

**TECHNICAL ASSESSMENT
OF THE
SAN JUAN RIVER BASIN IN NEW MEXICO
NAVAJO NATION WATER RIGHTS SETTLEMENT AGREEMENT**

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I. INTRODUCTION

A. Background on Navajo Nation Water Rights Settlement

The “Northwestern New Mexico Rural Water Projects Act” (Public Law 111-11, Title X, Subtitle B) was passed by the Congress and signed into law by the President of the United States in March 2009 (Settlement Act). The Settlement Act approved a proposed settlement of the water rights claims of the Navajo Nation in the San Juan River Basin in New Mexico and authorized construction of the Navajo-Gallup Water Supply Project (NGWSP). The State of New Mexico, the Navajo Nation and the United States in December 2010 signed the “San Juan River Basin in New Mexico Navajo Nation Water Rights Settlement Agreement” (Settlement Agreement) that conforms to the provisions of the Settlement Act. Also in December 2010, the United States and the Navajo Nation executed a contract for the Secretary of the Interior (Secretary) to deliver water from the Navajo Reservoir water supply for the Nation’s uses under the Navajo Indian Irrigation Project (NIIP) and the NGWSP and from the Animas-La Plata Project (ALP) for the Nation’s uses under that project (Settlement Contract). The proposed “Partial Final Judgment and Decree of the Water Rights of the Navajo Nation” that is Appendix 1 to the Settlement Agreement (Proposed Decree) was submitted to the Court in the San Juan River Adjudication suit, *State of New Mexico, ex rel. State Engineer, v. United States of America, et al.*, No. 75-184, New Mexico District Court, Eleventh Judicial District, County of San Juan (Adjudication) in January 2011. The settlement parties pursuant to the Settlement Agreement subsequently negotiated a quantification of the proposed “Supplemental Partial Final Judgment and Decree of the Water Rights of the Navajo Nation” (Proposed Supplemental Decree) which was submitted to the Court in the Adjudication on April 2, 2012. The Proposed Decree and Proposed Supplemental Decree (collectively, Proposed Decrees) describe the water rights of the Navajo Nation to divert and use water in the San Juan River Basin in New Mexico to be approved by the Court.

B. Purpose of This Report

This report provides the technical information that supports the factual bases for settlement described in the “State of New Mexico’s Revised Statement of Legal and Factual Bases for Settlement,” dated September 7, 2012 (NM Statement). Specifically, this report provides a comparison of proposed water rights to historic water uses, current rights and water right claims asserted by the United States for Navajo Nation water uses from the San Juan and Animas rivers and from ground water included in the Proposed Decree. For a description of proposed water rights, historic uses and water right claims for Navajo Nation irrigation and livestock water uses in the drainages of ephemeral tributaries to the San Juan River that are included in the Proposed Supplemental Decree, see “Quantification Analysis for the Proposed Supplemental Partial Final Judgment and Decree of the Water Rights of the Navajo Nation,” prepared by John Whipple and dated April 2, 2012. This report also provides descriptions and explanations of several protections to other water users that are provided as a result of the Settlement Agreement.

C. Summary of Water Rights in the Proposed Decree

The water rights in the Proposed Decree are intended to settle the federal reserved water right claims of the Navajo Nation and of the United States on behalf of the Navajo Nation, in the San Juan River Basin in New Mexico. The Settlement Agreement is based on currently existing or authorized federal

water projects, existing US Bureau of Indian Affairs' (BIA) land use permits under the Hogback-Cudei and Fruitland-Cambridge projects, and historic and projected municipal and domestic water needs for the Navajo Nation. Under the Proposed Decree, the Navajo Nation would be adjudicated reserved water rights from the San Juan River, the Animas River or groundwater for a total diversion of 606,660 acre-feet per year and a total depletion of 325,670 acre-feet per year. These reserved rights would be adjudicated a priority date of June 1, 1868; however, for purposes of priority administration and federal water project operations in accordance with authorizing legislation for the NIIP, the NGWSP and the ALP, the Proposed Decree also provides that the uses served by the NIIP and the NGWSP will be administered with the state law priority date of 1955 for Navajo Reservoir water supply uses under Office of the State Engineer (OSE) File No. 2849 and that the uses served by the ALP will be administered with the state law priority date of 1956 for ALP water supply uses under OSE File No. 2883.

The annual diversion and depletion amounts and farm delivery requirements (FDRs) for irrigation uses on the Hogback-Cudei and Fruitland-Cambridge projects that are included in the Proposed Decree are based on consumptive irrigation requirements (CIRs) determined consistent with the Lowry-Johnson method and the average irrigation and canal delivery efficiencies used by the 1938 State Engineer Hydrographic Survey of the San Juan River (1938 Hydrographic Survey) (see "Responses to Public Comments Received on Drafts of the San Juan River Basin in New Mexico Navajo Nation Water Rights Settlement," prepared by John Whipple and dated December 10, 2004 (Responses to Public Comments), pages 42-46). This is the methodology used by the Court for the "Judgment in *The Echo Ditch Company, et al., v. The McDermott Ditch Company, et al.*," New Mexico District Court, San Juan County, Cause No. 01690, entered in 1948 (Echo Ditch Decree), to adjudicate rights under non-Indian ditches to divert and use the waters of the San Juan River stream system in New Mexico for irrigation. The depletion rights for the Hogback and Fruitland projects for purposes of settlement include also incidental canal evaporation losses and non-crop evapotranspiration losses.

D. Methodology for Estimating Historic Uses

The amounts of historically irrigated acres for the Hogback-Cudei and Fruitland-Cambridge projects in the NM Statement are based on a review of: (1) BIA crop reports for the projects for the period 1936-1959; (2) BIA "Irrigation Land Data" reports for the period 1963-1968; and (3) irrigated crop surveys conducted by the Interstate Stream Commission (ISC) in 1994, 2000 and annually beginning 2003. Historic diversions for irrigation on these projects were estimated based on assumed maximum diversion rates being maintained throughout a 214-day irrigation season from April 1 through October 31 similar to the historic operating practices for non-Indian ditches diverting from the San Juan River. Historic depletions for the Hogback-Cudei and Fruitland-Cambridge projects were calculated based on CIRs computed using the modified Blaney-Criddle method plus incidental irrigation depletions. Except for the NIIP, the US Bureau of Reclamation (USBR) generally uses the modified Blaney-Criddle method to determine annual irrigation depletions throughout the Upper Colorado River Basin for the purpose of making reports to the Congress as to the annual consumptive uses and losses of water from the Colorado River system by state as directed by section 601(b) of the "Colorado River Basin Project Act" (Public Law 90-537). Historic use for the NIIP was estimated based on irrigated acreage data, project diversion data and estimated return flows reported in "Navajo Indian Irrigation Project Irrigation and Drainage 2009-2010 Analysis," prepared by the BIA and Keller-Bliesner Engineering, LLC, and dated November 9, 2011 (NIIP Irrigation and Drainage Analysis)). The depletions for the NIIP were calculated based on diversions minus return flows. Historic Navajo

Nation non-irrigation water uses were estimated based on water use records available from the BIA, the Navajo Tribal Utility Authority (NTUA) or other sources.

E. Methodology for Estimating Uses under Existing or Authorized Projects

The amounts of water use that are identified in the NM Statement as the Navajo Nation's current rights are based on water projects currently existing or authorized by federal law prior to the Settlement Act, and existing BIA land use permits for acreage under the Hogback-Cudei and Fruitland-Cambridge projects. The amounts of irrigable acres existing under ditch within the Hogback-Cudei and Fruitland-Cambridge projects for which the BIA has issued land use permits for farming were identified by the "Navajo Indian Reservation, Hogback & Fruitland Irrigation Projects Crop Utilization Survey," prepared by the BIA and dated October 1993 (1993 BIA Crop Utilization Survey). Diversions for irrigation on these projects were estimated based on assumed maximum diversion rates being maintained throughout the irrigation season, and depletions for these projects were calculated based on CIRs computed using the modified Blaney-Criddle method plus incidental irrigation depletions. The amount of acres currently authorized to be irrigated under the NIIP, and the currently authorized average annual diversion for the NIIP, were based on the project authorizations provided by the Act of June 13, 1962 (76 Stat. 96, Public Law 87-483) which authorized the NIIP and the San Juan-Chama Project (SJCP). The depletion amount for the NIIP was based on the "Navajo Indian Irrigation Project Biological Assessment," prepared by Keller-Bliesner Engineering and Ecosystems Research Institute, Inc., for the BIA and dated June, 11 1999 (NIIP Biological Assessment). The Navajo Nation's depletion allocation from the ALP was authorized by the "Colorado Ute Settlement Act Amendments of 2000" (114 Stat. 2763A-258; Public Law 106-554, Appendix D, Title III), and the diversion allocation was based on the "Animas-La Plata Project, Colorado-New Mexico, Final Supplemental Environmental Impact Statement," prepared by the USBR and dated July 2000 (ALP FSEIS). The amounts of other non-irrigation water uses included in the NM Statement under the Navajo Nation's current rights were based on NTUA records of diversions to the Shiprock Water Treatment Plant and permits or licenses approved by the State Engineer for uses on Navajo lands.

F. Sources of Information for Water Right Claims

The data used to estimate the amounts of the water right claims asserted by the United States for the Navajo Nation are described in "The United States' Statement of Claims of Water Rights in the New Mexico San Juan River Basin on Behalf of the Navajo Nation," filed with the Court in the Adjudication on January 3, 2011, as amended by the "Errata Notice – Concerning the United States' Statement of Claims of Water Rights in the New Mexico San Juan River Basin on Behalf of the Navajo Nation," filed with the Court on April 13, 2012 (US Claims), and in the supporting technical expert reports that were filed by the United States with the Court on January 30, 2012 (US Technical Reports). The irrigation water right claims asserted by the US Claims were based on crop consumptive uses calculated using the Hargreaves method plus incidental irrigation depletions. The State of New Mexico did not perform its own analysis of the data presented by the United States in the US Claims or in the US Technical Reports. Inclusion in this report of descriptions of the amounts of water right claims asserted by the US Claims should not be construed as agreement by the State of New Mexico to these claimed amounts of rights.

G. Disclaimers

This report was prepared at the request of the State of New Mexico, and neither the United States nor the Navajo Nation participated in the preparation of this report. The analyses contained herein are based solely on a review of the data and information available at this time. No method or analysis described herein should be construed as a precedent for quantifying other water rights in the San Juan River Basin in New Mexico or for computing actual depletions in the basin, or to prevent the State Engineer from requiring the use of different methods, data and assumptions for computing actual depletions resulting from water uses of the Navajo Nation for administration of the water rights in the Proposed Decrees.

II. NAVAJO NATION WATER USES

A. Irrigation Uses

1. Hogback-Cudei Irrigation Project.

a. Historic Water Use. The Hogback-Cudei Project is an existing irrigation project on the Navajo Indian Reservation that diverts water from the San Juan River upstream of Shiprock. Irrigation in the original Cudei Project area on the south side of the river valley downstream of Shiprock began as early as 1900, and construction of the Hogback Canal to provide irrigation water to lands on the north side of the river valley upstream and downstream of Shiprock and to lands on the south side of the river near Shiprock began in 1903. About 767 acres were irrigated under the Hogback Project in 1908 (see report of Herbert V. Clotts, dated June 30, 1943). Several siphons and extensions of the Hogback Canal were completed or rehabilitated by 1960 (see map of “San Juan River, Fruitland to Cudia,” prepared by the US Indian Service and revised January 10, 1950, with annotations noting completion dates of canal sections during the 1950s and the area of the Hogback Extension which was constructed in the 1960s). Based on a review of BIA records, the maximum area historically irrigated on the Hogback and Cudei projects combined was about 6,327 acres in 1966 (see the Appendix attached hereto, table 2). In 2002, the Cudei Project diversion was removed from the San Juan River, and the Cudei Project ditch system was connected to the Hogback Canal via a siphon constructed under the river. Field surveys conducted by the ISC since 2003 indicate that the maximum acreage irrigated on the combined Hogback-Cudei Project in the recent past was about 3,892 acres in 2007.

