is interstate I-40 access through Hipkoe exit, proximity to Winslow-Lindbergh Regional Airport could expand on types of potential future uses, flat land with little vegetation is good for development, Hipkoe exit has a service state and exits to local hotels, and the Cholla Power plant to the East.

One major reason that potential tenants are often reluctant to entertain deals on Indian reservations is uncertainty over the length of time necessary to negotiate a deal and how contracts will be enforced. Any steps that can be taken in advance to establish a business-like basis for initial discussions that leads to timely action can help minimize these concerns.

Planned Community Development

The vast amount of open space on the reservation gives the impression that abundant land around the population centers is available for development. This is not so. Most of the land in District Six is subject to village, clan, family or other claims and may be used by others only with permission. The land tenure system has nearly paralyzed the development of needed housing, vital services and economic development on District Six. It was identified as the number one problem of starting new businesses or expanding business that are successful enough to grow and need more space. It has been given as a reason that

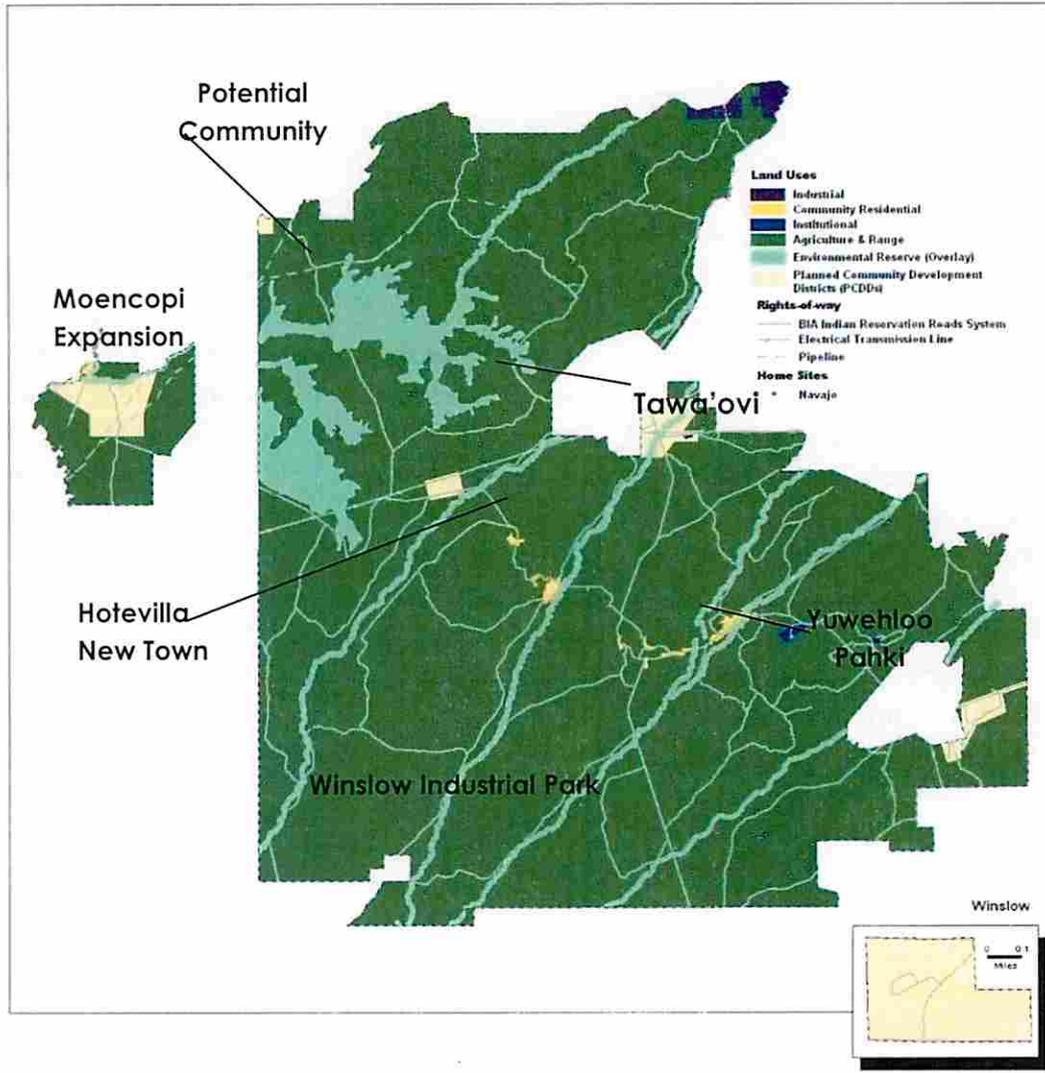
¹⁵ The Economic Development Plan for the Hopi Winslow Trust Property, Graduate Planning Program, University of Arizona, 1999

¹⁶ Merge Architects, 2013

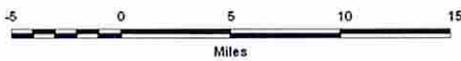


Hopis desiring to return to the reservation cannot find a place to live or to build a business that would provide employment and income to their fellow Hopi. The land tenure also makes it very difficult to site needed tribal, community and business facilities. The Hopi Veterans Memorial Center and the Hopi Junior/Senior High School have remote locations because the Tribe could not acquire more centralized sites.

The Office of Community Planning and Development is engaged in the development of the Tawa'ovi Community Project, the Lower Moencopi village planned site located across the Moencopi wash, the Hotevilla New Town site and the Upper Moencopi village expansion is also in the mix. A planned community would contain a mix of commercial, institutional, recreational and medium and high density development. They would be limited in size to 4-500 acres. The communities would be fully serviced. Eventually they would be able to undertake local governance. Development of these communities would provide the opportunity to address the issues of replenishing and adding to the reservation housing stock without infringing on village and clan rights. These developments will require planning and financial analysis expertise, utility and transportation infrastructure as well as construction materials, services and workers. To the extent the Tribal Government is able to effectively encourage the provision of these economic activities locally; the reservation economy may be stimulated.



FUTURE LAND USE



**Hopit Tunatya'at 2000:
The Hopi Strategic Land Use and Development Plan**

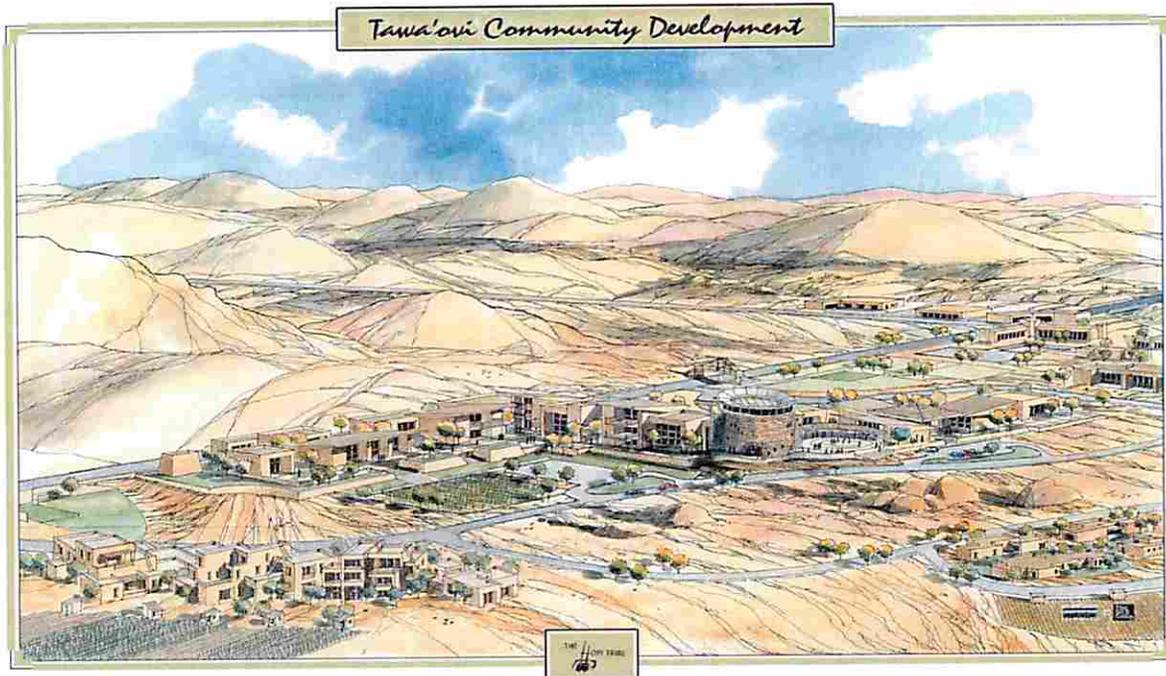
Prepared by The Office of Community Planning & Economic Development
April 2001



Tawa'ovi

The Hopi Tribe approved the construction of a planned community to be known as Tawa'ovi. Situated on 463 acres on Hopi Partitioned land 15 miles north of the Hopi Cultural Center, Tawa'ovi will be an environmentally sensitive residential, commercial, light industrial and tourist community patterned largely after Hopi village life but making a place for incorporation of desirable aspects of the modern world. Tawa'ovi and the Turquoise Trail Highway will someday serve as the northern gateway to the Hopi Villages, a destination point in northern Arizona's tourist economy and a jumping off point for tourist related activities at the Hopi villages.

With the development of Tawa'ovi, the tribe will be able to provide areas for mixed-use housing, various tribal facilities; commercial and industrial land uses; ranching and farming opportunities, a compact land use pattern with large open space areas; view corridors; areas for recreational, social, and cultural activities; and a community unified by an architectural theme that reflects Hopi values.



Tawa'ovi a Place among the Hopi Villages



Tawa'ovi will provide an economic stimulus benefiting all of the villages by providing an infusion of capital, address a critical need for housing. Creating an opportunity for families to grow and for families to return to tribal lands is a fundamental to the birth of this new community. Housing is configured in Hopi inspired neighborhood clusters with a close connection for community members to each other, and to their farm plots and workplaces right in the community, increased demand for goods and services, increased demand for productive capacity and employment opportunities, all of which will contribute to the general welfare of the tribe and its membership. Tawa'ovi will provide an opportunity to develop a Hopi community free of the competing land claims that have traditionally hampered economic development at both the Tribal and village levels.

Tawa'ovi will provide a place where economic development can proceed without posing a threat to the traditional village life-style that has always been an important part of Hopi culture. Commercial development is not always compatible with the level of privacy, solitude, and peace that are a part of Hopi village life and which have been preserved in and around the traditional village plazas on all of our mesas. Tawa'ovi will provide just such a place.

Tawa'ovi will constitute a magnet for financial resources that will flow not only into Tawa'ovi but also into the surrounding Hopi villages. Village members will construct the new community, village members will work in the community, village members will have opportunities for new housing in the community -- housing not currently available at the village levels as a result of problems in obtaining the land assignments within village boundaries -- and perhaps most importantly, Tawa'ovi will attract businesses, tourist and industry which will provide not only jobs for Hopi people but which will also produce an expanding market and customer base for businesses located in the villages.

Tawa'ovi Environmental Assessment (EA)

January 2012 the Tawa'ovi Community project environmental assessment (EA) was prepared for the construction of the proposed 463.75 acres Tawa'ovi Community Development project (Tawa'ovi Community) on Hopi Partition Lands in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and Hopi Tribal laws and regulations.

March 19, 2014 Bureau of Indian of Affairs, Hopi Agency issued Notice of Availability of the Proposed Tawa'ovi Community Development Project Final Programmatic Environmental Assessment and Finding of No Significant Impact (FONSI). Based on the "Tawa'ovi Community Development Project Programmatic Environmental Assessment" (September 2013), the BIA has determined that by implementation of the proposed action and best management practices specified in the PIEA, the proposed Project will have no significant impact on the quality of the human environment in accordance with Section



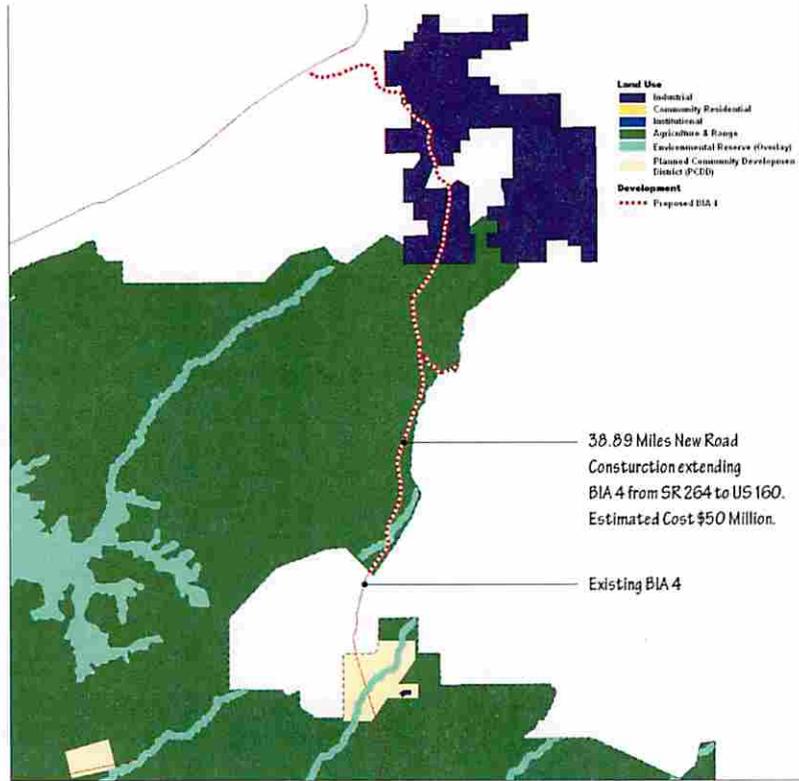
102(2) (c) of the National Environmental Policy Act of 1969, as amended, an Environmental Impact Statement is not required.