In 2009, the Navajo Nation agreed to limit its irrigation diversions for the Hogback-Cudei Project during the period 2009-2012 to 170 cubic-feet-per-second (cfs) throughout the irrigation season under the “Recommendations for San Juan River Operations and Administration for 2009-2012” (Recommendations). The Recommendations were entered into by ten major water users with diversion facilities on the San Juan River, and for the term of the cooperative agreement provide: (1) maximum diversion rates or amounts for water uses made by each of the endorsing parties; and (2) agreements on the sharing of available water supplies and shortages in the event that shortages on the San Juan River occur.¹ At the maximum agreed-upon diversion rate included in the Recommendations for the entire irrigation season, the Hogback-Cudei Project under present conditions annually diverts about 72,160 acre-feet. Historic diversion rates and amounts to meet irrigation demands for the project may have been greater than under current conditions during the mid-1960s when the total acres irrigated on the Hogback and Cudei projects combined were substantially greater than the amount of acres irrigated recently. Based on a maximum acres

¹ The Recommendations were endorsed only for short-term cooperative river administration purposes in consideration of present conditions, and explicitly are not to be construed to: (1) be a determination or evidence of, or to establish, any party’s water rights or consumptive use of water; or (2) be a precedent for Navajo Dam operations or water administration in the San Juan River Basin in New Mexico in succeeding years. The endorsing parties are: (1) the Bloomfield Irrigation District; (2) the Hammond Conservancy District; (3) the Farmers Mutual Ditch; (4) the Jewett Valley Ditch; (5) the Public Service Company of New Mexico; (6) the Arizona Public Service Company; (7) BHP-Navajo Coal Company; (8) the City of Farmington; (9) the Navajo Nation; and (10) the Jicarilla Apache Nation. The Recommendations were accepted by the USBR and the State Engineer. Similar short-term cooperative agreements have been in place beginning 2003, with the first such agreement being made to avoid potential litigation regarding San Juan River system administration in the event of possible system-wide water supply shortages following the extreme drought that occurred in the basin in 2002.

irrigated in any one year of about 6,327 acres, the historic maximum yearly depletion by irrigation uses under the Hogback and Cudei projects combined is estimated to have been about 18,327 acre-feet.

b. Currently Authorized Water Use. The 1993 BIA Crop Utilization Survey reported that the irrigable acreage for the Hogback and Cudei projects combined at that time amounted to about 8,829 acres, and the BIA has issued land use permits for farming on about 8,830 acres of land existing under ditch within the Hogback-Cudei Project area. Based on the irrigation of 8,830 acres under the Hogback-Cudei Project, the Navajo Nation could divert water at a maximum rate of about 221 cfs assuming a diversion rate of 1 cfs per 40 acres consistent with the per-acre diversion rates included in the 1938 Hydrographic Survey and the Echo Ditch Decree for most non-Indian ditches in the San Juan River Basin in New Mexico. Assuming that the Navajo Nation operates the Hogback Canal to divert water at the maximum diversion rate throughout the irrigation season, the annual diversion for irrigation uses under the project equates to about 93,808 acre-feet. The associated annual depletion by irrigation uses under the project would be about 25,577 acre-feet, on average.

c. Water Right Claims. The US Claims assert federal reserved rights for historic and present irrigation uses on the Hogback-Cudei Project amounting to 9,303 acres of irrigation (see US Technical Reports, “Navajo San Juan Main Stem and NIIP Historically Irrigated Acreage,” prepared by Keller-Bliesner Engineering, LLC, and dated January 12, 2012, table 8). In addition, the US Claims assert federal reserved rights for future irrigation development from the Hogback Canal of an additional 11,218 acres of “practicably irrigable acreage” (PIA) (see US Technical Reports, “Navajo San Juan River Basin Practicably Irrigable Acreage Study,” prepared by Keller-Bliesner Engineering, LLC, and dated January 12, 2012, table 5.3).² The total amount of acreage under the Hogback Canal for which federal reserved water rights are asserted by the US Claims for historic and future uses combined is 20,521 acres. For these irrigation uses, the US Claims assert rights to: (1) divert a total project diversion requirement (PDR) of 141,643 acre-feet per year, on average (about 94,948 acre-feet of average annual diversion for historic and present irrigation uses on the Hogback-Cudei Project, plus about 46,695 acre-feet of average annual diversion for future irrigation uses from the Hogback Canal); and (2) deplete a total of 58,221 acre-feet per year, on average (about 24,818 acre-feet of average annual irrigation depletion for historic and present irrigation uses on the Hogback-Cudei Project, plus about 33,403 acre-feet of average annual irrigation depletion for future irrigation uses from the Hogback Canal).

d. Proposed Water Rights. The Proposed Decree includes for the Hogback-Cudei Project federal reserved water rights for the Navajo Nation to: (1) irrigate in any year up to 8,830 project acres currently under ditch for which the BIA has issued land use permits to the Navajo Nation or its members for farming as identified by the 1993 BIA Crop Utilization Survey; (2) divert in any year up to 48,550 acre-feet at the existing Hogback Project diversion dam for these irrigation uses; and (3) deplete in any year up to 21,280 acre-feet for irrigation uses on the project. The proposed FDR for the Hogback-Cudei Project is 3.3 acre-feet per acre, and the proposed maximum diversion rate for the project is 221 cfs. The depletion and diversion elements of the proposed water rights for the project are based on a CIR, FDR, PDR and maximum diversion rate that are consistent with the

² Table FF-1 of the US Claims, as amended, appears to provide an incorrect tabulation of the claims stated in the supporting technical expert report.

methodology used by the 1938 Hydrographic Survey to calculate CIRs, FDRs, PDRs and maximum diversion rates for non-Indian irrigation ditches in the San Juan River Basin.

e. Summary. The following is a summary of water right elements proposed for the Hogback-Cudei Project by the Proposed Decree as compared to maximum historic irrigation use, current irrigation use authorizations, and the US Claims:

	Historic <u>Use</u>	Current <u>Right</u>	<u>US Claims</u>	Proposed <u>Decree</u>
Acres	6,327	8,830	20,521	8,830
Annual Diversion (acre-feet)	72,160	93,808	141,643	48,550
Annual Depletion (acre-feet)	18,327	25,577	58,221	21,280

2. Fruitland-Cambridge Irrigation Project.

a. Historic Water Use. The Fruitland-Cambridge Project is an existing irrigation project on the Navajo Indian Reservation that diverts water from the San Juan River at Farmington. Some amount of irrigation within portions of the project area was apparently occurring by about 1900 (see “Navajo Indian Irrigation Project,” prepared by Leah Glaser and dated 1998, page 7). The Cambridge Project east of Shiprock was developed in 1934, and construction of the Fruitland Canal to replace and consolidate smaller irrigation ditches on Navajo lands from Farmington to the Cambridge Project area began in 1937. The Fruitland Canal also expanded the area of irrigation near Fruitland from that area established prior to the 1930s. The Cambridge Project diversion eventually became disconnected from the main channel of the San Juan River, and it began receiving water at the tail end of the Fruitland Canal as opposed to directly from the river. Based on a review of BIA records, the maximum area historically irrigated on the Fruitland and Cambridge projects combined was about 3,120 acres in 1965 (see the Appendix attached hereto, table 2). Field surveys conducted by the ISC since 2003 indicate that the maximum acreage irrigated on the Fruitland-Cambridge Project in the recent past was about 2,031 acres in 2007.

Under the Recommendations, the Navajo Nation agreed to limit its irrigation diversions for the Fruitland-Cambridge Project during the period 2009-2012 to 100 cfs throughout the irrigation season. Assuming that the Fruitland-Cambridge Project diverts water at the maximum agreed-upon diversion rate described by the Recommendations for the entire irrigation season, the project under present conditions annually diverts about 42,447 acre-feet. Historic diversion rates and amounts to meet irrigation demands for the project may have been greater than under current conditions during the mid-1960s when the total acres irrigated on the Fruitland and Cambridge projects combined were greater than the amount of acres irrigated recently. Based on a maximum acres irrigated in any one year of about 3,120 acres, the historic maximum yearly depletion by irrigation uses under the Fruitland and Cambridge projects combined was estimated at about 8,694 acre-feet.

b. Currently Authorized Water Use. The 1993 BIA Crop Utilization Survey reported that the irrigable acreage for the Fruitland Project at that time amounted to about 3,335 acres, and the BIA has issued land use permits for farming on about 3,335 acres of land existing under ditch within the Fruitland-Cambridge Project area. Based on historic use, the Navajo Nation diverts water at a maximum rate of about 100 cfs into the Fruitland Canal, which equates to an annual diversion for irrigation uses under the project of about 42,447 acre-feet assuming that the canal is operated to

divert water at this rate throughout the irrigation season. The associated annual depletion by irrigation uses under the project would be about 9,293 acre-feet, on average.

c. Water Right Claims. The US Claims assert for the Navajo Nation federal reserved rights for historic and present irrigation uses on the Fruitland-Cambridge Project amounting to 3,711 acres of irrigation (see “Navajo San Juan Main Stem and NIIP Historically Irrigated Acreage,” prepared by Keller-Bliesner Engineering, LLC, and dated January 12, 2012, table 8). The US Claims does not assert for the Navajo Nation any rights for future irrigation development from the Fruitland Canal based on the PIA standard. For these irrigation uses, the US Claims assert rights to: (1) divert a PDR of 42,876 acre-feet per year, on average; and (2) deplete 10,072 acre-feet per year, on average.

d. Proposed Water Rights. The Proposed Decree includes for the Fruitland-Cambridge Project proposed federal reserved water rights for the Navajo Nation to: (1) irrigate in any year up to 3,335 project acres currently under ditch for which the BIA has issued land use permits to the Navajo Nation or its members for farming as identified by the 1993 BIA Crop Utilization Survey; (2) divert in any year up to 18,180 acre-feet at the existing Fruitland Project diversion dam for these irrigation uses; and (3) deplete in any year up to 7,970 acre-feet for irrigation uses on the project. The proposed FDR for the Fruitland-Cambridge Project is 3.3 acre-feet per acre, and the proposed maximum diversion rate for the project is 100 cfs.³ The depletion and diversion elements of the proposed water rights for the project are based on a CIR, FDR and PDR that are consistent with the methodology used by the 1938 Hydrographic Survey to calculate CIRs, FDRs and PDRs for non-Navajo irrigation ditches in the San Juan River Basin.

e. Summary. The following is a summary of water right elements proposed for the Fruitland-Cambridge Project by the Proposed Decree as compared to maximum historic irrigation use, current irrigation use authorizations, and the US Claims:

	Historic Use	Current Right	US Claims	Proposed Decree
Acres	3,120	3,335	3,711	3,335
Annual Diversion (acre-feet)	42,447	42,447	42,876	18,180
Annual Depletion (acre-feet)	8,694	9,293	10,072	7,970

3. Navajo Indian Irrigation Project.

a. Historic Water Use. The NIIP is an existing irrigation project on Navajo Nation lands that diverts water from the San Juan River at Navajo Reservoir. The Colorado River Storage Project Act (Public Law 485) in 1956 authorized construction of Navajo Dam and Reservoir, and the USBR completed construction of the dam and initiated filling of the reservoir in December 1962 to provide water supply in support of the NIIP and other uses. The NIIP was authorized for construction by the Act of June 13, 1962. Irrigation water deliveries to the NIIP were first made in 1976, and the amounts of actual acres irrigated, diversions and depletions for the NIIP generally

³ The Proposed Decree provides that the maximum diversion rate for the project may be reduced to as low as 83.4 cfs pending effectiveness of project rehabilitation in reducing the rate of diversion necessary to meet the consumptive use demands under the project. A diversion rate of 83.4 cfs would be consistent with 1 cfs per 40 acres of water right as per the diversion rates for large non-Indian ditches in the basin adjudicated by the Echo Ditch Decree.

have increased over time as project construction advances. Based on BIA records for the NIIP through 2010, the maximum annual water use by the project occurred in 2009 (see the Appendix attached hereto, table 1). As of 2009, about 69,941 acres were developed for irrigation under the project, of which about 61,534 acres of crops were irrigated and 8,407 acres were fallowed or in limited irrigation status as needed to maintain ground cover for the Conservation Reserve Program (see NIIP Irrigation and Drainage Analysis). The annual diversion from Navajo Reservoir for the NIIP in 2009 was about 209,947 acre-feet, and the annual return flow from the NIIP to the San Juan River in 2009 amounted to about 21,031 acre-feet including operational waste or spill discharges plus return flows estimated based on measurements of surface flows in channels and from springs at the NIIP boundary. The annual depletion from the San Juan River by the NIIP in 2009 was thus about 188,916 acre-feet calculated as diversions minus return flows. About 79,760 acres have been developed for irrigation on the NIIP as of 2012. Some of the historic water use by the NIIP has been for aquaculture purposes or for other agricultural purposes such as food processing and feedlot operations on the project.

b. Currently Authorized Water Use. The ISC on June 17, 1955, filed with the State Engineer the Notice of Intention under OSE File No. 2849 for storage and diversion from the San Juan River at Navajo Reservoir to make up to 630,000 acre-feet of water per year available to the Navajo Project for irrigation, power and domestic purposes. The Notice of Intention for the Navajo Reservoir water supply (OSE File No. 2849) was assigned to the United States Department of the Interior via letter dated September 27, 1957, from S.E. Reynolds to the USBR. The rights held by the Secretary to store water in Navajo Reservoir and supply water for the NIIP and other purposes contemplated by the Act of June 13, 1962, carry a priority date of June 17, 1955.

A report entitled “Navajo Indian Irrigation Project,” prepared by Leah Glaser for the USBR and dated 1998, provides a history of events and project planning that led to the authorization of the NIIP and the SJCP and a history of the development of the NIIP during the first two decades following authorization. The NIIP was designed for flood irrigation at the time the project was authorized, but was later redesigned as a sprinkler irrigated project and the project lands were consolidated between about Bloomfield and Kirtland south of the river valley. It is anticipated that the full authorized project acreage will not be developed for irrigation until about 2030 based on current annual federal funding levels for project construction.

Section 2 of the Act of June 13, 1962, authorized the irrigation of up to 110,630 acres of land on the NIIP with an average annual diversion of 508,000 acre-feet per year for the project. Based on the NIIP Biological Assessment, the NIIP with full build-out to irrigation of 110,630 acres every year would develop an average annual depletion from the San Juan River of about 280,600 acre-feet per year by the early 2030s, after which the depletion amount would gradually decline to an average of about 270,000 acre-feet per year in the long term as the deep percolation losses to the ground water underneath project lands equilibrate with consequent increases in ground water discharge to ephemeral channels that are tributary to the river.⁴ The USBR and the US Fish and

⁴ Both NIIP depletion estimates are based on return flows measured at the project boundaries. However, the NIIP Biological Assessment did not account for incidental losses on discharges or return flows at the western boundary of the NIIP into the Chaco River drainage between the NIIP boundary and the confluence of the Chaco River with the San Juan River. Thus, the actual depletions to be measured as diversions minus return flows to the San Juan River could be greater than indicated by the NIIP Biological Assessment.

Wildlife Service for Endangered Species Act (ESA) section 7 consultation on the completion of the NIIP used these depletion estimates.

c. Water Right Claims. The US Claims assert for the Navajo Nation federal reserved rights for historic and present irrigation uses on lands held by the United States in trust on behalf of the Navajo Nation (Navajo Nation trust lands) within the NIIP boundary amounting to about 78,336 acres that are presently developed for irrigation (see US Technical Reports, “Navajo San Juan Main Stem and NIIP Historically Irrigated Acreage,” table 10). The associated water use amounts claimed for the NIIP total to an annual PDR of about 259,576 acre-feet and an annual depletion of about 193,914 acre-feet. The US Claims also assert federal reserved rights for future irrigation uses on the NIIP amounting to 34,880 acres of irrigation remaining to be developed on the project, with associated additional water use amounts claimed for the project of an annual PDR of about 115,579 acre-feet and an annual depletion of about 86,342 acre-feet. The total NIIP water right claim including historic use plus future use associated with completion of the project amounts to 113,216 acres of irrigation, with associated total water use amounts of an annual diversion of about 375,155 acre-feet and an annual depletion of about 280,256 acre-feet. These claim amounts for irrigation uses on the NIIP are for Navajo Nation trust lands only, and exclude annual diversions and depletions for irrigation of about 1,424 acres on the NIIP that are on Navajo lands but not on Navajo Nation trust lands. For all irrigation uses under the NIIP combined, the total amount of claimed irrigated acreage is 114,640 acres, with an associated average annual diversion of about 379,874 acre-feet per year and an associated average annual depletion of about 283,781 acre-feet per year.

d. Proposed Water Rights. Based on the Act of June 13, 1962, the Proposed Decree includes for the NIIP federal reserved water rights for the Navajo Nation to irrigate up to 110,630 acres with an associated average annual diversion of up to 508,000 acre-feet per year during any period of ten consecutive years as may be needed to meet consumptive use demands on the project. However, under the Proposed Decree, the Navajo Nation will have to obtain a permit from the State Engineer, subject to non-impairment of existing water rights, to divert more than an average annual diversion of 353,000 acre-feet per year during any period of ten consecutive years under the NIIP water right if any portion of the water diverted is used for non-irrigation purposes.⁵ The Proposed Decree also limits the average annual depletion by the NIIP to 270,000 acre-feet per year during any period of ten consecutive years, based on diversions less return flows to the San Juan River and including crop consumptive uses, depletions by non-irrigation uses, and incidental depletions. In any one year, the Proposed Decree provides that the Navajo Nation could not exceed the ten-year average diversion or depletion limits by more than 15 percent. The proposed maximum diversion rate for the NIIP is 1,800 cfs based on the physical capacity of the existing project diversion works.

Water deliveries to the NIIP are subject to sharing of shortages in the Navajo Reservoir supply with other Navajo Reservoir supply water contracts for uses in New Mexico as provided in section 11(a) of the Act of June 13, 1962, as amended by the Settlement Act. Also, consistent with the

⁵ Based on the NIIP Biological Assessment, the NIIP with full build-out of sprinkler irrigation to 110,630 acres will require an average annual diversion of about 337,500 acre-feet per year assuming that planned water conservation measures for the project are fully implemented and effective. If planned water conservation measures are not implemented or are not effective, then irrigation of 110,630 acres each year on the NIIP will require an average annual diversion of about 372,000 acre-feet per year. This range of possible future diversion demands for full irrigation of the NIIP was used as the basis for negotiating the 353,000 acre-feet per year average annual diversion threshold for the project included in the Proposed Decree (see Responses to Public Comments, pages 10-13).

provisions of paragraph 3 of the Partial Final Judgment and Decree of the Water Rights of the Jicarilla Apache Tribe, the Proposed Decree provides that the Navajo Nation’s 1868 priority reserved water rights from the Navajo Reservoir water supply for the NIIP are subordinated to its Settlement Contract rights, based on the rights held by the United States under OSE File No. 2849, with a state law priority date of June 17, 1955.

e. Summary. The following is a summary of water right elements proposed for the NIIP by the Proposed Decree as compared to maximum historic project water use, current project water use authorizations, and the US Claims:

	Historic <u>Use</u>	Current <u>Right</u>	<u>US Claims</u>	Proposed <u>Decree</u>
Acres	79,760	110,630	114,640	110,630
Annual Diversion (acre-feet)	209,947	508,000	379,874	353,000 ⁶ (508,000)
Annual Depletion (acre-feet)	188,916	280,600	283,781	270,000

4. Individual Pump Irrigation.

a. Water Right Claims. The US Claims assert for the Navajo Nation federal reserved rights for historic and present irrigation uses from two individual pumps along the San Juan River serving a combined total of about 15 acres of land that are not associated with the Hogback-Cudei or Fruitland-Cambridge projects (see US Technical Reports, “Navajo San Juan Main Stem and NIIP Historically Irrigated Acreage,” table 8). For these irrigation uses, the US Claims assert rights to divert a total PDR of about 113 acre-feet per year, on average, and rights to deplete about 40 acre-feet per year, on average.⁷

b. Proposed Water Rights. The Proposed Decree does not include any water rights for the claimed individual pump irrigation uses.

c. Summary. The following is a summary of assumed water use elements for the individual pump irrigation uses from the San Juan River:

	Historic <u>Use</u>	Current <u>Right</u>	<u>US Claims</u>	Proposed <u>Decree</u>
Acres	15	15	15	0
Annual Diversion (acre-feet)	113	113	113	0
Annual Depletion (acre-feet)	41	41	41	0

⁶ The average annual diversion for the NIIP is effectively limited to a diversion demand for a sprinkler irrigation project of about 353,000 acre-feet per year, even though the authorizing legislation for the NIIP provides for an average annual project diversion of up to 508,000 acre-feet per year.

⁷ Based solely on the information in the US Claims, it was assumed for the purposes of this report only that the elements of historic use and authorized use were similar to the elements of the rights asserted by the US Claims for these irrigation uses.

5. Additional Lands Based on PIA Claims.

a. Water Right Claims. The US Claims assert for the Navajo Nation federal reserved rights for future irrigation development of an additional 41,432 acres of land which the United States claims as PIA, over and above the PIA claims for future irrigation development from the Hogback Canal (see US Technical Reports, “Navajo San Juan River Basin Practicably Irrigable Acreage Study,” table 5.3). These additional PIA lands would be associated with a possible Morgan Lake Canal irrigation project that would divert water from the San Juan River near Kirtland to supply lands south of Shiprock (about 28,138 acres) and possible diversions from the San Juan River below Shiprock to supply lands northwest of Shiprock (about 13,294 acres). For these irrigation uses, the US Claims assert rights to divert a combined total PDR of 150,827 acre-feet per year, on average, and to deplete a combined total of 116,442 acre-feet per year, on average.⁸

b. Proposed Water Rights. The Proposed Decree does not include any water rights for the claimed PIA future irrigation developments.

c. Summary. The following is a summary of claimed water right elements for the additional PIA uses from the San Juan River under a possible Morgan Lake Canal or possible future diversions below Shiprock:

	<u>Historic Use</u>	<u>Current Right</u>	<u>US Claims</u>	<u>Proposed Decree</u>
Acres	0	0	41,432	0
Annual Diversion (acre-feet)	0	0	150,827	0
Annual Depletion (acre-feet)	0	0	116,442	0

6. Totals for Irrigation Uses Combined. The following is a summary of water right elements proposed by the Proposed Decree for all Navajo Nation irrigation uses from the San Juan River in New Mexico combined as compared to maximum historic water use, current water use authorizations, and the US Claims:

	<u>Historic Use</u>	<u>Current Right</u>	<u>US Claims</u>	<u>Proposed Decree</u>
Acres	89,222	122,810	180,319	122,795
Annual Diversion (acre-feet)	324,667	644,368	715,333	419,730 ⁹ (574,730)
Annual Depletion (acre-feet)	215,978	315,511	468,556	299,250

⁸ These PIA claims exclude those for 1,239 acres of future ground water irrigation in the Chaco River drainage.

⁹ See footnote 6.

B. Domestic, Commercial, Municipal and Light Industrial (DCMI) Uses

1. Non-Project DCMI Uses from the San Juan River System.

a. Historic Water Use. Under present conditions, the physical capacity to divert water to, and treat water at, the Shiprock water treatment plant is limited, and the NTUA-Shiprock Agency meets much of its domestic water demands by purchasing water from the City of Farmington.¹⁰ Based on water use reports filed with the OSE by the City of Farmington and Navajo Nation Department of Water Resources data, the NTUA-Shiprock Agency during 2005 purchased about 1,700 acre-feet of treated water from the City's water distribution system, and directly diverted from the San Juan River or Hogback Canal near Shiprock about 580 acre-feet of water for Navajo Nation domestic, commercial, municipal and light industrial (DCMI) uses in Navajo communities along the San Juan River corridor (for a combined total of about 2,280 acre-feet of surface water for DCMI uses in 2005). Assuming an average return flow rate from NTUA-Shiprock Agency DCMI uses along the San Juan River valley of about 60 percent of the water diverted by or delivered to the agency, the amount of depletion associated with these uses was about 912 acre-feet in 2005.

b. Currently Authorized Water Use. It was assumed for this report that the Navajo Nation's current authorization to divert and deplete water from the San Juan River for its DCMI demands exclusive of the ALP is limited by its existing diversion and water treatment capabilities as reflected by historic NTUA-Shiprock diversions. This amounts to 580 acre-feet per year of diversion and depletion.

c. Proposed Water Rights. The Proposed Decree includes federal reserved water rights for the Navajo Nation to divert up to 2,600 acre-feet and deplete up to 1,300 acre-feet of water from the San Juan River each year for DCMI uses, exclusive of the ALP and the NGWSP. These amounts are based on: (1) the sum of the amounts of historic DCMI diversions by the NTUA-Shiprock Agency plus water purchases from the City of Farmington by the agency of about 2,280 acre-feet in 2005; (2) historic heavy industrial uses made at the Navajo (Shiprock) Helium Plant under License No. 2472 (for an annual diversion of about 1,450 acre-feet) and at the Navajo (Shiprock) Mill under License No. 2807 & 2875 (for an annual diversion of 1,200 acre-feet), which licenses are to be cancelled under the Settlement Agreement; and (3) an assumed return flow of 50 percent consistent with return flow percentages assumed for future DCMI uses under the ALP. The proposed maximum diversion rate for these DCMI uses is 5.0 cfs.

2. Animas-La Plata Project.

a. Currently Authorized Water Use. The ALP FSEIS included for the Navajo Nation's uses under the project an annual diversion of 4,680 acre-feet from the Animas River with an associated annual depletion of 2,340 acre-feet from the San Juan River stream system. The "Colorado Ute Settlement Act Amendments of 2000" (114 Stat. 2763A-258; Public Law 106-554, Appendix D, Title III) authorized construction of the ALP and the Navajo Nation Municipal Pipeline (NNMP), and made an allocation of project water to the Navajo Nation in the amount of 2,340 acre-feet per annum of depletion. The ALP pump-storage facilities (namely, the Durango Pumping Plant and

¹⁰ Diversions and depletions of treated water that the NTUA-Shiprock Agency has purchased from the City of Farmington historically have been supplied under the water rights of the City. In the future, it is anticipated that these uses will be met with the Navajo Nation's water rights.

Lake Nighthorse in Colorado) were completed in 2010, and the initial fill of Lake Nighthorse was completed in 2011. Construction of the NNMP to convey the Navajo Nation's ALP water along the San Juan River corridor to help meet its DCMI water demands is scheduled to be completed in 2012. The Navajo Nation has filed application with the OSE for a permit to divert its ALP allocation from the Animas River through the City of Farmington's diversion works and water treatment plant for ultimate delivery to the Navajo Nation through the NNMP.

b. Proposed Water Rights. Based on the Navajo Nation's authorized ALP water allocation, the Proposed Decree includes federal reserved water rights for the Navajo Nation to divert up to 4,680 acre-feet of water from the Animas River each year and deplete up to 2,340 acre-feet for its DCMI uses under the ALP. Water deliveries for the Navajo Nation's uses under the ALP are subject to sharing of shortages in the ALP water supply with other ALP supply water contractors as provided by the Animas-La Plata Project Compact. Also, the Proposed Decree provides that the Navajo Nation's 1868 priority reserved water rights for its uses under the ALP are subordinated to its Settlement Contract rights based on the rights held by the United States under OSE File No. 2883, with a state law priority date of May 1, 1956. The proposed maximum diversion rate for the Navajo Nation's uses under the ALP is 12.9 cfs based on the capacity of the NNMP.