Turquoise Trail

The Turquoise Trail is nearly 50% completed, providing an opportunity for the tribe to market north/south connections from the Monument Valley/Navajo National Monument areas to the Hopi mesas and I-40 to the south. The Hopi Tribe will be able to attract visitors coming from the west (Grand Canyon/Lake Powell) and the east (Canyon de Chelly/Chaco Canyon and the Navajo Reservation) and effectively divert them along BIA 4.

The Peabody Western Coal mining operations ceased in 2005 resulting in increased unemployment and decrease in revenue. Hopi employment at Peabody Coal has always been minimal due to the long commute. It has been virtually impossible to drive directly to Peabody from the main Hopi Reservation. The roads are rough at best and impassable much of the year. Driving the 100 mile route thru Tuba City takes too much time. The completion of the Turquoise Trail road would have enable Hopi to work at these lucrative mining jobs without the long and costly drive.

Hardrock, a Navajo community with an estimated population of 1,256 lies about one and one-half miles west of the proposed Tawao'vi site. The Navajo Chapter of Piñon lies fifteen miles to the east of the study area's northern boundary. A road (BIA N8031) runs from Piñon to BIA 4 as a diagonal though the northern upper third of the village site. It intersects with BIA 4 approximately one mile north of the Hardrock road. Piñon has an estimated population of 2,228. The majority of retailing services for these communities are provided at border towns such as Winslow, Tuba City and Gallup. First Mesa Consolidated Villages has plans to develop a grocery and retail center at Polacca to support the medical facility and related housing.



**STRATEGIC DEVELOPMENT
Turquoise Trail (BIA 4)**



**Hopit Tunatya'at 2000:
The Hopi Strategic Land Use and Development Plan**



Off Reservation Investments

In 1995, the Hopi Tribe entered into an agreement with the United States for the resolution of certain lawsuits brought by the Hopi Tribe against the Government arising out of the failure of the United States to protect Hopi interests on Hopi Partitioned Lands. In exchange for settlement of these lawsuits, the United States agreed that the Hopi Tribe would have the right to acquire up to 500,000 acres of new lands to be taken in trust by the United States for the benefit of the Hopi Tribe. The agreement also included an obligation on the part of the United States to assist the Hopi Tribe in acquiring any interspersed or checker boarded state lands which were within the boundaries of any fee lands acquired by the Tribe. This settlement agreement was ratified in 1996 by the Navajo-Hopi Land Dispute Settlement Act, Public Law 104-301, and October 11, 1996.

Three Canyon Ranch

In 1997 the Hopi Tribe acquired 170,481 acres of deeded property (privately owned), an interest in 75,577 acres of state leased property (grazing lease), an interest in 74,085 acres of Forest Service permit property (grazing permit) and 120 acres of BLM permit property for a total of 429,264 acres of land. The Ranch, with holdings also in the Springerville area, runs over 4,000 head of registered and commercial Hereford cattle. The Hopi Tribal Natural Resources program is charged with the management and operation of the ranches to provide a financial return to the Tribe. The Hopi Tribal Economic Development Corporation formerly managed the ranches.

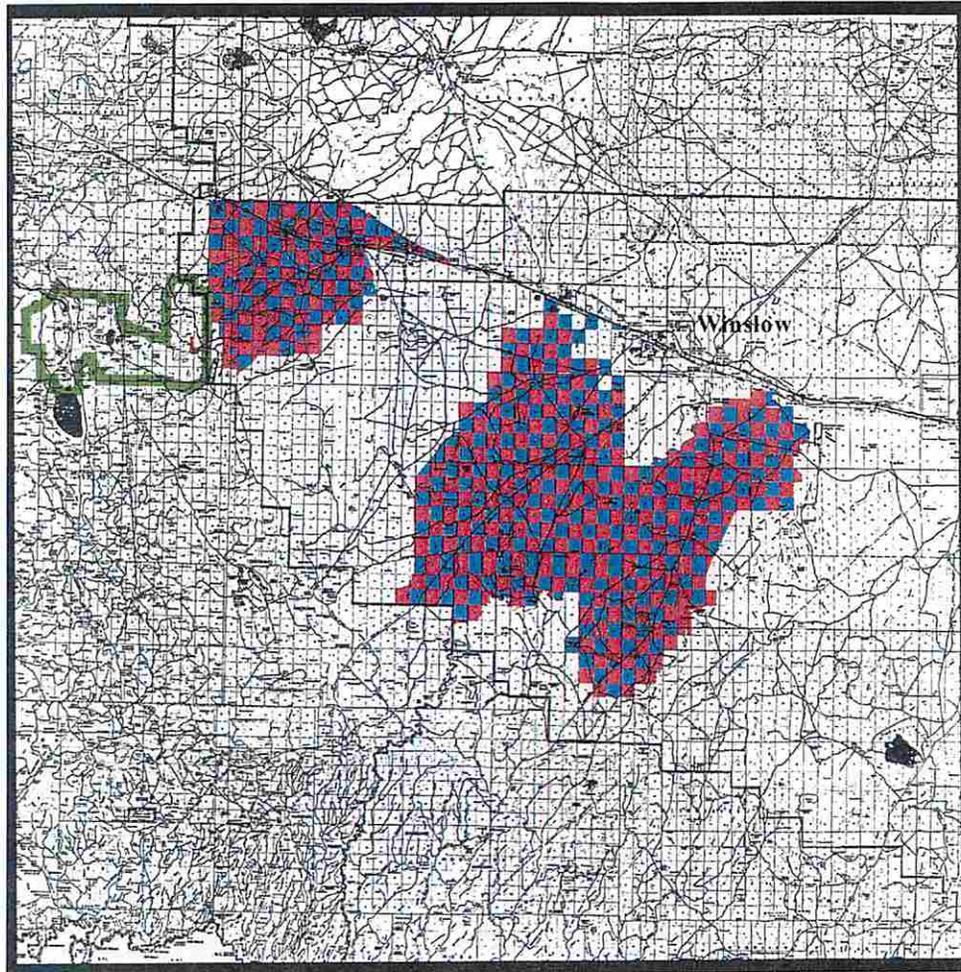
Among its successes are an increased inventory of top quality feeder cattle produced at lower costs, consistently decreasing costs as a percent of revenue, maintaining a broad genetic pool, increasing the number of bulls leased to Hopi ranchers, marketing various classes of cattle into a variety of markets at different times of the year to take advantage of seasonal market swings, developing the Black Angus, Hereford and Black Angus (Black Baldy) breeds to take advantage of changing market demands, improved range conditions in the face of a long-term drought and increased variety in animal and bird species.

The top three goals of the Hopi Three Canyon Ranch include developing a stand-alone Hopi cattle business that is self-supporting and income producing; establishing the Hopi Tribe as one of the best-known and largest ranch operations in the Southwest; and using available natural resources to their best advantage. The ranches provide a unique opportunity to diversify the Hopi economy in a way that complements the Hopi lifeway. The ranches were not bought strictly for economic reasons. Numerous sites and shrines lie within these ancestral lands of the Hopi people.



The acquired land is also located in a potential economic development corridor running along Interstate 40 adjacent to and between the towns of Flagstaff and Winslow. The Hopi Tribal Economic Development Corporation has a continuing feasibility study to maximize the potential for development. These lands outside of the 1882 Reservation boundary are seen as an opportunity for the Hopi Tribe to participate in the larger economy associated with these towns. The economic potential for the Hopi Tribe on the new lands generates a willingness on the part of the communities to open a dialogue. The Hopi Tribe has met with and consulted with all of the communities in Northern Arizona from Flagstaff to Springerville and Eagar.

The Tribe has also increased its water rights through these acquisitions. The extensive C-Aquifer underlies all of the acquired lands and can provide an important water resource for the Tribe in the future.



DEEDED LAND


STATE LAND


U.S. FOREST


Hopi Ranch Lands on I-40



Hopi Travel Plaza

The Hopi Travel Plaza is located four miles east of Holbrook, Arizona along Interstate 40. It contains a mix of leased and corporation owned businesses, serving both long distance truckers and other travelers. It features a full diner, gift shop, convenience store, fast food outlet, Burger King, a video game room, a barber shop and non-denominational chapel and overnight semi-truck parking. The Hopi Travel Plaza is currently undergoing renovations and parking lot upgrades.

Flagstaff Shopping Centers

The Hopi Tribe purchased the Continental Plaza in east Flagstaff in July 1999. The entire plaza, landscape and the parking lot have been upgraded to attract potential tenants.

The Hopi Tribe has an office there that is used for its partnership with Northern Arizona University as well as its high tech equipment that is used for its Geological Information system mapping. The Hopi Reservation currently does not have the technology to place these computers on its reservation.

The Hopi Tribe also purchased Kachina Village and Heritage Square located in downtown Flagstaff. They are being managed by the Hopi Tribal Economic Development Corporation who has the responsibility for generating and managing the rental income from the Centers. The Tribe continues to improve and create an attractive business plaza.

Kokopelli Inn and Hopi Cultural Center

The Hopi Cultural Center Enterprises Inc. purchased the Kokopelli Inn at Oak Creek Village near Sedona in October 2000. The Kokopelli Inn was constructed in 1997 with a total of 42 rooms. There is a small meeting room that is also used for breakfasts.

HCCE, Inc. plans to purchase additional land adjoining the property to add a restaurant, meeting rooms and a Hopi Learning Center/tourism office. There is a potential for tribal entrepreneurs to form tour groups from the Inn, to exhibit their artwork or to demonstrate the various techniques of Hopi weaving, pottery, carving and silver-smithing.

The Hopi Tribe have operated the Cultural Center and Motel at Second Mesa and the Kokopelli Inn at Oak Creek since in early 2000, giving responsibility for significant opportunities to grow these revenue producing profit centers.



Walpi Housing

Walpi Housing is an 83 town home rental community located adjacent to the Indian Health Service hospital on First Mesa. It is managed by the Hopi Tribal Economic Development Corporation and usually operates at a 99% occupancy rate.

Hopi Tribe Economic Development Corporation

With the capability of producing revenue that will diversify the Tribe's income sources and lead to economic opportunities – as well as risks-- through the acquisition of commercial shopping centers, motels and cattle ranches the Hopi Tribe has created Hopi Tribe Economic Development Corporation in 2004 with the Hopi Tribe as sole shareholder.

HTEDC manages both commercial business affairs, day to day operations for the Hopi Tribe's land and business investments. HTEDC is also responsible for researching and developing new business opportunities for the Tribe.

Water Issues

Increasing Hopi Domestic and Commercial Demand

The current per capita water use is estimated to be 160 gallons per person per day. The American average, as running water, modern appliances, and commercial ventures become more widespread across the reservation. It is estimated that both an increase in total gallons used per person and a growing population will create an annual demand of 36,300 acre feet by 2040. This demand, which includes both municipal and agricultural use, is a 90-fold increase in water consumption in 40 years. Existing water sources will not meet this projected demand.

Diminishing Availability

Traditionally used springs are drying up or are flowing (discharging) at unprecedented low levels. This may be because the recharge rate is less than the current rate of withdrawal. Perennial flows in the washes are also significantly reduced. The Moenkopi Wash in the vicinity of the Moenkopi Villages, within living memory, flowed year-round and provided a ready source of irrigation water for the fields. In the 1940's Polacca Wash was a perennial stream, and into the 1950's it was still possible to drink clean fresh water from anywhere in the stream.

Water Contamination

Water quality varies with the type of rock in which it is stored. Naturally occurring contaminants, such as radon and fluoride, are found in some wells and springs. Improperly closed wells enable contamination to enter ground water; improperly cased wells also



enable saline water from the D-aquifer to leak down into the N-aquifer. Past attempts to minimize the capital costs of drilling wells in the Hopi villages serves to increase maintenance costs, which have to be absorbed by villages. Other man-made threats to water quality include:

- ☐ Dumping of solid waste in or near washes
- ☐ Leaching or overflowing sewage lagoons
- ☐ Septic fields and tanks
- ☐ Munqapi area contamination from the UMTRA site
- ☐ Leaching from the BIA Tuba City landfill, and
- ☐ Leaking gasoline USTs.

Constraints Due to Limited Data

Hydro-geological data and analyses required for the delineation of aquifers and water bearing alluvial deposits are normally derived from well logs and pump tests. The Indian Health Service (IHS) and the Bureau of Indian Affairs (BIA), due to constraints of both mission and funding, drilled wells for over 50 years without adequate well logs or pump tests. Since over 90 percent of the wells were not logged, little information is available to assist in locating new wells, estimating the cost of new wells in the proximate area, or determining water quality. A lack of data regarding a geological fault line that runs through the southeastern corner of the Hopi Reservation led to a number of wells being drilled that produced inferior water. Lack of data also inhibits the ability to plan for future water use on the reservation.

The C-aquifer, the deepest feasible aquifer underlying the Hopi Reservation, extending south of Winslow, Arizona and Interstate 40. Data that is available for evaluating ground water resources is contained in databases that were studied and quantified to accompany the Hopi Power Plant Project in 2004. Data gathered may now be obsolete as weather changes have created drought conditions throughout the Southwest.

Water quality data is sparse and expensive to collect. The Hopi Tribe has invested a significant dollar amount in USGS data collection, with little return, in part because the USGS Water Wells database uses different locator identity information from that of the Tribe's.