3. Navajo-Gallup Water Supply Project.

a. Project Description. The NGWSP is the only new water use authorization provided by the Settlement Agreement and Settlement Act. The NGWSP service area includes Navajo Nation communities in northwestern New Mexico both within and outside the San Juan River Basin, plus the City of Gallup and a portion of the Jicarilla Apache Indian Reservation. The NGWSP will have two points of diversion: (1) Navajo Reservoir for delivery of water to communities along the US Highway 550 corridor; and (2) the San Juan River near Kirtland for delivery of water to communities along the San Juan River valley from Fruitland to Shiprock and generally along the US Highway 491 corridor between Shiprock and Gallup, with connections also to communities in the vicinity of Crownpoint and Gallup, New Mexico, and Window Rock, Arizona. The NGWSP was sized based on year 2040 projections of DCMI water demands within the project service area that would not be met from the Navajo Nation's diversions under the ALP or from ground water diversions, and includes DCMI water demands of the City of Gallup and the Jicarilla Apache Nation in addition to the Navajo Nation (see "Technical Memorandum on the Navajo-Gallup Water Supply Project," prepared by the Navajo Nation Department of Water Resources and others, and dated March 2001 (NGWSP Technical Memorandum)). The Settlement Act in 2009 authorized the NGWSP, including allocations of water from the NGWSP for the Navajo Nation in a total amount of 22,650 acre-feet of diversion annually for its DCMI uses in New Mexico with an associated depletion of 20,780 acre-feet from the San Juan River system, and approved a Navajo Reservoir water supply contract for the Navajo Nation's uses in New Mexico under the NIIP and the NGWSP.¹¹ The USBR has completed National Environmental Policy Act and ESA section 7 consultation compliance activities for the NGWSP and the final design criteria preparatory to project construction, and it held a groundbreaking ceremony for the project on June 2, 2012. Project construction is expected to be completed in 2024. Because most of the authorized NGWSP

¹¹ The pre-existing Navajo Reservoir water supply contract for the delivery of an average of 508,000 acre-feet per year to the NIIP was set to expire in 2016 unless extended, and the Settlement Contract incorporates the Navajo Nation's water allocations from the Navajo Reservoir supply for the NIIP and the NGWSP and the Navajo Nation's water allocation from the ALP.

diversions will be made near Kirtland below the confluence of the Animas and San Juan rivers, inflows to the San Juan River below Navajo Dam that may be available for diversion by the project with a 1968 priority date under OSE File No. 3215 could supply substantial portions of the project diversion demand during many months of the year, thus capturing water that otherwise would flow out of New Mexico unused, and resulting in conservation of water in storage in Navajo Reservoir.

b. Proposed Water Rights. The Proposed Decree includes federal reserved water rights for the Navajo Nation to divert up to 22,650 acre-feet and deplete up to 20,780 acre-feet of water each year from the San Juan River (at Navajo Reservoir or at Kirtland combined) for its future DCMI uses in New Mexico under the NGWSP.¹² Water deliveries for the Navajo Nation's uses under the NGWSP are subject to sharing of shortages in the Navajo Reservoir supply with other Navajo Reservoir supply water contracts in accordance with section 11(a) of the Act of June 13, 1962, as amended by the Settlement Act. Also, the Proposed Decree provides that the Navajo Nation's 1868 priority reserved water rights for its uses under the NGWSP are subordinated to its Settlement Contract rights based on the rights held by the United States under OSE File No. 2849 for water originating above Navajo Reservoir, with a state law priority date of June 17, 1955, and under OSE File No. 3215 for water originating below Navajo Dam, with a state law priority date of December 16, 1968. The proposed maximum diversion rate for the Navajo Nation's uses in New Mexico under the NGWSP is a total of 41 cfs for both points of diversion combined.

c. Proposed Diversion for Use of Water in Arizona. The Proposed Decree provides that the Navajo Nation may contract with the Secretary to divert and deplete up to 6,411 acre-feet of water each year from the San Juan River near Kirtland for its DCMI uses in Arizona under the NGWSP, with a maximum diversion rate of 12 cfs. Pursuant to the Upper Colorado River Basin Compact, the diversions for use in Arizona under the NGWSP are subject to the rights of water users in New Mexico to receive and use water within the consumptive use apportionment made to the State of New Mexico by the Upper Colorado River Basin Compact.¹³

4. DCMI Uses from Ground Water.

a. Historic Water Use. Because of the expansive, arid nature of the San Juan River Basin within New Mexico, the Navajo Nation meets many individual, community, agricultural and industrial needs throughout the basin from local ground water sources. Ground water withdrawal data from the NTUA indicate that the total amount of diversion for municipal, domestic and commercial uses in the drainage areas of ephemeral tributaries to the San Juan River supplied from ground water

¹² At full project development, it is anticipated that about 3,800 acre-feet will be diverted at Navajo Reservoir through the existing NIIP canal intake and about 18,850 acre-feet will be diverted at the existing Public Service Company of New Mexico's San Juan Generating Station diversion dam.

¹³ Other conditions include: (1) water deliveries to the project for uses in Arizona from the Navajo Reservoir supply are to be shorted completely before any residual amount of shortage is to be shared among Navajo Reservoir supply contracts for uses in New Mexico per section 11(a) of the Act of June 13, 1962, as amended by the Settlement Act; (2) the diversion and depletion of water in Arizona under the NGWSP is subject to an accounting of said depletion within the State of Arizona's allocations of water from the Colorado River system; and (3) the diversions for NGWSP uses in Arizona are not transferrable to other uses, including to uses in New Mexico, and shall not be leased or subcontracted by the Navajo Nation to third parties.

amounted to about 1,534 acre-feet in 2007.¹⁴ There is little, if any, depletion of San Juan River flow resulting from these municipal and domestic ground water uses.

b. Authorized Water Use. The NGWSP Technical Memorandum estimated that about 1,670 acre-feet of existing and future local ground water development within the San Juan River Basin in New Mexico could help meet future domestic water demands for Navajo communities in the basin. Based on this estimate, it was assumed for this report that the Navajo Nation without further authorizations could increase its ground water diversions for public water supply systems from 1,534 acre-feet in 2007 to about 1,670 acre-feet to help meet its future DCMI water demands.

c. Proposed Water Rights. The Proposed Decree includes the following ground water rights for Navajo Nation DCMI or agricultural uses in the San Juan River Basin in New Mexico: (a) reserved water rights with a priority date of June 1, 1868, for a maximum annual diversion of 2,000 acre-feet from ground water within the basin in New Mexico, which could be fully depleted from the source (including by evaporation from sewer settling ponds); and (b) additional reserved water rights to divert ground water in the basin on Navajo Nation trust lands with an administrative priority date equal to the date on which the Navajo Nation gives notice to the State Engineer of its intent to drill or pump wells to effectuate such additional diversions (except in the case of drilling a replacement well).¹⁵ The additional reserved water rights with future priority dates will be subject to non-impairment of other water rights and to offsetting any amount of actual depletion of San Juan River flow resulting from all Navajo Nation ground water uses in the basin in New Mexico combined, excluding *de minimis* uses from individual domestic wells, that is in excess of 2,000 acre-feet, by forbearing use of surface water rights included in paragraph 3 of the Proposed Decree if the State Engineer determines that this replacement water is needed for the State of New Mexico to meet its interstate compact obligations or to protect existing water uses in New Mexico.

5. Total for DCMI Uses.

a. Historic Water Use. Historic annual DCMI uses by the Navajo Nation from the San Juan and Animas rivers in New Mexico have in recent years amounted to about 2,280 acre-feet of diversion and 912 acre-feet of depletion. Historic annual DCMI uses by the Navajo Nation from ground water in the San Juan River Basin in New Mexico have in recent years amounted to about 1,534 acre-feet of diversion and depletion from the ground water source, with little, if any, measurable depletion of flow of the San Juan River. The total of all historic annual Navajo Nation DCMI uses in the basin in recent years is about 3,814 acre-feet of diversion and 2,446 acre-feet of depletion.

b. Authorized Water Use. Excluding the ALP, the Navajo Nation may currently divert and deplete for DCMI purposes about 580 acre-feet per year of water from the San Juan River at or near Shiprock, plus about 1,670 acre-feet per year of ground water in the basin. Under the ALP, the Navajo Nation also is authorized to divert up to 4,680 acre-feet of water annually each year from the Animas River at the City of Farmington's points of diversion, with an associated

¹⁴ It is assumed for this report that this diversion amount includes 13 acre-feet of annual ground water use at the Toadlena Fish Hatchery (see "The United States' Hydrographic Survey of Navajo Lands in the San Juan River Basin," dated December 29, 2010, at table L-1).

¹⁵ These rights exclude rights of the Navajo Nation to divert and use ground water in the drainages of ephemeral tributaries to the San Juan River for historic irrigation and livestock uses that are described in the Proposed Supplemental Decree.

depletion from the San Juan River system of 2,340 acre-feet. These authorized DCMI uses total to about 6,930 acre-feet per year of diversion and 4,590 acre-feet per year of depletion.

c. Water Right Claims. The US Claims assert for the Navajo Nation federal reserved rights for historic and future DCMI uses within the San Juan River Basin in New Mexico of 36,575 acre-feet per year of diversion and depletion of surface water from the San Juan River stream system. This water right claim is based on population projections and is not segregated into water project components.

d. Proposed Water Rights. The Proposed Decree includes federal reserved water rights for DCMI uses in New Mexico for the Navajo Nation to annually: (1) divert up to 2,600 acre-feet and deplete up to 1,300 acre-feet of water from the San Juan River; (2) divert and deplete up to 2,000 acre-feet of ground water within the San Juan River Basin; (3) divert up to 4,680 acre-feet and deplete up to 2,340 acre-feet of water each year from the Animas River under the ALP; and (4) divert up to 22,650 acre-feet and deplete up to 20,780 acre-feet of water from the San Juan River under the NGWSP. These proposed water rights total to about 31,930 acre-feet per year of diversion and 26,420 acre-feet per year of depletion for Navajo Nation DCMI uses in New Mexico.

e. Summary. The following is a summary of water right elements proposed for all Navajo Nation DCMI uses in New Mexico combined by the Proposed Decree as compared to maximum historic use, current water use authorizations, and the US Claims:

	Historic <u>Use</u>	Current <u>Right</u>	<u>US Claims</u>	Proposed <u>Decree</u>
Annual Diversion (acre-feet)	3,814	6,930	36,575	31,930
Annual Depletion (acre-feet)	2,446	4,590	36,575	26,420

C. Heavy Industrial Uses

1. Surface Water Uses.

a. Historic Water Use. The United States under OSE File No. 2472 appropriated an annual diversion from the San Juan River of about 1,450 acre-feet per annum for industrial uses at the Navajo (Shiprock) Helium Plant, which was placed in operation to separate helium gas in 1944, closed in 1969 and subsequently dismantled. The Navajo Refined Helium Gas Processing Plant operated as a replacement to the Navajo (Shiprock) Helium Plant during the 1970s and 1980s, and then the Red Valley Helium Plant near Shiprock operated irregularly after 2000 (see US Technical Reports, “Past and Present Large Navajo Industrial Water Use in San Juan Basin,” prepared by Cardno Entrix and dated January 2012). Based on “The United States’ Hydrographic Survey of Navajo Lands in the San Juan River Basin,” dated December 29, 2010 (US Survey), table L-1, historic maximum use at the helium plants amounted to 1,450 acre-feet per year of diversion as per OSE License No. 2472, with an associated depletion of 1,160 acre-feet. The United States under OSE File No. 2807 & 2875 appropriated an annual diversion from the San Juan River of 1,200 acre-feet per annum for industrial uses at the Navajo (Shiprock) Mill, which was placed into operation to process uranium-vanadium ore and products in 1954 and was closed in 1968. Based on the US Survey, historic maximum use at the mill amounted to 1,200 acre-feet per year of

diversion and depletion as per License No. 2807 & 2875. The United States has conveyed both License No. 2472 and License No. 2807 & 2875 to the Navajo Nation.

Other historic surface water uses on Navajo Nation lands in the basin for heavy industrial activities identified by the US Survey at table L-1 include: (1) 600 acre-feet per year of diversion and 366 acre-feet per year of depletion at the Navajo Agricultural Products Industry (NAPI) cattle feedlot; (2) 33 acre-feet per year of diversion and depletion at the NAPI industrial park; and (3) a combined total of 1,534 acre-feet per year of diversion and 733 acre-feet per year of depletion for oil field drilling and continued operations by the Midwest Refining Company in the 1920s, oil recovery uses at the Cha Cha Oil Field through 1976, and reclamation and continued remediation activities in the vicinity of the former Navajo (Shiprock) mill site in the 1980s and 2000s (see US Technical Reports, “Past and Present Large Navajo Industrial Water Use in San Juan Basin,” table 1). The water uses at the NAPI feedlot are currently supplied from the NIIP Canal, and water uses at the NAPI industrial park are currently supplied from the NTUA-Shiprock Agency domestic water distribution system. Water uses for the other heavy industrial activities were made under State Engineer permits. The total amount of historic water use for all identified heavy industrial uses from the San Juan River by the Navajo Nation combined is about 4,784 acre-feet per year of diversion and about 3,459 acre-feet per year of depletion, exclusive of the DCMI uses at the NAPI industrial park historically supplied by the NTUA-Shiprock Agency. These totals exclude the use of water diverted from the San Juan River by the BHP-Navajo Coal Company under OSE File No. 2838 for thermal electric power generation at the Four Corners Power Plant (FCPP) and for the associated mining of coal at the Navajo Mine.¹⁶

b. Authorized Water Use. In addition to the historic industrial water uses described above, the US Claims at Appendix CC identified a total of 5,380 acre-feet per year of diversion and 4,245 acre-feet of depletion for future food production enterprises on the NIIP, including several livestock farms, agricultural products processing facilities and an ethanol production plant, that would use water supplied from the NIIP Canal (see also US Technical Reports, “Future Large Industrial Water Claims on Navajo Nation in the San Juan River Basin,” prepared by Cardno Entrix and dated January 2012, table 4-1). Given that the Navajo Nation historically has used some of its NIIP contract water for the NIIP feedlot and for aquaculture, it is assumed for this report that the Navajo Nation may without further authorization use its NIIP contract water for additional non-irrigation purposes related to the NIIP. In addition, it is assumed for this report that the Navajo Nation may without further authorization develop a diversion from the San Juan River near Shiprock in the amount of 1,600 acre-feet per year, with an associated depletion of 1,440 acre-feet per year, for use at a future heavy mineral processing plant on the Navajo Indian Reservation identified by the US Claims.

The total amount of water use from the San Juan River for all identified Navajo Nation heavy industrial uses, including historic and identified possible future uses combined, that the Navajo Nation could make without further authorization was thus estimated at about 11,764 acre-feet per year of diversion and about 9,144 acre-feet per year of depletion. These totals exclude: (1) DCMI

¹⁶ Under OSE File No. 2838, up to 51,600 acre-feet of water may be diverted in any year from the San Juan River for thermal electric power generation purposes with an associated consumptive use of 39,000 acre-feet computed at the site of use. Diversions under OSE File No. 2838 for uses at the FCPP began in 1961, and water use reports filed with the OSE indicate that the maximum annual amount of diversion for uses at the FCPP and Navajo Mine combined was 36,246 acre-feet in 1987. The water rights for these uses are retained by the BHP-Navajo Coal Company under state law.

uses at the NAPI industrial park supplied by the NTUA-Shiprock Agency; and (2) the use of water diverted from the San Juan River near Kirtland by the BHP-Navajo Coal Company under OSE File No. 2838 at the FCPP and Navajo Mine, including for possible expansion of the Navajo Mine.

c. Water Right Claims. The US Claims assert for the Navajo Nation federal reserved rights for historic and future heavy industrial uses from the San Juan River in a total amount of 48,643 acre-feet per year of diversion and 39,213 acre-feet per year of depletion. These amounts include water right claims for historic and existing uses at the FCPP and the Navajo Mine under OSE File No. 2838 held by the BHP-Navajo Coal Company totaling about 36,246 acre-feet of diversion and 29,436 acre-feet of depletion, plus 600 acre-feet of diversion and depletion for future expansion of the Navajo Mine.

d. Proposed Water Rights. The Proposed Decree does not include any water rights for the Navajo Nation for heavy industrial uses from the San Juan River. Both License No. 2472 and License No. 2807 & 2875 are to be cancelled pursuant to the Settlement Agreement.

2. Ground Water Uses.

a. Historic Water Use. The following historic heavy industrial uses on Navajo Nation lands in the San Juan River Basin in New Mexico were identified by the US Survey at table L-1 as being supplied from ground water sources: (1) gas transportation uses at the Gallup Compressor Station and the White Rock Compressor Station; (2) mining uses in the Grants Mining District for the Crownpoint in-situ uranium mining pilot project and the Nose Rock Mine; (3) mining uses in the East Carrizo and Chuska District uranium mines; (4) mining and reclamation uses at the De-Na-Zin and Gateway Mines; (5) drilling of gas wells by the Beta Development Company and oil wells by Shell Oil Company; (6) oil and natural gas extraction from wells; and (7) fishery uses at the Toadlena Fish Hatchery.¹⁷ Declarations of ground water use have been filed with the OSE for many of these industrial uses in the name of the companies making the use; except, that the El Paso Natural Gas Company in Declaration Nos. SJ-43, SJ-44 and SJ-58 for use of ground water to operate the Gallup Compressor Station listed the Navajo Tribe as the owner of the water rights. Records of the OSE indicate that 86 acre-feet of ground water was used at the Gallup Compressor Station in 1958.

b. Authorized Water Use. Although the United States claims that an annual diversion of 331 acre-feet of ground water has been used historically at the Gallup Compressor Station, it was assumed for this report that the Navajo Nation historically used, and currently is authorized to use under state law, about 86 acre-feet of ground water at the station. The Navajo Nation does not hold the declarations under which some of the other heavy industrial ground water uses have been made.

c. Water Right Claims. The US Claims assert for the Navajo Nation federal reserved rights for historic and future heavy industrial uses from ground water within the San Juan River Basin in New Mexico in a total amount of 57,118 acre-feet per year of diversion with an associated depletion of 26,484 acre-feet per year at the place of use. The ground water diversions would be fully depleted from the source of water (see US Technical Reports, "Past and Present Large Navajo

¹⁷ The rights of the Navajo Nation to divert and use water at the Toadlena Fish Hatchery are included within the reserved ground water rights of the Navajo Nation for DCMI and agricultural uses described by paragraph 7 of the Proposed Decree.

Industrial Water Use in San Juan Basin,” table 1; and see US Technical Reports, “Future Large Industrial Water Claims on Navajo Nation in the San Juan River Basin,” table 4-1).

d. Proposed Water Rights. The Proposed Supplemental Decree includes state law water rights for the Navajo Nation to divert and deplete each year up to 86 acre-feet of ground water for industrial uses at the Gallup Compressor Station. All other heavy industrial uses by the Navajo Nation from ground water within the San Juan River Basin in New Mexico would be made under the proposed rights of the Navajo Nation to divert and use ground water for domestic, commercial, municipal, industrial, agricultural and other uses described in paragraph 7 of the Proposed Decree.

3. Total for Heavy Industrial Uses.

a. Historic Water Use. Historic annual heavy industrial uses by the Navajo Nation in the San Juan River Basin in New Mexico amounted to a total of about 4,870 acre-feet per year of diversion and 3,545 acre-feet per year of depletion (including 86 acre-feet of diversion and depletion of ground water).

b. Authorized Water Use. The Navajo Nation without further authorizations may currently divert about 11,850 acre-feet per year for heavy industrial uses in the basin with an associated depletion of about 9,230 acre-feet per year (including 86 acre-feet of diversion and depletion of ground water).

c. Water Right Claims. The US Claims assert for the Navajo Nation federal reserved rights for historic and future heavy industrial uses within the San Juan River Basin in New Mexico of 48,643 acre-feet per year of diversion and 39,213 acre-feet per year of depletion from the San Juan River, and for historic and future heavy industrial uses from ground water in the basin of 57,118 acre-feet per year of diversion and 26,484 acre-feet per year of depletion at the sites of use. These water right claims total to 105,761 acre-feet per year of diversion and 65,697 acre-feet per year of depletion at the sites of use.

d. Proposed Water Rights. The Proposed Decree does not include any water rights for the Navajo Nation for heavy industrial uses from the San Juan River. The Proposed Supplemental Decree includes state law water rights with a priority date of March 1953 for the Navajo Nation to divert and deplete each year up to 86 acre-feet of ground water for industrial uses at the Gallup Compressor Station.

e. Summary. The following is a summary of water right elements proposed for all Navajo Nation heavy industrial uses in New Mexico combined by the Proposed Decrees as compared to maximum historic use, current water use authorizations, and the US Claims:

	Historic <u>Use</u>	Current <u>Right</u>	<u>US Claims</u>	Proposed <u>Decree</u>
Annual Diversion (acre-feet)	4,870	11,850	105,761	86
Annual Depletion (acre-feet)	3,545	9,230	65,697	86

D. Total for DCMI and Heavy Industrial Uses Combined

The following is a summary of water right elements proposed for all Navajo Nation DCMI and heavy industrial uses from the San Juan River and from ground water in the San Juan River Basin in New Mexico combined under the Proposed Decrees, as compared to historic use, current water use authorizations, and the US Claims:

	Historic <u>Use</u>	Current <u>Right</u>	<u>US Claims</u>	Proposed <u>Decree</u>
Annual Diversion (acre-feet)	8,684	18,780	142,336	32,016
Annual Depletion (acre-feet)	5,991	13,820	102,272	26,506

These depletions are distributed as follows (in acre-feet):

	Historic <u>Use</u>	Current <u>Right</u>	<u>US Claims</u>	Proposed <u>Decree</u>
NGWSP	0	0		20,780
ALP	0	2,340		2,340
Other San Juan River DCMI Uses	912	580		1,300
Ground Water DCMI Uses	1,534	1,670		2,000
DCMI Use Subtotal	2,446	4,590	36,575	26,420
Heavy Industrial Uses	3,545	9,230	65,697	86
Total	5,991	13,820	102,272	26,506

E. Summary of Navajo Nation Water Uses

The following is a summary of water right elements proposed for all Navajo Nation water uses from the San Juan River Basin in New Mexico combined under the Proposed Decree, as compared to current rights and the US Claims (including also state law rights for 86 acre-feet per year of diversion and depletion of ground water for industrial uses included in the Proposed Supplemental Decree):

	Current <u>Right</u>	<u>US Claims</u>	Proposed <u>Decree</u>
Annual Diversion (acre-feet)	663,148	857,669	451,746 ¹⁸
Annual Depletion (acre-feet)	329,331	570,828	(606,746) 325,756

The proposed water rights for the Navajo Nation included in the Proposed Decree are distributed as follows by source of water (in acre-feet):

¹⁸ See footnote 6.

<u>Category of Use</u>	<u>Water from US Projects with Reservoir Storage (Administered with State Law Priority for Project)</u>		<u>Water from Direct Flow Only (Flow Available without Upstream NM Reservoir Regulation)</u>		<u>Ground Water</u>	
	<u>Diversion</u>	<u>Depletion</u>	<u>Diversion</u>	<u>Depletion</u>	<u>Diversion</u>	<u>Depletion</u>
NIIP (existing and future)	353,000 ¹⁹ (508,000)	270,000	0	0	0	0
NGWSP (new authorization)	22,650	20,780	0	0	0	0
ALP (future use)	4,680	2,340	0	0	0	0
Hogback-Cudei Project (existing)	0	0	48,550 (221 cfs)	21,280	0	0
Fruitland-Cambridge Project (existing)	0	0	18,180 (100 cfs)	7,970	0	0
Other San Juan River DCMU Uses (existing and future)	0	0	2,600 (5 cfs)	1,300	0	0
Reserved Ground Water Uses ²⁰ (existing and future)	0	0	0	0	2,000	2,000
Total	380,330²¹ (535,330)	293,120	69,330	30,550	2,000	2,000

¹⁹ See footnote 6.

²⁰ Excludes 86 acre-feet of industrial use rights under state law that are included in the Proposed Supplemental Decree.

²¹ See footnote 6.

III. PROTECTIONS TO OTHER USERS PROVIDED BY THE SETTLEMENT

A. Reasons for Settlement

The Settlement Agreement, including the Proposed Decrees, should be evaluated on the basis of comparing a future with the settlement against a future without settlement, which involves litigation risks associated with the water rights claims of the Navajo Nation and its members. The water right claims for the Navajo Nation asserted by the US Claims are much greater than the water rights for the Navajo Nation that would be provided by the proposed decrees, and the United States and the Navajo Nation also assert the earliest priority date for the diversion and use of water from the San Juan River stream system in New Mexico. Determining the amount of water rights that the Navajo Nation may obtain through litigation of these claims in the Adjudication is difficult. However, resolving the water right claims of the Navajo Nation, or of the United States made on behalf of the Navajo Nation, through settlement would provide certainty as to the rights of the Navajo Nation and allows the State of New Mexico to obtain several protections to other water users in the San Juan River Basin in New Mexico that could not be achieved through litigation of the claims.

B. Protection of Existing and Authorized Non-Navajo Uses

1. Protections Limiting Navajo Nation Depletions.

a. Water Uses Are within New Mexico's Compact Apportionment. Based on the "Hydrologic Determination, 2007, Water Availability from Navajo Reservoir and the Upper Colorado River Basin for Use in New Mexico," prepared by the USBR and approved by the Secretary on May 23, 2007 (2007 Hydrologic Determination), the Settlement Agreement, including the Proposed Decrees, resolves the water right claims of the Navajo Nation, and of the United States made on behalf of the Navajo Nation, in a total amount of depletion the use of which is within the consumptive use apportionment made and available to the State of New Mexico under the Upper Colorado River Basin Compact without displacing existing and authorized non-Navajo water uses in the San Juan River Basin in New Mexico.

b. Limit on Average NIIP Depletions. Under the Proposed Decree, the depletions under the water rights for the NIIP will be determined as depletions of the flow of the San Juan River based on diversions minus return flows to the San Juan River. The Navajo Nation under the Proposed Decree would have to schedule bringing new lands on Blocks 10 and 11 of the NIIP into production and manage cropping patterns on the NIIP so as to not exceed a maximum depletion of flow of the San Juan River of 270,000 acre-feet per year, on average, during any period of ten consecutive years, including incidental depletions of river flow resulting from deep percolation losses of applied irrigation water to ground water beneath NIIP lands and channel losses between the NIIP boundary and the San Juan River on discharges or returns to the Chaco River drainage.²² With settlement, these incidental depletions will be included within the maximum average annual

²² Also, the "Final Biological Opinion for the Navajo-Gallup Water Supply Project," prepared by the US Fish and Wildlife Service (FWS) and dated February 26, 2009, at pages 6-16 indicates that for purposes of ESA compliance, the Navajo Nation under certain circumstances may forgo use of up to 20,780 acre-feet per year of depletion on the NIIP to offset new depletions of flow of the San Juan River occurring as a result of its NGWSP diversions.

depletion of San Juan River flow for the NIIP of 270,000 acre-feet per year that is included in the Proposed Decree; whereas, without settlement, these incidental depletions would be in addition to an estimated average annual on-site NIIP depletion demand of about 270,000 acre-feet per year.