Hopi rangelands and wetlands are important source of plant materials for Hopi ceremonial, cultural, and day-to-day uses. One estimate¹⁷ is that up to 30% of the diet in some Hopi households comes from foods gathered from the land. The Hopi arts & crafts industry depends on the ability to gather plants easily and cheaply. The interests of Hopi people who eat traditional foods and of Hopi artisans who create the arts and crafts need to be protected from depletion of vital plant sources by overgrazing. Over-harvesting may also be an issue.

HOPI TRIBAL GOALS

The Economic Development Goals of the Hopi Tribe are broad and are intended to cover short and long-range conditions.

Population

Provide accurate and reliable population data for tribal programs.

Economy

Increase employment opportunities in the private sector.

Policies:

- ▣ Protect appropriate commercial and industrial sites from encroachment by residential and other uses.
- ▣ Encourage individual initiative to establish small business enterprises
- ▣ Support job training programs
- ▣ Protect the scenic vistas of the Hopi Reservation from roadside clutter that results from scattered, unplanned development.

Land Tenure

Promote land tenure (rights to live on and use an area of land) that is consistent with tribal tradition and current planning efforts.

¹⁷ Obtained from participants at the Gathering meeting for women held as part of the resource assessment phase of developing the Hopi IRMP.



Policies:

- ▣ Use traditional ways to settle land disputes within District Six.
- ▣ *Recognize customary use area within District Six when making decisions about range management, livestock permitting and land use planning.*
- ▣ Require all claims to land and resources on the HPL to be supported by tribal land assignments or use permits. This policy will not restrict subsistence, religious, or traditional gathering activities on the HPL.

Land Use

Conserve and develop the land for the benefit of tribal members.

Minimize conflicts between land uses.

Policies:

- ▣ Respect those uses of land and resources that sustain religious, subsistence, economic and recreational activities.

Housing

Provide every Hopi family with decent, safe, and sanitary housing according to its individual needs.

Allow tribal members to choose the location of their homes, subject to tribal policies.

Policies:

- ▣ Tribal Council has the authority to approve locations for new communities, subdivisions and individual home sites on the Hopi Partitioned Lands.
- ▣ New housing should be located near existing housing where water and other community facilities are available or can be provided.

Public Utilities

Provide public utilities to promote a healthful living environment.



Policies:

- ☐ Encourage the villages to build water and sewer systems that will meet current and future needs and preferences.
- ☐ New residential communities and commercial development should be located in areas where power, telephone service, water and sewer services can be provided.

Public Services and Facilities

Improve public facilities and services on the reservation.

Policies

- ☐ Give highest priority to law enforcement and medical care.
- ☐ Support an on-going fire safety program, including public education and inspections to make buildings fire safe.

Transportation

With the contracting thru (PL93-638) the Hopi Department of Transportation is encouraged to provide and maintain a safe and efficient transportation system for the reservation. Hopi Transit service is available but inefficient and questionable vehicle integrity could hamper a very much needed resource as service area covers in excess of a 100 mile radius.

Policies:

- ☐ Unnecessary roads should be returned to more productive use.
- ☐ New roads and streets should be located in areas with suitable soils, slope and drainage.

Rangeland

Obtain maximum grazing benefits from the range.

Policies:

- ☐ Rangeland should be managed for multiple uses.



Wildlife

Protect existing wildlife and wildlife habitat.

Reintroduce missing wildlife species selectively.

Policies:

- ▣ Wildlife management will be coordinated with other plans and programs; range, woodland, roads, water and recreation.
- ▣ Poor rangeland should be managed primarily for wildlife habitat, woodland and recreation.
- ▣ Game species that bring cultural and economic benefits should be introduced in appropriate areas. The Hopi Tribal Council approved the Hopi Game and Wildlife Ordinance to authorize elk and deer hunts on Hopi ranch lands and within District 6.

Woodland

Protect and increase tree cover in appropriate locations.

Policies:

- ▣ Do not allow tree cover to invade good rangeland.
- ▣ Return or introduce tree cover around villages and other appropriate areas to enhance the scenic quality of the landscape.
- ▣ Prohibit the use of herbicides to control tree cover.

Agriculture

Encourage traditional Hopi agriculture.

Conserve water and soil resources

Develop irrigated agriculture in a way that maximized both employment and return on tribal investment.

Policies

- ▣ Develop irrigated agriculture only where soils are well suited to crop production and will not deteriorate over a long period of time.



- ▣ Reserve for agriculture those sites that could be irrigated using water from the washes.

Water Resources

Assure an adequate water supply for present and future uses.

Maintain and enhance water quality.

Policies

- ▣ Balance water protection and use between religious and subsistence uses and more consumptive domestic and industrial/commercial uses.

Mineral Resources

Develop minerals such as sand, gravel and stone to meet local demands for construction materials.

Prevent mineral exploration and mining practices that permanently degrade renewable resources.

Conserve and protect mineral resources used for religious and subsistence purposes.

Policies:

- ▣ Adopt the Minerals Resource Development Policy (Draft)

Recreation

Increase the variety of recreation opportunities on the reservation

Improve existing recreation facilities

Policies:

- ▣ Support initiatives by the villages to provide and equip playgrounds for small children.
- ▣ Protect areas of the reservation with high scenic value.



Cultural Resources

Preserve the Hopi way of life.

Protect sacred places and subsistence gathering areas.

Policies:

- ▣ Consult traditional leaders before land assignments are granted in culturally sensitive areas.

Development Constraints

Protect life And property in areas subject to natural hazards.

Protect areas subject to extreme soil erosion.

Policies:

- ▣ Prohibit structures in areas constrained by steep slopes, easily erodible soils, periodic flooding or other unsuitable features.
- ▣ Consider exceptions where there is no alternative location or where economic benefits outweigh the cost of mitigation.



COMMUNITY AND PRIVATE SECTOR PARTICIPATION

The Hopi Comprehensive Development Plan, Parts I and II, of 1988, called the **Hopit Tunatya'at** was developed to formally establish goals and policies for the development and protection of Hopi land, resources and facilities. In 1990 the Tribal Council approved an amendment to the **Hopit Tunatya'at** by adopting Part III of the plan. This third section incorporated standards of land use planning and development and established a formal review and decision-making process.

The **Hopi Tribal Strategic Plan of 1994** reaffirmed most of the goals previously established, but added one new major area. In 1995 it was determined that the four major planning documents developed by the needed to be consolidated to provide a better understanding of the comprehensive and complex strategic issues that need to be addressed. The Hopit Pötskwaniat, or Hopi Tribal Consolidated Strategic Plan of 1995 was updated, revised and approved by HTC Resolution H-098-2011 on November 29, 2011

Hopi community and private sector participation is always encouraged and most activities (including certain traditional ceremonies) have included private sector agencies to inform the general public on what services are offered.



STRATEGIC PROJECTS, PROGRAMS AND ACTIVITIES OF HOPI TRIBAL GOVERNMENT

Broadband Internet Project:

The Hopi Tribe has formed the Hopi Tele-Communications Incorporated (HTI) to provide local broadband services to enable user applications that will create jobs and improve the quality of life on the Hopi Reservation. Hopi now have wireless local area network (WLAN) services developed parallel with the First Mesa pilot satellite services for high broadband users. This parallel 3-phase approach provides services to more subscribers to demonstrate a sustainable economic basis for expansion of the satellite and terrestrial WLAN broadband services.

Tawa'ovi Infrastructure

Tribal Council adopted the Tawa'ovi Community Master Plan. The Office of Planning and Development has administrative oversight of the project. The Tawa'ovi Community Development task Team will employ a Project Manager to implement the multijurisdictional plan. The first step of identifying a potable water source has been completed including a new well to provide additional demand of the planned 400 + homes to be built. Power resources are identified and with talks to evaluate cost effectiveness and subsequent contracts developed for service. Architectural and Engineering services were awarded to the Pollari & Thompson firm of Phoenix, Arizona. The first housing phase of 40 units has been identified as the North Village. All construction will be accomplished according to the phased development and construction plan.

BIA 4: Turquoise Trail

The Turquoise Trail (BIA 4) is a road that will, when completed, connect SR 264 at the Hopi Cultural Center to US 160 just north and west of the Peabody Coal mine lease. At present about one half the length of this roadway has been constructed. The segments that have been constructed were done so under special appropriations of the U.S. Congress and not as part of the annual IRR transportation improvement program. Completion of this road will be the main access to the planned Tawa'ovi Community for Hopi people as well as to the Peabody Coal mine. It would also facilitate north-south travel on the eastern side of the reservation and overall enhancement of the regional travel network. The remaining thirty-nine miles of construction would cost an estimated \$50 million to complete the highway.

Hopi Tribal Housing:

A BIA Consolidation Report of Tribal Inventories of Housing need identifies approximately 800 families in need of housing assistance with an additional 300 families needing rehabilitative



assistance. The Tribe needs funding for low-income housing construction and for rehabilitation of existing structures.

Lake Powell Pipeline

The Lake Powell Pipeline project is currently on hold pending continuance of the Little Colorado River litigation. The three design models of transporting water to Hopi villages remain intact.

There are three basic design solutions to transporting water from Lake Powell and distributing it to the Hopi Communities. Costs range from \$400 million to over \$500 million in 1990 dollars. The Arizona Department of Water Resources is also studying using Lake Powell water for Northern Arizona communities in the Flagstaff area including some Navajo communities located near US 89. This does not include the Western Pipeline project for any delivery to the Hopi Reservation villages. The Hopi Tribal Council must aggressively pursue the necessary preliminary engineering and fiscal feasibility studies leading to the identification and selection of the preferred corridor alternative.

Hopi Cultural Center Motel and Restaurant:

The Cultural Center is in need of renovation/rehabilitation and expansion. It provides the only overnight rooms on the central reservation, thus allowing only a small percentage of visitors to fully experience the countryside and, more importantly, providing a place to spend money on the reservation. The facility currently is at capacity. A new wastewater treatment facility will be needed at the cultural center. A Learning Center could also be created to provide a place where visitors would have the opportunity to ask questions, learn what is acceptable and feel more comfortable while on the Hopi Reservation. It could also provide space for demonstrations of various crafts, display cases for galleries and places where the individual artisan could display and sell a product.

Moencopi Legacy Inn and Resort:

The Upper Moencopi Development Corporation was the driver to build the Legacy Inn & Suites located at the interstate of State Route 164 and 160 completed in 2011 and operational in 2012 including 100 guestrooms and 16 suites, banquet and conference facilities, saltwater pool and whirlpool, fitness room, WiFi throughout the hotel and complimentary continental breakfast. A truck stop, convenient store and a Denney's restaurant complete the Legacy Inn Plaza.



Full Development of the Hopi Industrial Park:

The University of Arizona, School of Planning and the Drachman Institute prepared a market study for the utilization of the existing industrial structure on the Hopi Industrial Park. Although some infrastructure is already in place, additional infrastructure, utilities, as well as police, fire and maintenance services need careful planning. The City of Winslow provides both water and sewer services to the site; however, due to current pressure problems on the site, drilling an additional on or off-site well would provide more water. Another solution would be to attach a pumping unit to the existing pipes to increase water pressure and capacity to support further development. Merge Associates of Phoenix have completed a rehabilitation feasibility study for deliberation for the Tribal Council to decide its best course of action. EverGreen Building Solution Inc. is a low-cost housing manufacturing entity ready to establish business with the Hopi Tribe if and when rehabilitation is completed.

Dialysis Center:

The Hopi Tribe's Department of Human Services is pursuing a location to establish a Dialysis Center on the reservation to accommodate the Hopi and Navajo dialysis patients. Several locations have been reviewed. The First Mesa Village has designated a portion of land in conjunction with the Hopi Health Care Facility. These facilities will be in addition to the dialysis facilities at the Health Care facility.

Elderly Care Center:

The Hopi Tribe now has an Elderly Care Center to accommodate those tribal members who are currently provided services off-reservation. Hopi elders are forced to live off-reservation due to the lack of a facility and support services. A center provides easier access for relatives to visit patients more frequently and administer care needs that incorporate cultural and traditional methods of healing. The elderly Care Center is located in Upper Moencopi Village.

Hopi Veteran's Memorial Center:

The Hopi Tribe have expanded the Hopi Veterans Memorial Center to include a Wellness Center including free weights, Zumba classes, mechanical fitness machines, miles of rigorous outdoor trails, organized competitive and fun runs, a full sauna and a very popular 100 mile running club with over 300 members accommodate the increased interest in indoor and outdoor activities as well as the promotion of wellness and fitness.

Polacca Airport:

The present airport facilities need numerous improvements to increase safety and accessibility. The Hopi Tribe obtained a grant to plan, design and construct an all new facility. These include relocating, extending and surfacing the runway, paving the entrance



road, fencing the airport perimeter and upgrading the runway lights. The tribe also has access to entitlement grants which allow the tribe to conduct additional activities as the main project progresses.

TECHNICAL ASSISTANCE PROJECTS PRIORITY LIST

Village Governance Capacity:

Develop and provide a program to train Village Boards of Directors in management, structure and policy development. The Village Boards operate their governance structure without by-laws, policies or procedures. As they become responsible for more programs and the funding that goes with the programs, their ability to effectively manage their responsibilities becomes precarious. Currently records of previous decisions, authorizations or any other action of the Boards are non-existent or missing. Boards are unable to govern effectively as they do not have procedures for determining quorum, attendance or even requirement for membership on the board.

Tribal Enterprise Board:

Develop a Tribal Enterprise Board to oversee tribal businesses and assist in developing leases with a priority on the Hopi Industrial Park and Turquoise Commercial lease sites.

Multi-Use Recreation Areas Feasibility Study:

Perform a study to determine the feasibility of developing multi-use recreation areas. This includes village areas desiring these facilities and a Tribal project located in Blue Canyon.