Without settlement, future depletions of flow from the San Juan River by the NIIP could average significantly more than 270,000 acre-feet per year. The NIIP Biological Assessment at pages 32-45 estimated that if all 110,630 project acres were to be developed and irrigated each year, the average annual depletion demand for the NIIP would approach about 280,600 acre-feet per year in the near term including depletions resulting from deep percolation losses to ground water beneath project lands. Once the ground water beneath project lands stabilizes and return flows from deep percolation reach equilibrium with deep percolation losses, the NIIP Biological Assessment estimated that the average annual depletion may decline from 280,600 acre-feet per year to about 270,000 acre-feet per year. These amounts of depletion are on-site depletions within the NIIP boundaries that were calculated assuming certain amounts of surface return flows measured at the project boundaries in the Gallegos Wash, Ojo Amarillo and Chaco River drainages. Most of the project lands within the Gallegos Wash and Ojo Amarillo drainages have been developed, and most of the project lands within the Chaco River drainage remain to be developed.

The northern boundary of the NIIP nearly coincides with the edge of the San Juan River valley where return flows from Gallegos Wash and Ojo Amarillo, including from springs or seeps above the Fruitland Canal, are accumulated and measured at or near the points that washes or springs cross the Hammond Canal or Fruitland Canal, respectively. However, a significant portion of the water that is anticipated to be discharged or to drain from the project toward the west into ephemeral channels in the Chaco River drainage can be expected to be lost before reaching the San Juan River.²³ The NIIP Biological Assessment does not account for these incidental channel loss depletions between the project boundary and the mouth of the Chaco River, which is where returns from the project into the Chaco River drainage would enter into the San Juan River.

c. Limits on Annual Hogback and Fruitland Project Depletions. Under the Proposed Decree, the Navajo Nation's actual annual depletions under the water rights for the Hogback-Cudei and Fruitland-Cambridge projects will have to stay within the maximum annual depletion amounts for each project described in the decree. Accounting of the actual total irrigation depletions for each irrigation project, including crop consumptive uses plus incidental irrigation depletions, will be made using a methodology acceptable to the State Engineer. The Navajo Nation under the Proposed Decree will have to manage the acres irrigated or fallowed, cropping patterns and farm deliveries on the Hogback-Cudei and Fruitland-Cambridge projects each year so as to not exceed

²³ It has been estimated that approximately 30 percent of discharges from Morgan Lake into the Chaco River drainage, which discharges typically occur at an average rate of about 22 cfs for weeks at a time, are lost in the 16.5 channel miles between the lake and the mouth of the Chaco River (see "Memorandum on Historic Depletions from the San Juan River in New Mexico for Power Generation," prepared by Pat Turney and John Whipple, revision dated August 8, 2003). Current return flows from Block 3 measured at the western boundary of the NIIP that are not intercepted by the Navajo Mine would have to travel about twice as much distance across ephemeral channels to the San Juan River as compared to Morgan Lake discharges, and future return flows to the Chaco River drainage measured at the western boundary of the NIIP from Blocks 10 and 11, which remain to be constructed, would have to travel three to four times as much distance to the San Juan River as compared to Morgan Lake discharges. Current return flows from Block 3 at the western boundary of the NIIP have not been documented to return to the San Juan River. The NIIP Biological Assessment estimated that under full development of the NIIP and after the ground water beneath the project stabilizes, there may be about 18,900 acre-feet per year (or an average of about 26 cfs) of future return flows from the project to the Chaco River drainage measured at the western boundary of the NIIP.

the maximum annual depletion amounts for each project. In effect, the Proposed Decree would recognize a total of 12,165 irrigable acres under the Hogback-Cudei and Fruitland-Cambridge projects combined based on existing BIA Land Use Permits, but the annual depletion limits for the projects may result in a practical reduction in the amount of project acres that could be irrigated in any one year for crop production unless other Navajo Nation water rights are transferred to irrigation uses on the projects to supplement the water rights for these projects included in the decree. The annual depletion limits for the Hogback-Cudei and Fruitland-Cambridge projects thus help protect New Mexico's ability to meet its interstate compact obligations and may also provide some protection to existing water uses in New Mexico, and they are unique to the Navajo Nation's irrigation projects.

Specifically, for purposes of settlement, the maximum annual depletion amounts in the Proposed Decree for irrigation uses under the Hogback-Cudei and Fruitland-Cambridge projects were quantified based on per-acre consumptive irrigation requirements (CIRs) that are consistent with the CIRs for non-Indian ditches contained in the 1938 State Engineer Hydrographic Survey report approved by the Echo Ditch Decree, plus incidental irrigation depletions assumed to average about 16 percent of crop consumptive uses.²⁴ These CIRs were determined based on the Lowry-Johnson method, and average about 2.07 acre-feet per acre; whereas, the US Claims assert CIRs for both projects generally averaging about 2.37 acre-feet per acre calculated using the Hargreaves method (see Responses to Public Comments, pages 42-46; see also US Technical Reports, "Navajo San Juan Main Stem and NIIP Historically Irrigated Acreage," page 11). The US Claims generally used an incidental irrigation depletions factor of about 14.7 percent to calculate total depletions for both projects. Overall, the average annual depletion rate for the Hogback-Cudei and Fruitland-Cambridge projects provided by the Proposed Decree is about 2.4 acre-feet per acre, which is about 11 percent less than the average annual depletion rate for both projects of about 2.7 acre-feet per acre asserted by the US Claims.²⁵ In addition to asserting greater per-acre irrigation depletion rates for these projects than those that were used to negotiate the Settlement Agreement, the US Claims also assert rights for the Navajo Nation to irrigate up to 24,232 acres under both these projects combined, as compared to the 12,165 acres combined for these projects that are in the Proposed

²⁴ If the Court in the Adjudication adopts a methodology for calculating CIRs, farm delivery requirements (FDRs) and project diversion requirements (PDRs) that differs from that used to adjudicate non-Indian water rights in the Echo Ditch Decree, and if the adopted methodology would result in greater depletion and diversion rates for the Hogback-Cudei and Fruitland-Cambridge projects than those incorporated in the Proposed Decree, then the annual depletion and diversion amounts for these projects would be recalculated to be consistent with the methodology adopted by the Court.

²⁵ Using the modified Blaney-Criddle method, the ISC staff in 2006 estimated that the CIRs for the Fruitland-Cambridge and Hogback-Cudei projects may average about 2.36 acre-feet per acre and 2.45 acre-feet per acre, respectively, based on climatological data for the period 1929-2003 and on cropping pattern data for each project from crop field surveys conducted in 2000 and 2003-2005. The OSE Water Use and Conservation Bureau for preparing water use inventories has included incidental irrigation depletions factors of about 18.4 percent of crop consumptive use for flood irrigation from ditches in the Animas River valley and about 19.4 percent for flood irrigation from ditches in the San Juan River valley (see "Water Use by Categories in New Mexico Counties and River Basins, and Irrigated Acreage in 2000," OSE Technical Report 51, February 2003, table 9). Assuming an average incidental irrigation depletions rate of about 18 to 19 percent of crop consumptive use, the average annual irrigation depletion rates for the Fruitland-Cambridge and Hogback-Cudei projects would be about 2.8 acre-feet per acre and 2.9 acre-feet per acre, respectively, based on the modified Blaney-Criddle method.

Decree.²⁶ The US Claims further assert irrigation rights for an additional 41,447 acres outside of these projects, excluding NIIP acreage.

d. Offsets of Future Use Depletions Made by Navajo Allottees. The United States has set aside land allotments for use by individual members of the Navajo Nation that are separate from Navajo Nation trust lands. The United States has separate trust responsibilities to the allottees, and has not yet filed water right claims on their behalf. The United States, not the Navajo Nation, represents the allottees in the Adjudication. The Settlement Agreement does not settle water right claims of individual Navajo allottees, and the allottees are not bound by the Settlement Agreement and may have federal reserved claims to future uses in addition to claims for historic and existing agricultural and domestic uses in the San Juan River Basin. However, under the Settlement Agreement, the Navajo Nation agrees that any reserved rights which may be adjudicated to Navajo allottees for additional future uses will be fulfilled or serviced by water rights of the Navajo Nation described in the Proposed Decrees, or the depletions of flow of the San Juan River resulting from the use of water under such rights of allottees will be fully offset by a forbearance of use of water rights adjudicated to the Navajo Nation by the Proposed Decrees.

e. Limits on Depletions for Ground Water Uses. The Proposed Decree recognizes a reserved right with a June 1, 1868, priority date for the Navajo Nation to divert and consumptively use up to 2,000 acre-feet of ground water in the San Juan River Basin in New Mexico, not including the diversion of ground water for *de minimis* uses under residential domestic and stock tank use wells and the ground water uses included in the Proposed Supplemental Decree. The Proposed Decree also recognizes junior water rights for additional ground water withdrawals in excess of 2,000 acre-feet for uses on Navajo Nation trust lands with priority dates to be equal to the dates on which the Nation notifies the State Engineer of the additional ground water withdrawals, subject to non-impairment of other water rights. The Navajo Nation will have to offset, however, any cumulative depletion of flow of the San Juan River in excess of 2,000 acre-feet per year resulting from all of its diversions and uses of ground water in the basin in New Mexico combined, exclusive of *de minimis* uses under residential domestic and stock tank use wells and of the ground water uses included in the Proposed Supplemental Decree. This offset requirement will be met by forbearance of use of its surface water rights in accordance with a water replacement plan approved by the State Engineer in advance so as to fully offset the excess amount of depletion of river flow over and above 2,000 acre-feet per year. Exceptions to this offset requirement may be granted when, in the State Engineer's judgment, replacement water is not needed to avoid impairment to other water rights or interstate compact delivery requirements.

f. Limits on Tributary Water Use Depletions. The Proposed Supplemental Decree recognizes water rights for historic Navajo Nation water uses in New Mexico supplied from ephemeral tributaries to the San Juan River, springs, stock wells or irrigation wells, and does not include water rights for any uses asserted by the US Claims based on future water development. Further, in the event that the exercise of the Navajo Nation's water rights under the Proposed Supplemental Decree results in actual depletions at the places of use exceeding an average of 8,355 acre-feet per year during any period of ten consecutive years for all uses in the decree excluding stock water consumption, or results in actual depletions from the flow of the San Juan River exceeding an

²⁶ Also, the Congressional record on the Act of June 13, 1962 (Public Law 87-483), indicated that in the future, the total combined acreage for the Fruitland-Cambridge and Hogback-Cudei projects might expand to as much as 26,000 acres (see "85th Congress, 2nd session, Senate, Report No. 2198," August 5, 1958, p. 18).

average of 1,819 acre-feet per year during any period of ten consecutive years for all uses in the decree combined, the Navajo Nation will have to offset the amount of actual depletion that is in excess of these depletion limits by forbearing use of surface water rights if the State Engineer determines that this replacement water is needed for the State of New Mexico to meet its interstate compact obligations or to protect existing water uses in New Mexico. These limits on actual average depletions reflect historic use within the water supply available in the ephemeral tributary drainage areas.

Both depletion limits may be increased to reflect any change in depletion rights for Navajo tributary irrigation uses if the Court in the Adjudication adopts a different methodology for calculating CIRs than that used by the 1938 State Engineer Hydrographic Survey report upon which the rights adjudicated by the Echo Ditch Decree were based. Also, the limit on average annual depletions of flow of the San Juan River may be increased if the State Engineer adopts a change in methodology for calculating depletion effects on river flow from the use of water in the ephemeral tributary drainages, as compared to the methodology used to derive the depletion limit (see Quantification Analysis); provided, that the limit on the actual average depletion of flow of the San Juan River resulting from Navajo tributary water uses is not increased to a quantity that is greater than 50 percent of the limit on the actual average depletion at the places of use. The latter adjustment recognizes that better information may become available in the future as to the amount of impact that tributary water uses have on San Juan River flow, but also places a cap on the amount of any increase in the depletion limit. With these limits on actual depletions for the Navajo Nation's tributary water uses, the water rights in the Proposed Supplemental Decree will not affect the finding of the 2007 Hydrologic Determination that sufficient water is reasonably likely to be available to supply the Navajo Nation's uses under the NGWSP.

g. Repayment of Overuse. Under the Proposed Decree, if the Navajo Nation in any year diverts or depletes more water for its uses under the NIIP, the NGWSP or the ALP than it is entitled to pursuant to the Settlement Agreement, the Navajo Nation in the following year will forego the diversion and use of water on these projects in amounts that are equal to the quantities of overuse. This repayment of overuse provision protects the State of New Mexico in maintaining its ability to meet its compact obligations, and potentially protects reservoir storage available to make deliveries to all contractors for water from the Navajo Reservoir water supply or the ALP.

2. Protections Limiting Navajo Nation Diversions or Priority Calls.

a. Effective Reduction in NIIP Diversions. Based on the NIIP Biological Assessment, the amount of diversion required for the project is anticipated to average between 337,500 acre-feet per year and 372,000 acre-feet per year if all 110,630 acres were to be irrigated each year, depending on the implementation and effectiveness of planned water management changes and water conservation measures. The Proposed Decree recognizes an average annual diversion of 508,000 acre-feet per year for the NIIP pursuant to Public Law 87-483 and the existing contract with the Secretary for water from Navajo Reservoir to supply the NIIP. However, the Proposed Decree also provides that if any portion of the NIIP right is used for a purpose other than irrigation, then the Navajo Nation will have to file application with the State Engineer to increase the total average diversion by all uses under the water rights for the NIIP above 353,000 acre-feet per year, and approval of such application will be subject to non-impairment of other water rights in New Mexico. The Navajo Nation would be able to change the purpose or place of use of its water rights for the NIIP on Navajo Nation trust lands without State Engineer approval so long as the total average diversion

for all uses under said rights in the aggregate does not exceed 353,000 acre-feet per year, and any such changes must not impair other water rights in New Mexico or cause depletions under the water rights for the NIIP to exceed 270,000 acre-feet per year.²⁷ This amount of diversion assumes that either: (1) planned water conservation measures on the project are about half as effective as anticipated; or (2) water conservation measures do not occur or do not realize any benefits, and about 5 percent of the project acreage, on average, is fallow. Non-irrigation uses presently made under the water use authorizations for the NIIP include aquaculture, feedlot operations and food processing.

In effect, the Proposed Decree will impose a practical reduction on the annual diversions under the water right for the NIIP. The difference between the 508,000 acre-feet per year diversion authorized by Public Law 87-483 for the flood irrigation project that was originally planned and the estimated average annual diversion required for the sprinkler irrigation project that is actually constructed is not separable from the consumptive use right for the project, and therefore, is not transferable by itself to other uses.

b. Hogback and Fruitland Project Diversions Limited by Echo Ditch Decree Standards. The maximum instantaneous diversion rate in the Proposed Decree for the Hogback-Cudei Irrigation Project of 221 cfs is based on the per-acre diversion rate of 1 cfs per 40 water right acres consistent with the same standard used by the Echo Ditch Decree to adjudicate maximum diversion rates for non-Indian ditches in the San Juan River Basin. The maximum instantaneous diversion rate proposed for the Fruitland-Cambridge Irrigation Project of 100 cfs is based on the existing capacity of the Fruitland Canal, which is fully utilized at present; except, that the Proposed Decree provides for the maximum diversion rate to be reduced to as low as 83.4 cfs consistent with a per-acre diversion rate of 1 cfs per 40 water right acres depending upon the effectiveness of project rehabilitation authorized by the Settlement Act.

The Proposed Decree recognizes water rights for irrigation uses on both the Hogback-Cudei and Fruitland-Cambridge projects based on per-acre CIRs, FDRs and PDRs that are consistent with the CIRs, FDRs and PDRs, respectively, for non-Indian ditches contained in the 1938 State Engineer Hydrographic Survey report approved by the Echo Ditch Decree.²⁸ The diversions for irrigation uses on these two projects will be subject to an FDR of 3.3 acre-feet per acre. The diversions for the projects also will be subject to the annual diversion amounts for each project in the Proposed Decree; provided, that the annual diversion limits in the decree will not be enforced if PDRs are not enforced against the non-Navajo ditches on the San Juan River stream system.²⁹

²⁷ In addition, the BIA in 1999 pursuant to section 7 of the ESA consulted with the FWS on completion of the NIIP. The consultation was for a long-term average annual diversion of 337,500 acre-feet per year for the project. The BIA or the USBR would have to consult with the FWS under section 7 of the ESA prior to increasing diversions above an average of 337,500 acre-feet per year under the rights for the project.

²⁸ See footnote 26.

²⁹ The Proposed Decree would allow the Navajo Nation to make additional diversions to be made over and above the maximum annual diversion amounts in the decree if and when supplemental carriage water is needed in the Hogback or Fruitland canal systems and the State Engineer determines that there is excess flow available for such additional diversions without impairment to other water rights in New Mexico.

c. Subordinated Priority Dates for Navajo Uses under Federal Water Projects. Under the Settlement Agreement, the Navajo Nation's water rights for the NIIP and the NGWSP will be administered with a priority date of 1955 rather than a reserved priority date of 1868, and the uses of water under the NIIP and the NGWSP will share in shortages in the Navajo Reservoir water supply with the San Juan-Chama Project, the Jicarilla Apache Nation, the Hammond Irrigation Project and other existing Navajo Reservoir water supply contractors. The Navajo Nation could assert an 1868 reserved right priority for water for the NIIP and the NGWSP only if the ability to receive water for the projects under the Settlement Contract is irretrievably lost, such as due to removal of Navajo Dam. Water supply shortages to the NIIP or the NGWSP will not nullify the subordination of the reserved right priority.

The water made available to the Navajo Nation for its uses under the NIIP and the NGWSP is based upon water rights held by the Department of the Interior pursuant to OSE File No. 2849 with a priority date of June 17, 1955, for uses from water originating above Navajo Reservoir. The water supply available to the NGWSP at the diversion from the San Juan River near Kirtland is supplemented by inflows to the San Juan River arising below Navajo Dam, which may be diverted for the Navajo Nation's uses under the project pursuant to OSE File No. 3215 with a priority date of December 16, 1968. In general, once the spring snowmelt runoff ends in about July, water delivered to the NIIP and the NGWSP for the remainder of the irrigation season is from Navajo Reservoir storage at times when there is insufficient direct flow in the river available for diversion with the junior priority dates.

Similarly, under the Settlement Agreement, the Navajo Nation's water rights for the ALP will be administered with a priority date of 1956 rather than a reserved priority date of 1868, and the uses of water under the ALP will share in shortages in the project water supply with the San Juan Water Commission, the La Plata Conservancy District and other ALP contractors. The water made available to the Navajo Nation for its uses under the ALP is based upon water rights held by the Department of the Interior pursuant to OSE File No. 2883 with a priority date of May 1, 1956. In general, once the spring snowmelt runoff ends in about July, water delivered for the Navajo Nation's uses under the ALP for the remainder of the irrigation season is from Lake Nighthorse storage at times when there is insufficient direct flow in the Animas River available for diversion with the junior priority date.

d. Alternate Use of NIIP Water on the Hogback Project. Under the Settlement Agreement, the Navajo Nation agrees that when the direct flow of the San Juan River is so low that the amount of stream flow available for diversion at the Hogback-Cudei Project and Fruitland-Cambridge Project diversion dams is insufficient to meet water demands on the projects, it will refrain from or delay requests for a priority administration of upstream junior appropriators on the San Juan River stream system to increase the flow available for diversion at the head of the Hogback and Fruitland canals, respectively. Instead, the Navajo Nation agrees to make available from the NIIP water supply under its Settlement Contract up to 12,000 acre-feet of water in any year that could then be delivered from Navajo Reservoir storage to the Hogback-Cudei and Fruitland-Cambridge Projects to meet the diversions demands on these projects. The maximum amount of this alternate water supply for the Hogback-Cudei and Fruitland-Cambridge projects that will be required to be made available from the NIIP water allocation in any year will proportionately decrease from 12,000 acre-feet in years that the NIIP is allocated a full supply from the Navajo Reservoir water supply to 0 acre-feet in years that the NIIP water allocation from the Navajo Reservoir water supply is shorted by 20 percent or more. If the amount of alternate water supply required to be delivered to

the Hogback-Cudei Project or the Fruitland-Cambridge Project is exhausted in any year, then priority calls may be requested at times during the remainder of that irrigation season when additional water is needed to meet the water demands of the projects. The Navajo Nation at its own discretion could provide additional amounts of alternate water delivery from the NIIP to the Hogback or Fruitland projects. Also, this alternate water supply provision of the Settlement Agreement does not preclude the Navajo Nation from entering into cooperative river administration agreements with other water users such as the Recommendations.

In effect, the alternate water supply provision of the Settlement Agreement provides, by exchange, benefits of storage water in Navajo Reservoir to the non-Navajo water users on the San Juan River without them having to pay for it. To better understand the possible benefits, the hydrologic record was reviewed to determine risks of a priority administration being necessary without and with the alternate water supply provision. This review was based on the following conservative assumptions: (1) the Hogback-Cudei and Fruitland-Cambridge projects do not divert any releases of stored water from Navajo Reservoir made to maintain base flows for endangered fish species critical habitat from Farmington to Lake Powell; (2) all water rights are fully exercised and the actual diversion demands on the San Juan River through September are equal to the maximum diversion rates adjudicated by the Echo Ditch Decree, licensed or permitted by the State Engineer, or included in the Proposed Decree; (3) the amount of release from Navajo Dam needed to support the actual diversion demands on the San Juan River downstream from the dam under water rights in New Mexico that have priority dates senior to June 17, 1955, through September is about 450 cfs (250 cfs in October), except at times when the Animas River is contributing significant inflow to the San Juan River that can be used to meet demands below the confluence; (4) the USBR bypasses through the dam inflows to Navajo Reservoir up to 450 cfs through September (up to 250 cfs in October) to meet downstream water rights with priority dates senior to June 17, 1955; and (5) Navajo Reservoir releases in excess of reservoir inflows are releases of storage water that are not available for diversion downstream of the dam except in accordance with a Navajo Reservoir water supply contract as per section 11 of the Act of June 13, 1962 (Public Law 87-483).³⁰

Based on these assumptions, it was estimated that there may be shortages to the Hogback-Cudei or Fruitland-Cambridge projects for some period of time, usually in late summer to early fall, ranging from a few weeks to months in approximately 50 percent of the years (see Responses to Public Comments, Appendix D). Priority calls to alleviate these shortages could subject junior water uses to curtailment. However, in most of these years, the amount of water to be provided to the

³⁰ The Secretary in July 2006 approved a “Record of Decision on Navajo Reservoir Operations” (Record of Decision) that provides for operating the reservoir to meet the San Juan River Basin Recovery Implementation Program’s Flow Recommendations for the San Juan River (Flow Recommendations), or a reasonable alternative, while also operating the reservoir to supply water to contractors of the Navajo Reservoir water supply. The Flow Recommendations include releases of storage water from Navajo Reservoir as may be needed to maintain base flows in the San Juan River below Farmington at about 500 cfs, generally measured as the maximum of: (1) the average of the flow at the Farmington, Shiprock and Four Corners gages; or (2) the average of the flow at the Shiprock, Four Corners and Bluff gages. Operation of Navajo Reservoir to meet the Flow Recommendations contributes to providing ESA compliance for water uses supplied from federal water projects in the basin, including Navajo Reservoir, the NIIP, the NGWSP, the ALP, the Hammond Irrigation Project, uses under the Jicarilla Apache Nation’s Settlement Contract approved by Congress in 1992, and the SJCP. The hydrologic modeling which provided the basis for the Record of Decision met all water use demands on the San Juan River in New Mexico without consideration of administering releases of storage water from Navajo Reservoir separately from the available direct flow. It has not been determined whether the Hogback-Cudei and Fruitland-Cambridge projects pursuant to section 11(c) of the Act of June 13, 1962 (Public Law 87-483) cannot be prohibited from diverting any storage water that is in the river at their diversion dams and would otherwise flow out of the State of New Mexico unused.

Hogback and Fruitland projects in accordance with the alternate water supply provision would be sufficient to avoid altogether the occurrence of a priority call during the year. With the alternate water supply provision, it was estimated that if all water rights were fully exercised on the river there may be a priority call in about 5 percent of the years.

e. Reserved Tributary Uses Not Transferable. Under the Proposed Supplemental Decree, the Navajo Nation's federal reserved water rights for diversion and storage of water in stock ponds from tributary water sources described in subparagraph 3.A.1 of the decree: (1) cannot be transferred to other purposes of use or to other sources of water supply; and (2) essentially are in-situ storage rights that can only be moved within 1,000 feet of the locations described by the US Survey, subject to not being relocated below the confluence with another watercourse and to not increasing the amount of depletion over and above the historic average annual depletion at the original location. In addition, the Navajo Nation's federal reserved water rights for diversion and storage of water in stock ponds from water sources other than the San Juan River will be limited as described in subparagraph 3.A.1 of the Proposed Supplemental Decree, such that construction and use of stock ponds in other locations not claimed by the US Survey would have to be offset using other depletion rights adjudicated by the Proposed Decrees. Further, the Proposed Supplemental Decree includes substantial limitations on the transferability of water rights for Navajo Nation irrigation uses from tributaries to the San Juan River.