PLAN OF ACTION

The purpose of Hopi Tribal Government, as stated in its Constitution and By-laws, is to promote the welfare of the Hopi people; to provide a way of working together for peace and agreement between villages; to preserve the good things of Hopi life; and to provide a way of organizing to deal with modern problems with the United States Government and the outside world generally. The CEDS is built upon the foundation set forth in past planning.

The purpose of this action plan is to support, enhance and implement the goals and policies established by this foundation by formulating development plans and directing efforts to implement them. The following initiatives are current development priorities that will be given attention in shaping the development of local and outlying economic development.

Hopi Tribal economic development emphasis will be concentrated on pursuing programs that will create a positive entrepreneurial business environment on the Hopi Reservation. On-Reservation development expertise is necessary to create effective communication and cooperation among the villages and the tribe to support development efforts on the reservation.

Improvements in education and training are necessary to enhance the understanding of development efforts that will benefit the Tribe, villages and people. Cooperative working efforts with the villages and private sector will increase opportunities for development of projects that will create healthy employment and revenue opportunities for the whole tribe. Therefore, the strategy of the Hopi Tribe is to work closely with the villages and to encourage coordination, cooperation and understanding of the economic development process.

SELF-GOVERNANCE AND SELF-SUFFICIENCY

GOVERNANCE

Goal: to work cooperatively toward the implementation of the common vision by instituting the collaboration and coordination of governance activities between the central tribal government and village governance.

Strategies:

1. Develop and implement appropriate tribal/village organization and management systems of governance to provide the most effective and efficient delivery of services to the Hopi people.
2. Develop and adopt a policy that supports village primacy.



3. Provide technical expertise and appropriate resources to the villages to develop and/or strengthen their management infrastructure.
4. Conduct a constitutional convention to discuss constitutional reform.

Goal: To plan and construct proper facilities to adequately house the tribal and village administrative offices.

Strategy:

1. Plan and construct modern facilities equipped with state of the art furniture, equipment/machinery and tools.

Goal: To ensure that Tribal Council, Standing Committees, Village Officials, Tribal/Village Executive and Administrators are trained and well prepared to assume the roles, responsibilities and authorities relative to their positions.

Strategies:

1. Conduct Governance work sessions to define the role, responsibilities and authorities of Tribal Officials and village officials and their executive and administrative personnel.
2. Establish offices for Tribal Council Representatives to operate from at their respective villages.
3. Institute regular and effective communication between and among all levels of tribal and village government and among the Hopi people.
4. Develop and establish innovative programs/projects that create a positive work environment for employees resulting in high morale, productivity and teamwork.

Goal: To provide the Tribal government with sources of income that can be utilized in the provision of service to the Hopi people.

JUDICIAL

Goal: To establish an effective and efficient Hopi Justice System.

Strategies:

1. Enhance independence of the judicial system.
2. Enhance juvenile services



3. Appoint a full time juvenile/children's court judge
4. Construct a juvenile correctional facility
5. Implement juvenile prevention and diversion programs.
6. Establish adequate number of probation/counseling positions needed to effectively and efficiently handle the caseload.
7. Plan and construct new court facilities properly equipped with state of the art furniture, equipment/machinery and tools.
8. Create and establish a Hopi Bar Association.
9. Establish a "conflict resolution mechanism" that allows the people to settle their differences and civil matters out of court.

LAW ENFORCEMENT

Goal: To establish an effective and efficient Hopi Law Enforcement System.

Strategies:

1. Revise laws, codes and ordinances to address present situations (reflecting cultural values).
2. Define the roles, responsibilities, authorities and jurisdiction of all law enforcement services including Natural Resources and Cultural Preservation Protection Enforcement Services and prioritize plans to upgrade.
3. Promote and facilitate public education and awareness of Hopi laws, codes and ordinances and support for Law Enforcement
4. Support and provide assistance to villages/communities to uphold their regulatory policies.
5. Secure and assume jurisdiction over non-Indians as practical considering the Supreme Court ruling.
6. Provide lobbying support for additional funding for Tribal and BIA Law Enforcement agencies.



ECONOMIC DEVELOPMENT

Goal: To create and establish an autonomous Hopi Economic Development Enterprise Board that would direct and manage commercial planning and development.

Strategies:

1. Define and develop strategies for economic development initiatives on Hopi lands.
2. Develop and update the economic development plan on a regular basis.
3. Identify the most economically, environmentally and culturally suitable commercial development opportunities identifying appropriate businesses other than tourism.
4. Designate and establish suitable commercial and industrial zone (sites) for development purposes.
5. Identify resources, clearances and infrastructure needs for commercial development.
6. Protect and prevent scenic vistas and culturally sensitive areas from encroachment, abuse or unplanned development.
7. Support and assist the villages with commercial development planning.
8. Develop and implement Hopi Incorporation rules and procedures.

Goal: To increase Hopi employment opportunities by supporting small business development and appropriate education and job training programs.

Strategies:

1. Assess workforce skills to determine training needs.
2. Organize the means to educate and support Hopi entrepreneurs in planning, establishing and operating businesses.
3. Establish formal partnerships with institutions of higher learning to assist the Tribe, villages and entrepreneurs to develop small businesses.



Goal: To establish appropriate relationships with financial institutions/agencies on and off the reservation to fully leverage the tribal resources and investments to acquire long term, low interest loans for business development, housing development/ownership and agricultural development

Strategies:

1. Establish an economic development trust fund, a set-aside fund to make loans and use as matching funds for infrastructure.
2. Establish a banking institution on the reservation.
3. Support and invest in the Hopi Credit Association.

Goal: Establish a Hopi Chamber of Commerce

Goal: To seek new opportunities to reduce the rate of unemployment and raise the standard of living while at the same time protecting the culture and life-style of the Hopi people.

TOURISM

Goal: To create a Tourism Office and appropriate Regulatory Policies.

Strategies:

1. Use Hopi Tourism Marketing and Feasibility Study of 2001 to initiate the development of a tourism plan.
2. Establish an appropriate tourism office and related programs/regulatory policies.
3. Establish a partnership between the Hopi tourism office with federal, state and international (funding, planning and facilitating) agencies and state/city chambers of commerce.
4. Control and facilitate (educate) visitors through the development and implementation of tourism policies in cooperation and coordination with the villages/communities
5. Establish communications points where brochures, maps, policies, etc., are easily accessible to the public. (Cultural Center, Kokopelli Inn, Moenkopi Legacy Inn, Winslow Chamber)
6. Establish tourism routes and facilities on the Hopi Reservation.



7. Support and assist individual Hopi entrepreneurs to establish and provide transportation services on the reservation, coordinating services with off reservation travel agencies and transportation providers for visitors.
8. Reassess tourism business fees/visitor fees and develop a standard fee structure among all the villages.
9. Encourage and promote more attractive signs and positive messages on signs on the Hopi Reservation and all the villages.

Goal: Support and assist the local artisans and crafts persons to develop, organize and manage Indian markets/fairs on the reservation.

Goal: Establish ancestral parks/archeological sites.

HOUSING

Goal: To ensure that every Hopi family is provided the opportunity to own or rent a decent, safe and sanitary home according to their needs and income.

Strategies:

1. Reserve the responsibility and authority to development communities, subdivisions and individual home sites to the respective jurisdictions of villages and tribal government. This would include utility service infrastructure.
2. Support and assist the villages to develop new communities and sub-divisions
3. Develop and maintain land use data and maps specifically for home site development purposes and to facilitate the creation of R-O-As and/or easements
4. Seek funding and/of financing sources and programs to assist in providing a variety of housing options.

Goal: To ensure that residential homes are constructed and maintained in the manner that assures safety, durability and adherences to Hopi aesthetic qualities and sensitivity to the environment.

Strategies:

1. Adopt and enforce uniform construction standards and tribal building codes that will ensure quality homes, repairs or modifications.



2. Train and hire local labor force on all construction projects with the idea of creating a local skilled labor force and of attaining high quality workmanship/standards.
3. Support and assist the Hopi Tribal Housing Authority to operate, modernize, develop and maintain Hopi Housing

Goal: To develop and establish a self-help home program that allows families to plan, finance, construct and maintain their own homes.

Goal: To develop rental housing to be available for Hopi families and non-Hopi individuals who reside on the Hopi Reservation to provide services to the Hopi people.

Strategies:

1. Implement a second phase of the Walpi Housing project doubling the units available for rent.

PUBLIC UTILITIES

Goal: To provide public utilities for local resident for purposes of ensuring a safe and healthy environment.

Strategies:

1. Provide support and assistance to the villages to secure funds and to build water and sewer systems that will meet present and future needs.
2. Conduct annual joint meetings with the Villages, Indian Health Service (IHS), Hopi Housing Authority (HHA) and other related entities to evaluate and assess the progress of water and sewer facility construction activities; to develop action plans to address the identified future needs, to set priorities for new projects, and to coordinate activities to secure financing or grants.

Goal: To provide affordable and environmentally safe energy (electricity, solar, gas, wood/coal, etc.) for local residents and businesses for the purpose of economic self-sufficiency.

Goal: To develop and establish an autonomous water/wastewater management cooperative for the Hopi Reservation for purposes of a more effective and efficient management of facility construction and maintenance activities in compliance with environmental laws.

Goal: Review and make basic recommendations on the relationship between housing, employment and transportation looking for ways to improve these issues.



Goal: To upgrade existing telecommunication system to the state-of-the-art standards for present and future needs.

Goal: To initiate feasibility studies to determine if the Hopi Tribe should create and establish its own public utilities entities.

Goal: To develop and adopt an ordinance for the control, use and regulation of all public utilities.

TRANSPORTATION

Goal: To design and develop a safe and efficient roads system for the Hopi Reservation.

Strategies:

1. Conduct annual joint meetings with BIA and ADOT officials to evaluate progress on roads construction and maintenance activities and to set priorities for new projects.
2. Adopt and enforce FHA design standards (including the Arizona Manual of Uniform Traffic Control Devices, for residential street and reservation roads.
3. Conduct an inventory of all non-blacktop roads to determine and decide which roads should be systematically maintained and which roads should be closed.
4. Develop policies for right-of-ways for constructing underground utilities on the roads system and to adopt appropriate regulations for enforcement purposes.

Goal: To adopt and enforce FHA regulations for the monitoring and controlling of commercial traffic and transportation of hazardous materials and chemicals on the reservation roads system.

Goal: To design and develop a public transportation and delivery system for the reservation.

Strategies:

1. In coordination with BIA and ADOT, develop and implement a reservation-wide transit system.
2. Support and assist villages and individuals to establish public transport and delivery services.



Goal: To design and construct a new airport facility that meets present and future needs for public and commercial purposes.

RECREATION

GOAL: To create an Office of Recreation and related regulatory policies.

Strategies:

1. Reassess existing feasibility studies, tribal ordinances, etc., to develop and establish an Office of Recreation and appropriate programs.
2. Support village based comprehensive recreational programs by assisting the villages/communities with securing funds for the development of facilities and implementation of programs and activities.

GOAL: To increase the variety of recreational opportunities on the reservation and improve existing recreational facilities.

Strategies:

1. Support and assist the villages to develop and equip recreation facilities (playgrounds) for youth and small children.
2. Design suitable areas on Hopi lands such as Blue Canyon, etc. for developing public recreational facilities for picnicking, camping and hiking.
3. Improve existing recreational facilities and develop new facilities, and the regular maintenance of roadside rest areas and picnic grounds.
4. Develop water-based recreational facilities and programs that preserve Hopi water resources.
5. Support and enhance cultural, sporting and educational activities.
6. Develop and implement wilderness/nature retreat programs that support health/wellness objectives.



CULTURAL PRESERVATION AND PROTECTION

Goal: To preserve the Hopi way of life and protect sacred places and subsistence gathering areas.

Strategies:

1. Develop an ordinance and applicable policies to protect culturally sensitive areas from new development and land use changes.
2. Consult village and clan leaders before land assignments are granted in culturally sensitive areas.
3. Prepare informational material to instruct and educate tourists on the appropriate and proper behavior/mannerism that demonstrate sensitivity and respect to the Hopi people.
4. Develop necessary plans to establish a Hopi Tribal museum and cultural education facility.
5. Design and Construct a Hopi Tribal Archives for storage and maintenance of historically significant information/material and cultural/religious paraphernalia.

Goal: To promote and develop the Hopi language.

Strategies:

1. Mandate all schools on the Hopi Reservation to include a Hopi language curriculum
2. Seek and propose for funding to develop Hopi language programs for villages to include Hopi language and tapes.
3. Develop, adopt, fund and fully support a total Hopi language and cultural immersion program to be incorporated within the villages, communities, off-reservation Hopi organizations and educational systems on the Hopi Reservation.

Goal: To provide adequate staffing for the Cultural Preservation Office to meet the internal requirements of Section 106 (National Historic Preservation Act) as requested from all entities.



QUALITY HUMAN SERVICES

EDUCATION

Goal: To adopt and implement a Hopi Education Master Plan.

Strategies:

1. Provide necessary funds to the Hopi Board of Education for the completion of the Hopi Education Master Plan. (Provide a clear definition of the philosophy and mission of Hopi education.)
2. Define quality Hopi education and the roles and responsibilities of the various constituencies that make decisions on educational issues.
3. Review and update (amend/modify) Tribal Ordinance 36 to include a Hopi Language Program and other culturally relevant programs.
4. Ensure quality education for all Hopi people through the standardization of curriculum, through the establishment of transitional programs between grade levels, and through the establishment of formal linkages/networks between local and off reservation schools.
5. Assess existing educational facilities and determine the need to upgrade and/or build new facilities that will meet present and future needs including compliance with all applicable codes/regulations.
6. Reaffirm and clarify the role of the Hopi Board of Education and Human Services Committee in dealing with educational issues.
7. Evaluate, assess and reorganize the local elementary school board organizations.
8. Develop and implement plans for contracting for an education system from the BIA Office of Indian Education Programs.

Goal: To enhance the full range of educational opportunities.

Strategies:

1. Consolidate post-secondary educational programs and fund sources under one office to ensure equal access and opportunities for all Hopi people.
2. Support high school, technical/vocational and college internship and mentorship programs.



3. Establish a post high school work-study program.
4. Encourage student participation in career awareness and outreach programs beginning with the preschool level.
5. Increase the number of qualified Hopi teachers and establish continuing education programs for teachers.
6. Establish a network of instructors to teach Hopi language, history and culture.
7. Promote and support parent involvement in education
8. Promote and support a full community college on the reservation.

HEALTH

Goal: To develop a comprehensive health system to ensure that all Hopi people have access to adequate health care services.

Strategies:

1. Ensure that health care providers are licensed/certified within their field, and that they are helpful, courteous, compassionate and responsible.
2. Recognize and fully support the integration of traditional healing for all patients requesting such services.
3. Combine traditional Wellness and Fitness practices into a comprehensive Wellness Program, which provides health care information, and encourage responsibility for people's own health and well-being.
4. Establish Emergency Medical Services substations throughout the Hopi Reservation.
5. Develop a comprehensive plan to provide home-based services for specified targeted population groups. (Elderly, developmentally disabled, etc.)

Goal: Provide a reservation-wide tribal medical/life insurance program, including a "Funeral Services Fund" for enrolled members.

Goal: Conduct a comprehensive assessment to determine the feasibility to construct or renovate current buildings to provide a care and nutrition facility for all ages and special needs groups (e.g. elderly care, child day care, care for persons with disabilities, etc.)



Goal: Incorporate and address environmental concerns and integrate health and epidemiological data into the GIS or establish a centralized data base that will assist those agencies in appropriately assessing and providing intervention, when needed, as it impacts the health of the Hopi people.

Goal: Establish and fund a rehabilitation center located on Hopi with a program that is culturally sensitive and appropriate. This should include an aftercare program which is essential to the maintenance of one's own wellness.

Goal: Establish an Office for Developmentally Disabled Persons on the reservation.

Strategies:

1. Conduct a comprehensive research and study to develop a feasibility plan for the development of an Office of Developmentally Disable Services.
2. Provide funding for the design and construction of the facilities for the Office of Developmentally Disable Services.

SOCIAL SERVICES

Goal: To eliminate alcohol, drug and substance abuse by the Hopi people.

Strategies:

1. Establish and implement a juvenile diversion program.
2. Establish and support early intervention and prevention programs.

Goal: Meet the needs of all reservation youth by providing adequate facilities, services and activities

Strategies:

1. Conduct a comprehensive assessment on the needs of Hopi Youth reservation-wide and develop appropriate facilities and programs around the general consensus and financial affordability
2. Develop a comprehensive year round youth recreation program



Goal: To meet the needs of the elderly.

Strategies:

1. Establish a comprehensive elderly services program.
2. Conduct a comprehensive assessment of the needs of the elderly reservation wide and develop programs and facilities around the general consensus and financial affordability

Goal: To eliminate the physical, emotional and sexual abuse and neglect of children, adults, elderly, disables/special needs individuals.

Strategies:

1. Establish a crisis and treatment/counseling center/shelter with adequate facilities and professional staffing.
2. Provide a meaningful identification and adjudication process that adequately manages all types of abuse cases.
3. Develop a comprehensive prevention and advocacy program.

Goal: Develop a comprehensive assessment and program of services for special population groups (e.g., veterans, disabled, special needs, etc.)

Goal: Fully assess the service needs of providers who experience traumatic events/situations and provide services that would be culturally appropriate to the individual.

CONSERVATION AND EFFECTIVE USE OF NATURAL RESOURCES

LAND USE AND TENURE

Goal: To enhance and develop Hopi lands for the benefit of all Hopi people.

Strategy:

1. Assure that land use development is consistent with established development Plans (including applicable policies and procedures)



HOPI PHYSICAL CHARACTERISTICS

Goal: To regain and protect aboriginal Hopi lands

Strategies:

1. Manage the lands and resources in a manner that ensures and assures proper access and utilization for religious, economic and recreational purposes.
2. Formally recognize the village land holdings and establish management policies that respects the responsibility and authority of the village officials to plan and develop these lands and resources
3. Update all existing records within the Office of Realty Services to determine expired, active and pending realty transactions and to correct deficiencies.
4. Establish and implement the GIS Program to provide reliable data/information to tribal council, department and villages for planning and decision making purposes.

RANGELAND

Goal: To develop and manage rangelands and resources for maximum benefit of all Hopi people, utilizing proper conservation measures.

Strategies:

1. Develop and implement effective management mechanisms (regulations, policies, facilities, manpower, etc.) to ensure quality range and livestock management services.
2. Maximize the use of additional funding sources (i.e. Federal, state, etc.)
3. Prioritize range improvement funds on the basis of greatest economic yield potential.

Goal: To prevent and eradicate animal diseases on Hopi Lands.

Strategy:

1. Develop and implement appropriate prevention programs to eradicate animal borne disease



Goal: To evaluate and enhance the existing Hopi Veterinary Services to ensure quality services.

WOODLANDS

Goal: To ensure the protection and proper management of woodland resources on Hopi lands.

Strategies:

1. Develop and implement culturally and environmentally sensitive woodland management and harvesting plan and adopt regulations to enforce Ordinance #47.
2. Manage woodland for multiple uses, including fuel source, wildlife cover, religious/ceremonial use and aesthetic value.
3. Promote and implement tree planting in locations that are best suited for growth and survival.
4. Re-introduce tree cover around villages and other appropriate areas to enhance the scenic quality of the landscape.
5. Prohibit the use of harmful chemicals to control tree cover.

WILDLIFE

Goal: To ensure the protection and management of wildlife and wildlife habitats on Hopi land.

Strategies:

1. Develop and implement a culturally sensitive wildlife management plan and regulations to enforce Ordinance #48.
2. Establish linkages and coordinate wildlife management services among tribal programs (i.e. range, woodland, roads, water, recreation, etc.) and with other agencies (i.e. Federal, State, Tribes, etc.).
3. Consult and work cooperatively with clan leaders to protect eagle-nesting sites and to establish protective buffer zones.
4. Develop and implement regulations and policies for commercial market and sale of wildlife (permits, etc.)



Goal: To reintroduce selected wildlife species.

Strategy:

1. Introduce selected game species that will bring cultural and economic benefits.

WATER RESOURCES

Goal: To ensure adequate and quality water supply for present and future needs of the Hopi Tribe.

Strategies:

1. Complete the settlement of the Little Colorado River case.
2. Develop and implement a culturally sensitive Hopi Tribal Water Management Plan for both surface water and ground water.
3. Develop and implement a water quality standards and management code, regulations and policies that ensure a balance between protection and use.
4. Establish a GIS database of all Hopi aboriginal water resources
5. Identify contaminated sources of water and either mitigate the contaminated sources or quarantine them from public contact.
6. Upgrade, repair and sample Hopi Village and Tribal water supply delivery systems to conform to Environmental Protection Agency (EPA) compliance standards.
7. Reduce program dependence on outside experts and diminishing federal funding by utilizing a portion of Peabody water royalties for water resource activities.
8. Develop and implement an environmental monitoring plan, including the establishment of a tribal laboratory to serve routine needs of village and Tribal water supply systems
9. Develop and implement permitting/inspection process for water works construction.
10. Provide training and certification of water and wastewater operators.
11. Develop wastewater treatment and reuse.



12. Develop water system plans for villages.

13. Seek self-determination contracts for the maintenance of water systems.

MINERAL RESOURCES

Goal: To ensure the protection and proper management of mineral resources on Hopi lands.

Strategies:

1. Develop and implement a tribal mineral resource development plan.
2. Protect mineral resources used for religious and subsistence purposes.
3. Regulate and permit the commercial mining of construction materials.
4. Develop community development plans and utilize the community impact funds and AML funds for development of community facilities.
5. Develop and establish a Hopi Mining Regulatory Authority equipped with proper facilities and staffing.
6. Implement public facility projects upon Secretary of Interior's final approval of Hopi Abandoned Mine Lands Reclamation plans.

Goal: To initiate a comprehensive surface and sub-surface minerals inventory program.

Strategy:

1. Investigate severance of sub-surface resources on Hopi Partitioned Lands.

AGRICULTURE

Goal: To create an Office of Agriculture and establish agricultural programs.

Strategies:

1. Develop and establish a Hopi Office of Agriculture and appropriate service programs.
2. Develop and implement a comprehensive agricultural development plan.
3. Construct and maintain irrigation systems at suitable sites for economic purposes.



4. Encourage and support traditional Hopi farming practices when and where it is best suited.
5. Mitigate for prevent soil erosion and deterioration.
6. Prioritize development of the most suitable agricultural lands.

PERFORMANCE MEASURES

Economic Development Indicators

An indicator is something that helps you understand where you are, which way you are going and how far you are from where you want to be. A good indicator alerts you to a problem before it gets too bad and helps you recognize what needs to be done to fix the problem. Sustainable indicators show a more integrated view of the world by linking the economy, the environment and the society of the community.

Indicators that should be monitored for the Hopi economy include:

- ☐ Diversity and vitality of the local job base.
- ☐ Variability of skill levels required for jobs.
- ☐ Wages paid in the local economy that are spent in the local economy.
- ☐ Percent of businesses with local control.
- ☐ Percent of local economy based on renewable natural resources.
- ☐ Number of individuals trained for jobs that are available in the local economy.
- ☐ Number of students who go to college and come back to the community.
- ☐ Number of tribal members who attend village meetings.
- ☐ Distribution of affordable housing throughout the community.
- ☐ Yearly percentage increase in number of dwelling units.
- ☐ Acreage being used for farming.
- ☐ Percentage of elderly and youth population participating in program for the elderly and youth.



Partners for Economic Development

The Economic Development Administration of the US Department of Commerce has been an important partner to the Hopi reservation in economic development. Other important Federal Agencies include BIA, HUD and USDA.

At the State level, Arizona Department of Tourism may provide assistance in visitor development efforts. The Arizona Department of Economic Security, Arizona Department of Transportation and Arizona's Government Information Technology Agency (GITA) could also be important.

Closer to home, Arizona educational institutions, especially NAU, NPC, ASU and UofA can make important contributions to improving the reservation economy. The Northern Arizona Council of Governments (NACOG) is also an important resource.

Private sector resources include Arizona Public Service Company's Economic and Community Development Department and the Arizona Association for Economic Development (AAED).

With new lands along the I-40 Corridor in Winslow, Holbrook, and Flagstaff, in Sedona and near Springerville/Eager, the Hopi may wish to participate in local economic development organizations in those areas. The Hopi currently work with one of the Navajo County Supervisors and welcomes interaction with all of the neighboring counties and incorporated towns and cities.



Appendix A



PHYSICAL FEATURES

The main Hopi Reservation is located in eastern Coconino and northern Navajo Counties, Arizona. It encompasses 2,439 square miles or 1,561,054 acres, and is bounded on all sides by the Navajo Indian Reservation. Most of the reservation is open land used for traditional farming and livestock grazing. Hopi shrines, sacred features and ceremonial gathering areas are scattered throughout the main reservation.

The Hopi own a 220-acre parcel of land on the border of Winslow, Arizona, known as the Hopi Industrial Park. It has been put under trust land status. In 1968 a 120,000 square foot building was constructed on a 15 acre parcel for apparel manufacturing (the building is now vacant and in need of repair), 25 acres has been dedicated to the Hopi Housing Authority for HUD sponsored low-income rental units. 160 acres currently remains undeveloped.

In 1997 the Hopi Tribe acquired additional aboriginal lands totaling 429,264 acres of pine, oak, juniper and Piñon forest, working ranches and rangeland as partial settlement in the Navajo-Hopi Land Dispute settlement Act of 1996. These lands were and still are working cattle ranches. Currently the ranches raise for profit Hereford registered and commercial cattle. These new lands are located in Navajo, Coconino and Apache counties. The Hopi Tribe, in coordination with Arizona State Game and Wildlife, will host its first big game hunt during hunting season for 2010. The Hopi Tribe is completing the process to take these lands into trust status. Future development has not yet been determined by the Hopi Tribe although the potential exists for summer and winter recreation activities, Trophy big game hunts, bed and breakfast operations, executive retreats, life skills building for adults/youth, Interstate frontage billboards and a truck stop.

The main Hopi Reservation is located within the Great Basin Desert, on the Colorado Plateau, encompassing and extending beyond the southern edge of Black Mesa. Black Mesa consists of sandstone belonging to the Mesa Verde Group, underlain by Mancos Shale. The southern escarpment breaks off sharply to form the broad, flat Little Colorado River Valley. The southern scarp of Black Mesa forms discontinuous, finger-like projections called Antelope Mesa, First Mesa, Second Mesa, Third Mesa, Howell Mesa and Coalmine Mesa.

Five major washes cross the Hopi Reservation: Moenkopi, Dinnebito, Oraibi, Polacca, and Jeddito. All are tributaries of the Little Colorado River, and flow in a generally northeast to southwesterly direction. While the majority of the washes are



ephemeral, intermittent and perennial reaches exist in some areas, primarily as a result of groundwater discharge.

The climate of the Hopi Reservation is semiarid, with precipitation ranging from 6 to 10 inches per year in the lower elevations, and 10 to 14 inches per year in the higher elevations. The majority of the precipitation occurs July through October. May and June are the driest months. Scattered thunderstorms are common in the summer. Snow accumulates most heavily in January and decreases steadily into May. The average seasonal snowfall is 14 inches. The climate is characterized by mild to hot summers, and cold winters. In summer the average temperature is 70°F, and the average daily maximum temperature is 87°F, as recorded at Keams Canyon. The growing season ranges from 120 days at the higher elevations to 160 days in the lowlands. Elevations within the Hopi Reservation range between 4,500-7,500 feet above mean sea level.

Reservation Vegetation Zones

The Hopi Reservation covers diverse environmental zones. These various environmental zones support plant communities that Hopi have continued to harvest and manage for a number of needs and applications, since prehistoric times. As part of Hopi stewardship, plant resources are key to sustaining the many domestic and religious needs of Hopi society. Prior to widespread grazing native vegetation supported wildlife such as small and big game, resident and migratory birds, insects, reptiles, amphibians, and many others that made up the source of annual gathering harvests for Hopi needs.

Tutskwa: Desert Scrub / Grasslands

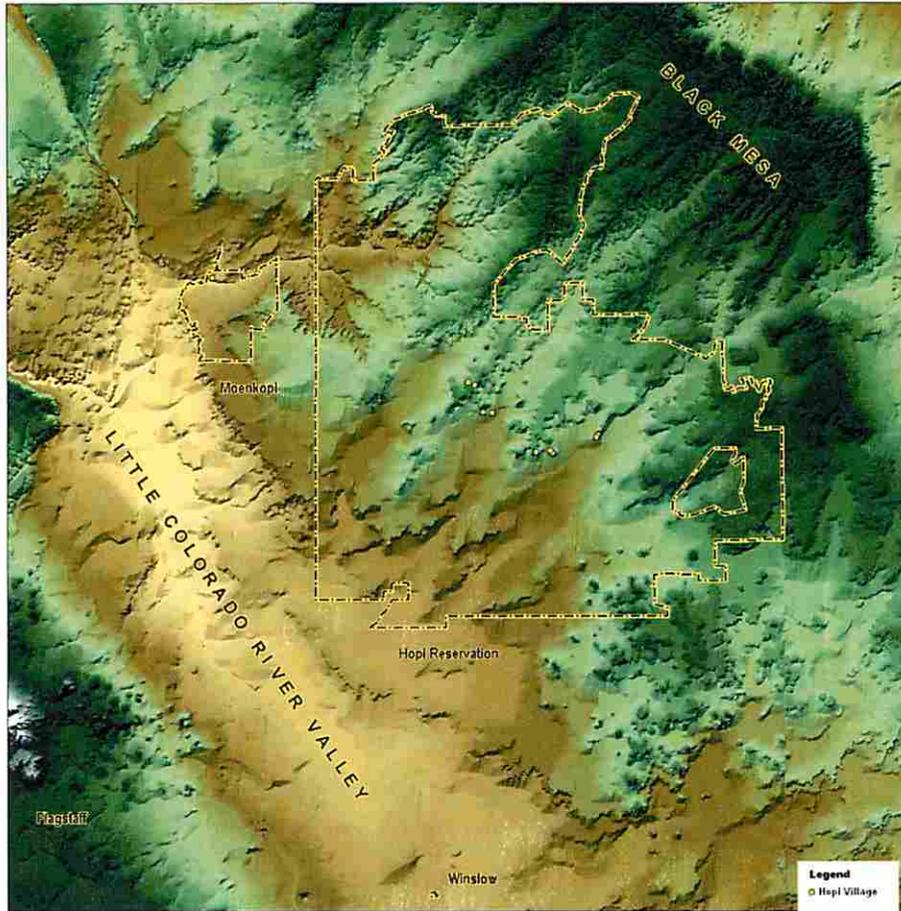
The various grasslands habitats/plant communities on the Hopi Reservation comprise approximately 1.5 million acres, or 96% of the existing trust lands. The Semi-Desert Grassland occurs below 5500 feet in elevation¹⁸ and receives average annual precipitation of five to eight inches. It occupies 264,353 acres, or 17% of the Reservation. Vegetation in this zone is predominantly grasses, of which galleta (*Hilaria jamesii*), Indian ricegrass (*Oryzopsis hymenoides*), and alkali sacaton (*Sporobolus airoides*) are dominant. Characteristic forbs are rosemary mint (*Poliomintha incana*), winterfat (*Eurotia lanata*), and several low saltbushes (*Atriplex*

¹⁸ Elevations are approximate. Areas on south and west exposures are often mapped as drier climatic zones at elevations above the upper range given. On north and east slopes, the reverse often occurs. (BIA, Hopi Range Inventory Report, 1996, p. 3)



spp.). This is a nearly treeless area, with the exception of riparian areas, or where soil moisture is concentrated.

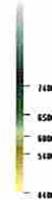
Mixed Grassland occurs between 5500 and 6200 feet in elevation, and receives average annual precipitation of eight to twelve inches. It occupies 993,907 acres, or 64% of the Reservation. This zone is dominated by grasses when in good range condition. The presence of big sagebrush (*Artemisia tridentata*) indicates transition into Sagebrush-Grassland zone. Important forbs are buckwheats (*Eriogonum* spp.), low sagebrush (*Artemisia bigelovii*), and four-winged saltbush (*Atriplex canescens*). Scattered juniper trees are also found in shallow soils.



REGIONAL TOPOGRAPHY



Elevation



Units: Feet

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Sagebrush-Grassland occurs between 6200 and 7000 feet and receives average annual precipitation of twelve to fifteen inches. It occupies 285,738 acres, or 18% of the Reservation. Big sagebrush is the dominant shrub. Blue grama, galleta, and Indian ricegrass are the dominant grasses, but bottlebrush squirreltail (*Sitanion hystrix*), western wheatgrass (*Agropyron smithii*), and needle-and-thread (*Stipa comata*) are much more prevalent than in lower zones. Some areas of steep, shallow soils have canopies of pinyon (*Pinus edulis*) and juniper (*Juniperus monosperma* and *J. osteosperma*) with understories of muttongrass (*Poa fendleriana*), prairie Junegrass (*Koeleria pyramidata*), desert needlegrass (*Stipa speciosa*), and elk sedge (*Carex geyeri*).

PasíqöLö: Wetlands - Riparian Plants and Deciduous trees

The Hopi regard the protection of PasíqöLö as an important step towards fulfilling stewardship responsibilities due to cultural and religious links to water. Hopi ideology focuses on the propitiation and value of moisture in all its forms, including those that sustain wetland environments. Wetlands are not elevation specific ecological zones; neither do they receive more or less precipitation than surrounding environments. However, they are characterized by the presence of water, for some or all of the year, hydric soils, and wetland vegetation¹⁹.

Riparian plants, paatusaqa, in these wetland environments are important because of their link, physically and spiritually, with the life-giving moisture that sustains them. Wetlands are found in different areas throughout the reservation such as in the major washes, seeps, springs, and drainages. A few examples of wetlands found throughout the reservation are Kalbito Springs, Wipho Wash, Keams Canyon, and Pasture Canyon. Each area is unique and historically supported many forms of native plant life. This zone occupies an estimated 8,000 acres, or less than 1% of the Reservation. Dominant vegetation species include cottonwood (*Populus spp.*), willow (*Salix spp.*), tamarisk (*Tamarisk spp.*) and Russian olive woody species, cattails (*Typha angustifolia*), rushes (*Phragmites australis*), reeds (*Equisetum hyemale*), and wetland grasses (*Spartina gracilis*, *Polypogon monspeliensis*, and others).

Habitat loss for most of these important native plant species is imminent. Most wetlands need rehabilitation due to their being overrun with noxious woody weedy species, i.e. tamarisk and Russian olive trees, which push out native plants and use water in an unsustainable manner.

¹⁹ US Army Corps of Engineers Definition.



Hóoqölä – Tuve’qölä: Piñon-Juniper and Great Basin Conifer Woodlands

Most woodland on the Hopi Reservation consists of Piñon-Juniper tree stands. These woodlands provide an optimum resource for many activities and have been utilized by Hopi for a multitude of purposes. Woodlands are commonly a mixture of piñon and juniper, with junipers dominant in the lower part of the Zone, and piñon increasing to become dominant in the Piñon Juniper Woodland Zone. Piñon Juniper Woodland occurs between 6500 and 7500 feet elevation, and receives average annual precipitation of fifteen to seventeen inches. Piñon-juniper canopy is the dominant feature. This zone occupies only 9,543 acres or less than 1% of the Reservation. Big sagebrush is dominant in deep soiled areas, along with bottlebrush squirrel tail, blue grama, galleta and Indian ricegrass. Mutton grass, prairie June grass, and bottlebrush squirrel tail are most prevalent under tree or shrub canopies. Gambel oak (*Quercus gambelii*) is a primary indicator of this Zone, along with Utah serviceberry (*Amelanchier utahensis*).

Yet the current condition of this resource is poor due to over-use for fuel harvesting, unmanaged roads, erosion, and human pollution. A recent study indicated that the Hopi Tribe might only have 10 years of woodland resources remaining, at current rates of consumption²⁰. The major areas of woodland resources are in Range Units 262, 263, and the mesa tops above Keams Canyon.

PAAVAHU: Water Resources

Historically, Hopi people relied on a dense network of springs for their water. However, growing population and modern development have increased the demand for water beyond the capacity of these springs and compelled Hopi to look for alternative sources. The Hopi now rely primarily on subsurface aquifers for both human and livestock uses.

Many growing communities in northeast Arizona use these same aquifers and the surface drainage of the Little Colorado River and its tributaries. Since the area's constrained water supply has to support a growing population, there is negotiation and litigation surrounding water use rights. Additionally, human impacts are compromising the quality of the region's water, both above and below ground. Since aquifers depend on infiltration of surface water for recharge, they are vulnerable to overuse, drought, contamination and harmful human activities. Source water for the Hopi Reservation is in dire straits for a variety of reasons.

²⁰ Bruce Koyiyumtewa report, 1999.



Surface Water Resources

The surface water resources of the Hopi Reservation include the five major washes, Jeddito, Polacca, Oraibi, Dinnebito, and Moenkopi, which traverse the Hopi Reservation from a northeast to southwest direction. The washes are dry most of the year and only flow during high runoff events. Winter storms are of long duration and low intensity and produce little runoff. This is in contrast to the intense summer thunderstorms. Over 80 percent of the annual stream flow occurs from July through October. When stream flow does occur, it contains large amounts of silt. Short reaches of Moenkopi, Dinnebito, Oraibi, Polacca and Jeddito Washes contain flowing streams or pools of water year-round. These flows are sustained by groundwater discharge, due to unconfined aquifer conditions. Over the long-term, total stream flow on the reservation averages about 25,000 acre-feet per year, but shows extreme variability from year to year.²¹

All of the Hopi washes are listed as impaired under the Hopi Tribe's Clean Water Action Plan Unified Watershed Assessment, due to sediment load, chemical contamination, and presence of coliform bacteria. The only known current utilization of surface water on the Hopi Reservation is for cattle watering through diversions to off-stream storage and cattle ponds on tributaries to the washes. Under the settlement proposal in the Little Colorado River Adjudication, the Hopi and Navajo Tribe would share in the waters of these washes equally, according to a formula regulating impoundment storage volumes.

Ground Water Resources

Owing to the limited and highly variable supply of surface water, groundwater is an important resource. Groundwater resources will have to provide for much of the Hopi people's future needs. Groundwater originates as rainfall and surface water that seeps into the ground and is stored in porous rock and soil layers called aquifers. Aquifers under the Hopi Reservation are stacked one on the other and are generally separated by nonporous barriers of clay shale or other rock.

Perched Aquifers

Perched aquifers are sand deposits that lie within a confining soil and rock layer. Livestock, game, and human occupation easily contaminate these aquifers. The Tuba City Landfill contaminates one of the perched zones and another is

²¹ Sonosky, Chambers and Sachse, 1986



contaminated by the Thriftway/Sunwest gasoline station spills at Tuba City and Munqapi. These aquifers may yield water to seeps, springs and windmills. They are limited in extent and poor in quality. In general, this water is of acceptable quality for stock watering but unsuitable for domestic use or irrigation.

Quaternary Alluvial Deposits

Sand and soil are deposited along the washes by fluvial action and wind. These deposits may contain water of variable quality and production. D.B. Stephens and Associates dug four wells into the alluvium in 1993 as part of the ongoing water source inventory conducted by the Hopi Water Resources Program. A well dug into the alluvium along upper Wepo Wash was very good in quality and production. A well dug into the alluvium near Polacca Airport was moderate in quality. Two wells dug into the alluvium along Oraibi Wash were moderate to poor in quality. Two boreholes attempted in the alluvium along upper and lower Dinnebito Wash were dry. A windmill near Polacca is dug into the alluvium and used for water hauling for drinking and livestock water. The quality is unknown.

Wepo Sandstone Aquifer

This uppermost aquifer is a rock unit high on the Hopi mesas near the Peabody Coal Company Black Mesa Mine lease. A few windmills are drilled into this aquifer, mostly on the Navajo Partitioned Lands. It is limited in extent and storage, and little is known about the quality of the water.

Toreva Sandstone Aquifer (T-Aquifer)

This aquifer outcrops along the edges of the Hopi Mesas, and supplies the springs traditionally used for drinking water supply and garden irrigation near the villages. Water supply wells have been drilled into this aquifer at First Mesa and a hand-dug well was drilled into it at Kykotsmovi early in the 20th Century. Water quality ranges from very good (potable) to poor (due to metals and bacterial contamination). Production is fair. At Hotevilla and Bacavi, the water contains radioactive gas (radon) in excess of the proposed maximum contaminant level (MCL). The exact extent of the aquifer is unknown due to poor well logs at Hopi. This aquifer is easily contaminated by human occupation, due to its nearness to the ground surface in inhabited areas.



Dakota Sandstone Aquifer (D-Aquifer)

This aquifer consists of the Dakota Sandstone and Entrada Sandstone water-bearing units. It is extensively used for windmills in cattle watering. Some people may haul water from these windmills. The aquifer water quality ranges from very good to poor. Springs in the Keams Canyon area discharging from this aquifer may contain arsenic and other metals. Saline water from this aquifer may contaminate drinking water wells in the Polacca and Hopi High School areas due to poor well construction and/or natural inter-formational leakage and seepage. The Spider Mound well is thought to penetrate this aquifer and contains fluoride in excess of the MCL. The exact extent of this aquifer is unknown due to poor well logs at Hopi. Production ranges from poor to fair. The Entrada Sandstone is unsaturated in the south Oraibi basin.

Navajo Sandstone Aquifer (N-Aquifer)

This aquifer consists of the Navajo Sandstone, the Kayenta Mudstone and the Windgate Sandstone. It is the primary drinking water aquifer on the Hopi Reservation, being the source for all village wells, except Spider Mound. In many areas, the water is sufficiently pure to use in steam irons (nearly distilled water quality). The production rate is generally good, ranging from 20-600 gallons per minute. Contamination is possible from inter-formational leakage through faults and fractures in the overlying rock. The exact extent of this aquifer is unknown due to poor well logs at Hopi.

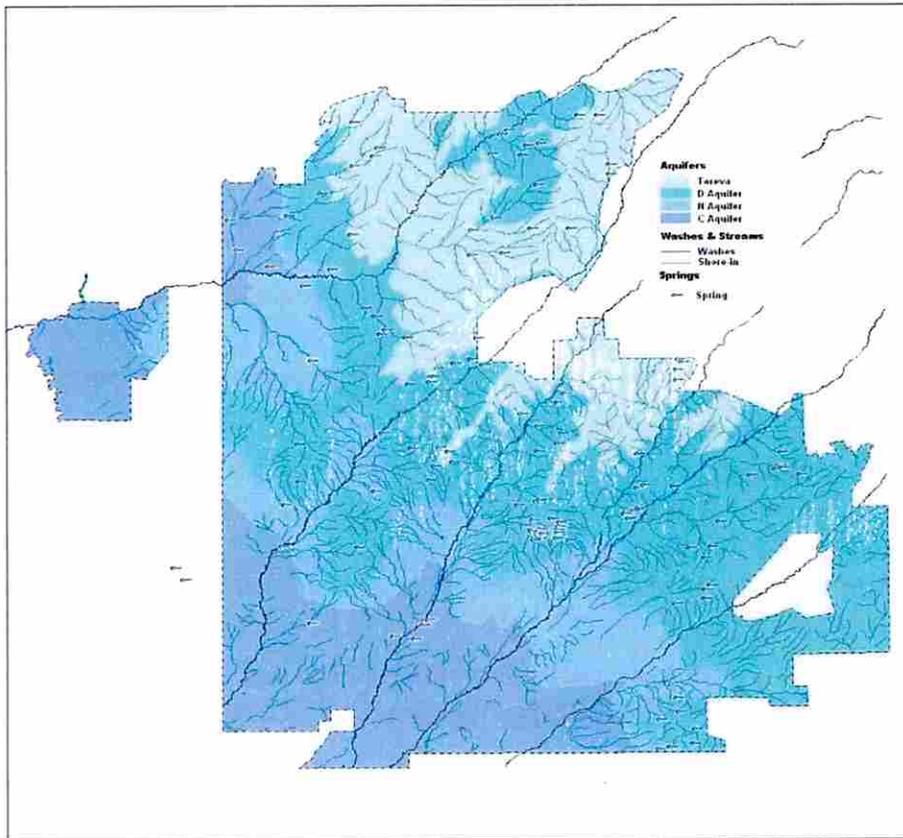
Coconino Sandstone Aquifer (C-Aquifer)

This aquifer consists of the Coconino Sandstone and Supai formations. It is known to underlie the Hopi Reservation. It extends throughout the Little Colorado River Basin and is used for drinking water supply in the nearby cities of Flagstaff, Winslow, Holbrook, St. Johns, and others. The quality ranges from very good (at Peabody) to very poor. The production rate is very good at Winslow and very poor at the Peabody Mine. An oil exploration well in the southern part of the Hopi Reservation (Oraibi Wash Basin) was once used for water supply. This aquifer is under intense investigation by Hopi Water Resources Program Staff and D.B. Stephens and Associates for water supply in the southern portion of the Hopi Reservation and at Munqapi. Exploration wells may be drilled into this aquifer in the next several years at Munqapi. Another study is soon to be published for the southern part of the aquifer by the US Geological Survey.



Muav Limestone and Redwall Limestone Aquifer

This aquifer is used for water supply in the City of Sedona and at the Hualapai and Havasupai Indian Reservations, but is nearly 4,000 feet deep at Hopi. It is not considered a viable or affordable source of water for Hopi.



HYDROLOGY



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TUTSKWA NIQW TOKO'AT: LAND AND MINERAL RESOURCES

Hopi cultural values and traditions have always focused on the need to respect and care for the land granted to us by Maasaw with the condition that it not be negatively impacted. Prehistoric uses of the land usually came from stone, clays, sands, coal, other minerals and materials used for construction, cultural uses, and fuel. Gathering sites are governed by traditional arrangements; some sites are public, while others 'belong' to individuals who developed them

The passage of the Hopi Tribal Council Resolution H-83-79 on July 9, 1979 requires further study of Hopi energy resources before any development can take place, and places a moratorium on all additional energy resource exploration and development on all tribal lands. This moratorium is to remain in place until "a formal energy resource development policy has been adopted by the Tribal Council." The Policy would serve as a tool to properly assess, develop and manage energy resources while protecting the cultural, religious and hydrologic resources of the Tribe, so that a balance between Hopi traditional values and economic viability can be achieved.

The 1991 *Mineral and Energy Resources on Hopi Lands* report by the Hopi Office of Mining and Mineral Resources summarizes available data on Hopi mineral and energy resources, discussing some economic, environmental, and political concerns relative to those resources and identifies policy issues pertinent to each resource as follows from the *Executive Summary*.

Owako – Coal:

The full extent of coal resources on Black Mesa is unknown. Coal production is a major economic resource of the Hopi Tribe. A long-range marketability study should be commissioned to determine the feasibility/unfeasibility for future development.

Oil and Gas

Incomplete information is available on the six oil wells drilled on District Six during the 1960's. If the U.S. government declares a national energy emergency the Hopi Tribe could consider allowing oil and gas exploration on the Hopi Partitioned Lands and other Tribal lands owned outside the exterior boundaries of District Six. Because of the cultural significance District Six holds for the Hopi people, it would not be practical to explore or mine in that part of Hopi land.



Coal-Bed Methane

Coal-bed methane contained in the Toreva and Dakota formations may provide a valuable energy resource for the Hopi Tribe. Coal-bed methane production requires the de-watering of the coal-bearing formations; poor quality water produced by the Toreva or Dakota aquifers as a by-product of pumping methane may be reinjected back into the aquifer, or may provide a feasible alternative to N-aquifer water now used by Peabody. Coal-bed methane should be assessed to determine the feasibility of extracting it from the coal prior to mining the coal resource itself. There is potential for deriving more economic value for the product by using or marketing both types of resource. The Hopi Tribe should also look seriously at the opportunities to develop coal-bed methane for use as a fuel by the Hopi people.

Uranium

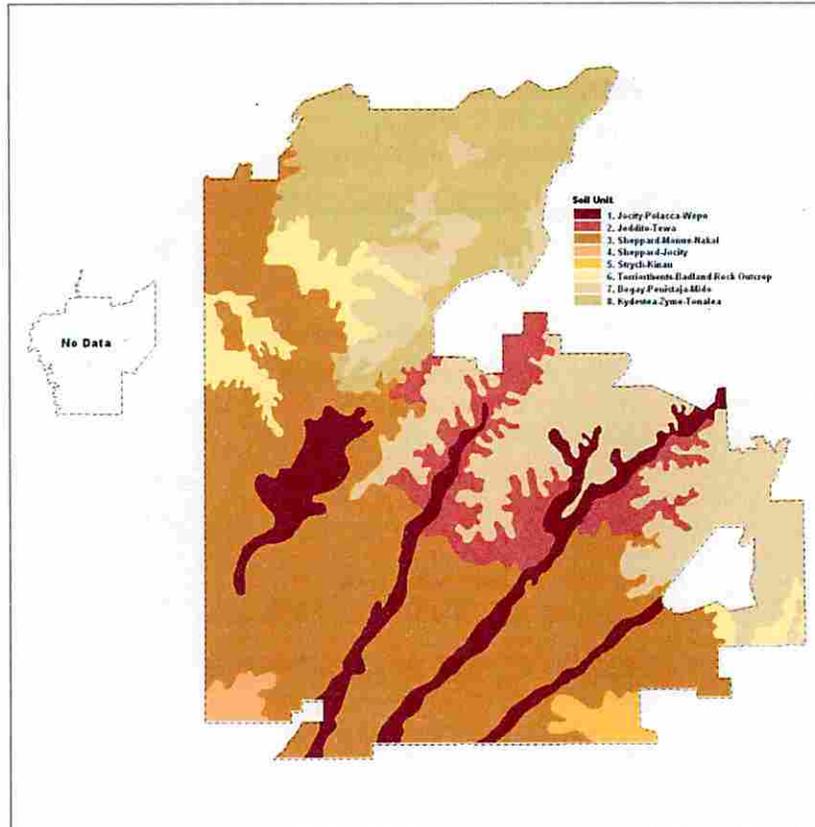
Economic uranium deposits probably underlie Hopi land. However, the Hopi Tribe would view uranium development with extreme skepticism in view of the well-known health problems and environmental damage resulting from uranium mining.

Carbon Dioxide and Helium

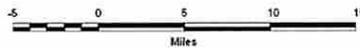
Both carbon dioxide and helium may underlie Hopi land. If either of these two gases is discovered in economic quantities, a significant capital investment will be required to build pumping stations, compressor plants, and pipeline facilities to transport the gases.

Tuuwa, Owa, Tusyavu, Tsöqa - Industrial Minerals

Deposits of sand, gravel, clay, building stone, and scoria are sufficient to supply Hopi demands for many generations to come. Proximity to roads and future planned developments is the most important consideration in using these resources. Needs for construction materials should be assessed to insure the efficient development of the Hopi infrastructure.



GENERAL SOILS



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Major Economic Sectors

Traditional dry farming and bartering was once the mainstay of the Hopi economy. An economic transition from traditional subsistence lifestyle to participation in the American cash economy has begun. This change has created numerous areas of conflict for the Hopi government, Hopi Villages and the Hopi people.

The Hopi economy consists of a modern, formal sector and a traditional, subsistence sector. The modern sector includes conventional jobs performed for wages. Most of these jobs are service sector jobs at large, institutional places of work. Self-employment and small business activity are a vital element of the total economic profile on the Hopi Reservation, but this part of the economic base is vulnerable and still very small as compared to other off-reservation rural communities of the same size population. The reservation economy remains underdeveloped and un-diversified. Communities that border the reservation benefit from a tremendous drain of revenue as the Hopi people are forced to shop for goods and services that are not available on the Reservation

The traditional sector includes the use of crafts, materials, corn and other foodstuffs to exchange for other articles or commodities and to give away in social and religious activity. Individuals on the Hopi Reservation devote substantial effort to production within the informal sector of the economy. The primary elements of the traditional economy are crafts production, farming and ranching.

Tribal members most often use a variety of economic strategies to survive. Many combine full-time or part-time work with livestock grazing, making and selling of traditional arts and crafts, selling surplus crops, and gathering various materials for their own use or for sale. Much of this mixed cash/subsistence/traditional economy is based on land and resource use. The two sectors of the economy are linked. Cash that originates as wages may be used to purchase goods that originate in the subsistence sector. The subsistence sector provides economic alternatives for people who are unemployed, under-employed or work seasonally.

Agriculture

Many Hopi residents are involved in farming and ranching but commercial economic activity is limited in the agriculture sector. Farming centered on raising corn remains a largely traditional activity. Only a fraction of the individuals grazing cattle pursue ranching as a profit-driven business. The purchase of Cibola Farms in



La Paz County provides an opportunity to produce both alfalfa and cotton in commercial quantities.

The total number of farming and ranching jobs on the Hopi Reservation is estimated to be about 75, consisting of five farms and 70 ranchers. All these individuals are considered to be self-employed. Proprietors' income associated with these economically motivated agricultural operators is estimated to total about \$300,000. Considerable effort is devoted to farming and ranching for traditional, social and vocational purposes.

Farming:

The majority of Hopi families' farm, but only a tiny fraction of all farmers on the Hopi Reservation raise crops to earn income. Examples of income-producing crops are fruits grown for sale mainly to locals and shelled corn. Some Hopi farmers sell or trade corn with each other and with outsiders. Some people travel to Hopi specifically to buy shelled Hopi corn.²²

Approximately 9,000 acres of the Reservation are cultivated. Farmland is typically restricted to small, 1 to 5 acre plots located on alluvial fans and floodplains. Crop production was traditionally the mainstay of the Hopi people and is still an important cultural activity on the reservation. Most Hopi farmers do not use fertilizers or pesticides.

The quantity and imputed dollar value of the traditional corn harvest on the Hopi reservation is substantial, but has not been estimated. However, an estimate of the considerable quantity of food prepared to give away on traditional occasions gives an indication of the level of effort devoted to raising food for traditional consumption and giveaways. Food costs to an individual household for a given occasion vary in value from a minimum of \$100 for ceremonies to as much as \$2,000 to feed guests at a wedding pay-back. Households also give away food at most dances, with the estimated value varying from a few hundred dollars for a night dance to as much as \$4,000 for a plaza dance. These estimates do not include potential or estimates of labor cost to prepare for these activities.

²² Kathleen Manolescu, Hopi Corn Production. A Report on Research conducted for the Bureau of Indian Affairs, Phoenix Office



Livestock Production:

Although livestock production is not a traditional Hopi activity²³, it has become an integral part of modern Hopi life. The introduction of livestock into Hopi land stems from the Spanish colonization of the Southwest beginning in the mid-1600s. Hopi herdsman have raised a variety of livestock over the course of the last 400 years, including sheep, goats, horses, cattle, and swine. It is also the most extensive land use activity on the Hopi Reservation.

The Hopi Reservation is divided into 36 range units and 15 District 6 units that are intended to provide for better distribution of livestock than was possible prior to the 1960's. Until the 1960's, sheep were the predominant livestock. In the late 1960's, after catastrophic blizzards decimated the sheep herds, sheep were replaced with cattle as the predominant livestock.

The impact of livestock production on arable lands on the Hopi reservation has been significant. Approximately 1.4 million acres of Hopi reservation land has been put into use as grazing lands for the production of beef, mainly through cow-calf operations.

The majority of Hopi ranchers do not generate sufficient income from their animals to support themselves. Most individuals are employed full-time in other income generating activities. Most Hopi ranchers raise livestock in a traditional way for occasional cash, personal consumption or social exchanges and obligations. For example a Hopi individual may start and raise a small herd of cattle over a two- or three-year period for the express purpose of sponsoring a ceremony or feeding a wedding party.

There are approximately 346 permittee's on the Hopi Range, including 50 Navajo. The Hopi range supports a cattle herd recently numbered at 4,800 head, plus sheep and horses. Although most cattle raised on Hopi are sold for cash, estimates vary from 10 or 15 to more than 70, as to how many operators treat ranching as a vocation. At an assumed average individual herd size of 20, annual income per operation is estimated at a little less than \$4,000, for a total income from ranching of about \$280,000. The estimated income value of all cattle either consumed, given away or sold for occasional cash is about \$640,000 over and above the approximately \$280,000 in annual income earned by economically

²³ There is a widely expressed view that Hopi people were not supposed to go into the ranching business because cattle will destroy the land and contaminate the springs



motivated ranchers. Even for vocational ranchers on Hopi, ranching is just one of two or more sources of income.

Ranchers do not bear the true cost of ranching. The tribal government provides and maintains fencing, watering facilities (windmills, drinkers and stock tanks), and rehabilitates range units, at a cost of approximately \$800,000/year. The revenue from grazing permits does not cover these expenses. Ranchers have little to no investment in the infrastructure and hence have little desire to maintain or upgrade facilities. Additionally, Hopi ranchers do not bear any expense for land maintenance, as they would if ranching off-Reservation. Animal owners do bear the cost of veterinary services.

One of the main factors limiting and affecting livestock production on the Hopi Reservation is the lack of reliable water sources. Ranching has created a need to provide more access points to water sources for livestock. These water sources are usually springs, riparian areas, windmills and earth dams that have been either developed or installed specifically for livestock use. Many range units have too few wells, and rely on surface water impoundments. Areas surrounding watering points are overgrazed while areas further from water sources are over-rested. Other watering facilities are non-operational – windmills are broken, stock tanks are silted in and many water sources are infested with tamarisk (salt cedar).

The livestock industry, like other activities that utilize Hopi resources, should be managed according to Hopi land stewardship values to promote sustainable use of the range. One suggestion, intended to provide benefits to both farmers and ranchers, is to allow grazing use in the farming areas during the fallow period of late fall and winter. This idea could provide an opportunity for cooperation between the two groups, both because of the potential benefits for both groups, but also to avoid the potential disasters from this practice.

Gathering:

Hopi people gather plants and wildlife to meet subsistence and cultural needs. While most of the Hopi rangelands are used for grazing livestock, the moderate subsistence and growing ceremonial need for plants and animals also impact the Hopi environment. At a meeting for Hopi-Tewa women on subsistence gathering they indicated that over 30 percent of their fresh food is collected from Hopi land, rather than purchased from local markets. A significant number of people likewise reap economic benefits from utilizing plants and minerals in the production of arts and crafts such as Katsina dolls, baskets, and pottery.



The recent development of a commercial market for herbal healing and organic foods encourages unsustainable and excessive gathering practices of plants, mostly by non-Hopi people on Hopi land. Since these individuals have little stake in the plants growing back the next year, they may take the entire plant rather than specific parts; they may not leave enough to ensure that the plant grows back the following year. These individuals are operating an unlicensed, and therefore uncontrolled, business on the Hopi Reservation.

Construction

The construction sector on Hopi is dominated by publicly funded public works projects (roads, sanitation, health and other public facilities). A small amount of employment in construction trades rounds out the mix. In all, the construction sector on Hopi generates about 90 construction jobs and about \$2.1 million in pay on an ongoing, annual basis. Increasingly, construction projects funded by allocations to the villages have generated construction employment as well. Self-employed and small business entrepreneurs in the construction trades create a small but significant number of jobs in the construction sector of the Hopi Reservation economy. They operate in a variety of specialties: concrete, home improvement and repair, plumbing and heating, masonry and specialty solar installations.

A minerals inventory prepared in the 1950's identified sources of sand, gravel, clay, crusher rock, and building stone that could be developed. Agencies such as the Arizona Department of Transportation and the Bureau of Indian Affairs continue to import road materials from outside the reservation. Developing those local sources could provide jobs for tribal members as well as a source of community economic development projects.

Hopi Artisans and the Crafts Industry -- Manufacturing

Artisans producing the traditional Hopi crafts remain the core of the manufacturing sector on the Hopi Reservation. Crafts production involves numerous individuals, many of whom pursue their vocation seriously but on a part-time basis and with limited access to markets, thereby reducing the "per job" pay yield of crafts work. Work in crafts production is sometimes combined with ranching, construction or other jobs. Other small manufacturing ventures, some rooted in Hopi tradition, round out the Reservation's manufacturing sector.

Including 1,000-plus artisans – a conservative assumption about the number of individuals pursuing crafts production as a vocational commitment – the



manufacturing sector generates approximately 1,075 jobs and generates an estimated \$5.7 million in pay.

Crafts are produced by several thousand Hopi individuals for both occasional income and to participate in social and ceremonial exchanges. All crafts production on the Hopi Reservation – including crafts produced for income, crafts for occasional sale and crafts used in social and ceremonial exchanges – is estimated to have a total sales value of \$11.2 million, including crafts valued at \$7.6 million sold and crafts valued at \$3.6 million given away in social and ceremonial exchanges.

Crafts production for occasional sale is extremely common and is estimated at having a sales value of approximately \$1.9 million, spread over perhaps several thousand Hopi individuals. A volume of craft items is also produced to be given away for ceremonial purposes throughout the year. An estimated 2,200 baskets are given away each year at basket dances held at villages across the mesas and an average of 100 baskets, woven plaques or pots may be given away at wedding pay-backs held as part of the 30 or so Hopi weddings occurring each year. Even greater volumes of craft items are produced to give away during the major plaza dances of the annual ceremonial cycle. Plaques, dolls, moccasins, rattle, bows and other items are given to children at Bean Dance and Home Dance. These are quite significant in number and value.

In addition to the production of material by Artisans noted above, other ongoing manufacturing activities produce garments, trophies and corn meal.

Trade

Fifteen of 35 trade establishments on Hopi are galleries, comprising the other significant component of the crafts industry on the Reservation. Crafts galleries on the Reservation sell to both retail and a growing number of wholesale customers. There are also four restaurants, four fast food vendors and six small stores carrying various mixes of groceries, dry goods, hardware and prepared foods. These galleries, food service and general stores comprise the bulk of the Reservation's trade sector, which, as a whole generates about 145 jobs and \$1.8 million in pay.



Retail Trade Leakage:

With a reservation population of about 7,000 and estimated total reservation personal income of as much as \$40 million; there is considerable trade and services leakage off the reservation. Since rent or house mortgage payments are generally not required due to ownership patterns, the disposable personal income portion of this amount is larger than in off-reservation communities. A key step in improving economic conditions is to retain more of that income on the reservation through the provision of more competitive goods and services. While the entrepreneurial spirit seems to be alive and well among the Hopi people, the absence of a commercial development sector providing needed sites and buildings for lease or sale is a notable barrier to halting this trade leakage.

Recreation and Tourism:

The economic impact of the non-Hopi visitor to the Hopi Reservation is significant, estimated at somewhere between \$3.2—\$6 million/year. There is a significant impact upon cultural resources as well since there is a high motivation of the tourist to "experience" the Hopi Reservation.

An economic motivation exists on the part of many members of the Hopi community to promote tourism and tourism development on the reservation. The traditional Hopi crafts remain the core of the manufacturing sector on the Hopi Reservation. This produces approximately 1,075 jobs and generates about \$5.7 million in pay. Nearly half of all trade establishments are galleries and crafts shops.²⁴

Overall the environment of the Hopi country does create a sense of a pristine and healthy environment. Woodlands provide scenic landscapes that add to positive visitor experiences. The potential exists for the development of commercial recreation activities such as hunting, bird watching, hiking and camping. The Keams Canyon reservoir on the Hopi Reservation is the only place in northern Arizona still being stocked for recreational fishing by the US Fish & Wildlife Service. No native fish have been identified on the Hopi Reservation. The Hopi dry-farming tradition is a unique form of agriculture that leads to the visitor's desire to interact or purchase goods produced from this activity. There is potential for an organic food market to benefit sales of Hopi-raised produce, both on and off the Hopi reservation.

²⁴ Center for Applied Research. (1999). *An Economic Profile of the Hopi Reservation*. Prepared for the Hopi Tribe Office of Research and Planning.



Some tour guides exploit the environment by taking their tour groups to unpermitted sites, making their own roads to get there, and causing erosion in the process. There is also the potential, however, that with increased visitation to major tourist sites, in a controlled manner, there may be a reduction in vandalism at these sites.

If the level of tourism is to increase on the Hopi Reservation, infrastructure to support those visitors must first be developed. Necessary facilities include public toilets, motels, Laundromats, wastewater dumping, showers, etc. that will provide for individuals and groups who come to the Hopi Reservation.

Currently water conservation techniques are not applied in tourist-oriented businesses such as local restaurants, shops, and motels. An increase in tourism-supporting developments may exceed the water use of many Hopi homes that do not have indoor plumbing and septic systems. Most Hopi understand the need to use water conservatively; visitors are not educated about this need. This presents a conflict. Guidelines for tourism businesses to be water conservative may need to be created.

Transportation, Communications and Public Utilities

The TCU sector generates approximately 105 jobs and about \$2.2 million in pay. Village water and wastewater services provide the dominant part of this category. Some jobs that might otherwise fall in this category are also provided by tribal government (solid waste, transit) but are classified in the services section.

There is no tribal policy or regulation of road construction or maintenance activities. BIA maintenance regulations specify that roads be maintained, "as constructed." Many roads are graded flat, some roads are angled into slopes, and other roads need ditches and culverts. Consequently, water pools or washes out these types of roads, resulting in high maintenance. The BIA prioritizes school bus routes for grading and only main non-system roads receive maintenance from the Hopi Tribe. Poorly maintained roads cause damage to the vehicles they use, and represent a significant cost to Hopi. The lack of alternative means of transport on the Reservation makes roads an essential component of socio-economic and cultural life. Therefore, roads need to be managed in a manner that supports Hopi people's sustainable use of their natural resources and protects these resources from adverse impact.

There is a lack of communication regarding transportation issues between tribal programs, and between tribal and village governments. In some cases



affecting villages, Tribal Council-adopted road maintenance priorities are changed without village representatives' knowledge or approval.

The development of local resources to help in road maintenance and construction efforts is viable. Use of sands and gravel for road construction and maintenance quarried locally could provide sufficient volume to help support a mining operation that could also provide materials for the construction industry locally. Individuals may also hire Abandoned Mine Land program grading equipment to grade roads although few people are aware of this opportunity. The public is generally unaware of which agency or organization is responsible for maintaining particular roads on the reservation.

The Hopi Senom Transit System Program is subsidized by the Arizona Department of Transportation to provide daily transportation for tribal employees across the reservation, including Flagstaff, to the tribal complex in Kyołsmovi. Services are provided on a fee basis.

Finance, Insurance and Real Estate

There is limited activity in the FIRE sector, which generates about 25 jobs, and about \$300,000 in pay. Significant employers in this sector are the non-profits; the Hopi Foundation and the Hopi Credit Association.

Services

The Services sector generates 990 jobs and about \$26.1 million in pay, the largest payroll on the Reservation when taken as a whole. Eleven schools are the largest generator of services jobs. Grant schools and the BIA cover elementary and secondary education on Hopi. A variety of post-secondary institutions have programs on the Reservation. Because of its role providing direct services to the Reservation, the bulk of Hopi tribal government employment has been classified in the services sector. The IHS Health Clinic is the third substantial services job provider on the Hopi Reservation. Private-sector jobs are generated at establishments providing automotive repair, personal and business services.



Government

Public administration generates approximately 195 jobs and an aggregate payroll of about \$6.3 million on the Hopi Reservation. Seven out of eight of the public administration jobs are with the Hopi Tribe or the BIA. The IHS and Arizona state agencies with offices on the reservation generate the remainder of public administration jobs on Hopi. Public administration jobs are those in the legislative, executive and judicial branches of tribal government, the top administrative levels at BIA. At the IHS, only jobs in environmental health are classified as public administration.

Appendix 6