3. Additional Protections to Non-Navajo Water Uses.

a. Protection of ALP Uses. The allocations of ALP water made to the SJWC, the LPCD and the Navajo Nation by the Colorado Ute Settlement Act Amendments of 2000 total an annual depletion of 13,520 acre-feet. In the event that curtailment of water uses in New Mexico is required pursuant to provisions of the Upper Colorado River Basin Compact and it results in curtailment of uses under these ALP water allocations, the Navajo Nation under the Settlement Agreement will forbear exercising a portion of its water rights as needed to make water available for the ALP uses in New Mexico to the extent that the ALP uses would then have the same percentage water supply for the year as the NGWSP uses in New Mexico; provided, that up to one-third of this forbearance is conditional. The conditional amount of forbearance is based on an equal amount of decreed, licensed or permitted water rights being found to be either lost for non-use, permanently retired by the State of New Mexico, or cancelled by the State Engineer. This provision of the Settlement Agreement does not require the Court, the State of New Mexico or the State Engineer to take any of these actions; rather, it simply provides that up to one-third of the ALP protection to be provided by forbearance of use of the Navajo Nation's water rights is conditional.

b. Protection of San Juan-Chama Project Diversions. Section 8(a) of Public Law 87-483 limits the average annual diversion by the SJCP during any period of ten consecutive years to 135,000 acre-feet per year. The Settlement Act clarifies that the normal annual diversion requirement for the SJCP is 135,000 acre-feet for the purpose of implementing the water allocation formula described by section 11(a) of Public Law 87-483 during years of shortages in the Navajo Reservoir water supply. This normal annual diversion requirement for the SJCP mitigates against water allocation shortages for the project diversions in the San Juan River Basin, as the annual diversions by the SJCP for export to the Rio Grande Basin are anticipated to average only about 105,200 acre-feet per year over the long term based on the available hydrologic record (see "San Juan-Chama Project Water Supply," prepared by John Whipple and dated July 2007). Also, it can reasonably be anticipated that during years of shortage in the Navajo Reservoir water supply, actual SJCP

diversions are likely to be limited more by a lack of water physically available at the project's diversion dams on tributaries to the San Juan River in Colorado than by a shorted water allocation calculated pursuant to section 11(a) of Public Law 87-483.

c. Protection of Non-Navajo Irrigation Rights and Farmland. In the Jicarilla Apache Nation's Settlement Contract approved by Congress in 1992, the United States agreed to buy-out private water rights totaling 11,000 acre-feet per year of depletion from the San Juan River stream system by 2040 to reconcile total commitments of depletion from the system in New Mexico with the State's allocation of Upper Colorado River Basin water, as reflected on page 24 of the "Hydrologic Determination, 1988, Water Availability from Navajo Reservoir and the Upper Colorado River Basin for Use in New Mexico," prepared by the USBR and approved by the Secretary on February 2, 1989 (1988 Hydrologic Determination), or make other satisfactory provision to reconcile those commitments with New Mexico's allocation. If the buy-out provision were implemented, the United States could seek to acquire currently unused decreed irrigation rights or to acquire and retire up to approximately one-third of the remaining irrigated non-Indian farmland in the San Juan River and Animas River valleys, excluding farmland within the USBR's Hammond Irrigation Project. With the Settlement Agreement and the 2007 Hydrologic Determination, the United States likely will no longer be required to buy-out and retire any existing private water rights in the basin to comply with its obligation under the Jicarilla Apache Nation Settlement Contract.

C. Other Protective Benefits for Non-Navajo Water Users

1. Benefits Related to the Adjudication of Water Rights.

a. Navajo Acceptance of the Echo Ditch Decree. Under the Settlement Agreement, the Navajo Nation agrees to not challenge the elements of water rights previously adjudicated by the Echo Ditch Decree; except, on the basis of forfeiture, abandonment or illegal use since entry of the Echo Ditch Decree in 1948. The Navajo Nation also may challenge any quantifications of carriage water requested for irrigation uses that are in excess of the per-acre farm delivery or diversion amounts provided in the 1938 State Engineer Hydrographic Survey report approved by the Echo Ditch Decree.

b. Settlement of City of Farmington Water Rights. The State of New Mexico, the City of Farmington and the Navajo Nation entered into an agreement regarding the quantification and adjudication of the City's primary water rights, including the City's trust rights described in the Echo Ditch Decree (see "Agreement Among the State of New Mexico, the City of Farmington and the Navajo Nation," executed by the State Engineer on March 11, 2005 (Farmington Agreement)). Under the Farmington Agreement, the City agreed to support the Settlement Agreement, including entry in the Adjudication of the Proposed Decree. The Navajo Nation agreed to not challenge the adjudication of the City's water rights as described by the Farmington Agreement so long as the Settlement Agreement has not been terminated and the City has fulfilled its commitment to support the Settlement Agreement and entry of the Proposed Decree.

c. Navajo Waiver of Water Right Claims in Exchange for Wet Water. In return for federal authorization and funding of the NGWSP, the Navajo Nation, and the United States acting in its capacity as trustee for the Navajo Nation, will waive and release all claims for water rights in the San Juan River Basin in New Mexico except to the extent that such rights are included in the

Proposed Decrees (see Appendix 3 to the Settlement Agreement). Based on the PIA standard and more modern economic development standards, the US Claims assert reserved water rights for the Navajo Nation for historic and future uses in the basin in New Mexico totaling about 937,608 acre-feet of diversion and 595,257 acre-feet of depletion, plus unspecified reservoir evaporation depletions associated with 65,647 acre-feet of reservoir storage. Under the Proposed Decrees, the total depletion right for all Navajo Nation water uses in the basin will be limited to 334,542 acre-feet per year, which includes depletions for the Navajo Nation's uses under the NIIP and the ALP as currently authorized, for the existing Hogback-Cudei and Fruitland-Cambridge projects as currently permitted for farming by the BIA, and for other existing Navajo Nation uses. The only new water use authorization in the basin in New Mexico that is provided for the Navajo Nation by the Settlement Agreement and the Settlement Act is for the Navajo Nation's uses under the NGWSP in an annual amount of 22,650 acre-feet of diversion and 20,780 acre-feet of depletion for municipal and domestic uses by Navajo communities in northwestern New Mexico.

2. Benefits Related to General Administration Issues.

a. Limit to the Right to Use Water. Under the Proposed Decrees, the rights of the Navajo Nation to divert and use water will be limited to the amounts of water then necessary for actual uses. For example, the Navajo Nation will not be entitled to divert 221 cfs for irrigation on the Hogback-Cudei Project, and no priority call would be made to make 221 cfs available for diversion by the project, at times when the actual diversion demand that is required for the amount of acres then being irrigated is less than this.

b. Navajo Acceptance of State Engineer as Water Master in the Basin. Under the Settlement Agreement, the Navajo Nation agrees that the State Engineer has authority to serve as the water master in the San Juan River Basin and to administer all water rights in priority as necessary to comply with interstate compact obligations and other applicable law. This includes State Engineer jurisdiction to determine beneficial uses and any needs for curtailments of use in response to priority call requests made by the Navajo Nation on behalf of the Hogback-Cudei and Fruitland-Cambridge irrigation projects.

c. Limited Administrative Authority for the Navajo Nation. Under the Proposed Decrees, the Navajo Nation will administer its water rights on Navajo Nation trust lands in the San Juan River Basin in New Mexico, subject to non-impairment of non-Navajo Nation water rights and to the provisions of the decrees and the Settlement Agreement. The Navajo Nation will be responsible for measuring and reporting water uses under its water rights, and the State Engineer will monitor Navajo Nation water uses for compliance with the Proposed Decrees. Transfers of water rights of the Navajo Nation to uses to be located off Navajo Nation trust lands will require approval of the State Engineer. The Navajo Nation also agrees that the Court will retain jurisdiction to review and resolve disputes, if any, between the Navajo Nation, the State Engineer, or other parties to the Adjudication regarding administration of the Nation's water rights.

3. Water Marketing.

a. Authority Provided for Within-State Marketing of Navajo Water. The Settlement Agreement provides the Navajo Nation with the authority to lease its reserved rights and to subcontract its Navajo Reservoir water supply contract water to others within New Mexico, subject to non-impairment of other water rights and also to State Engineer permit approval if the lease or

subcontract involves a change in the place of use to a location off Navajo Nation trust lands or a change in the point of diversion.

b. State Consent Required for Out-of-State Marketing of Navajo Water Rights. The provisions of the Colorado River Compact, the Upper Colorado River Basin Compact and other federal law restrict the marketing or transfer of water between the State of New Mexico and the other Colorado River Basin states. The Settlement Act does not authorize or otherwise allow export of any portion of the State of New Mexico's apportionment under the Upper Colorado River Basin Compact to any other state. New Mexico state law also restricts interstate movement of water if an application to the State Engineer to take New Mexico water out-of-state for use in another state will result in impairment to existing water rights, is contrary to the conservation of water within the State, or is detrimental to the public welfare of the citizens of New Mexico.

Under the Settlement Agreement, the Navajo Nation agrees that it will not lease, contract, exchange or otherwise transfer water for use outside the State of New Mexico without the consent of the ISC. This agreement is an additional protection against water leaving New Mexico in the event that it is later determined that interstate marketing of water is permissible under the combination of laws that govern the use of waters of the Colorado River stream system. This additional protection can only be secured through settlement.

APPENDIX:

HISTORIC ANNUAL NAVAJO NATION IRRIGATION USES FROM THE SAN JUAN RIVER

A. Navajo Indian Irrigation Project

Keller-Bliesner Engineering, LLC, prepared analyses of historic annual water use by the NIIP for the years 1976-2010, including acres irrigated by crop type and conservation reserve acres irrigated only to maintain natural grass cover, as described in the following reports: (1) “Navajo Indian Irrigation Project Biological Assessment,” dated June 11, 1999; (2) “Navajo Indian Irrigation Project 2006 Irrigation and Drainage Analysis,” dated September 12, 2008; and (3) “Navajo Indian Irrigation Project Irrigation and Drainage 2009-2010 Analysis,” dated November 9, 2011. The annual depletions for the project can be estimated based on the diversions into the NIIP main canal from Navajo Reservoir minus operational spills and waste and measured drainage return flows at the project boundaries. The on-site depletions computed in this manner include deep percolation losses to ground water underneath project lands. Table 1 attached hereto provides an annual summary of the acres irrigated on the project historically, the historic annual diversions, annual operational spills and drainage return flows, and estimated depletions by the project through 2010. Actual net depletions from the San Juan River are greater than the on-site depletions on the project shown in table 1 due to incidental losses on spills and drainage return flows between the project boundaries and the San Juan River.

B. Hogback-Cudei and Fruitland-Cambridge Irrigation Projects

Data for the amount of acres irrigated on the Hogback, Cudei, Fruitland and Cambridge projects are available in: (1) a report by Herbert V. Clotts, dated June 30, 1943, indicating the amount of acres under the Hogback Project irrigated in 1908; (2) annual crop reports for the Hogback, Cudei, Fruitland and Cambridge projects that were prepared by the BIA for many of the years within the period 1936-1959, which include acres irrigated by crop type for the years indicated; (3) annual Irrigation Land Data reports prepared by the BIA for the years 1963-1968, which include acres used or presently irrigated under the these projects; (4) a field survey of irrigated crops under these projects made in 1994, which survey was conducted by the ISC for the USBR’s 1994 San Juan Basin Water-Related Land Use Inventory for New Mexico and provides data on irrigated acreage by crop type; and (5) field surveys of irrigated acres under these projects made in 2000 and 2003-2010, which surveys were conducted by the ISC with the cooperation of the Navajo Nation and provide data on the amount of irrigated acres by crop type (ISC memoranda describing the field surveys and survey results are available for those surveys conducted prior to 2009). Table 2 attached hereto provides an annual summary of the amount of acres irrigated under the Hogback-Cudei and Fruitland-Cambridge projects for years for which such data are available. No records are available for the amount of water diverted or spilled each year from the Hogback, Cudei, Fruitland or Cambridge projects.

Table 1. Historic Annual Navajo Indian Irrigation Project Irrigated Acres, Diversions and Depletions
Based on Data Provided by the US Bureau of Indian Affairs¹

<u>Year</u>	<u>Acres Irrigated</u>		Diversion from Navajo Reservoir (<u>acre-feet</u>)	<u>Return Flow at Project Boundaries</u>		Depletion ² (<u>acre-feet</u>)
	Cropped <u>Acres</u> ²	Conservation <u>Acres</u> ³		Spills (<u>acre-feet</u>)	Drainage (<u>acre-feet</u>)	
1976	8,154	0	35,067	375	426	34,266
1977	13,713	0	37,525	2	667	36,856
1978	17,756	0	49,775	42	1,248	48,485
1979	19,209	0	75,709	195	3,580	71,934
1980	26,444	0	109,552	889	5,377	103,286
1981	32,690	0	91,520	2,759	3,988	84,773
1982	39,704	0	114,828	154	5,308	109,366
1983	39,590	1,561	128,523	1,102	4,145	123,276
1984	35,858	1,526	127,458	1,316	4,127	122,015
1985	39,384	1,648	131,815	3,514	4,510	123,791
1986	35,068	1,600	124,790	7,186	5,859	111,745
1987	35,779	1,600	130,528	5,358	5,545	119,625
1988	36,705	4,816	128,868	4,978	5,487	118,403
1989	43,206	2,364	170,656	3,177	7,210	160,269
1990	43,728	1,680	142,988	2,827	6,525	133,636
1991	41,620	1,605	152,788	3,077	7,442	142,269
1992	42,175	1,679	146,300	11,880	5,927	128,493
1993	18,031	1,679	166,500	14,817	5,664	146,019
1994	46,716	1,679	180,900	12,860	7,192	160,848
1995	51,305	1,792	181,800	23,804	7,598	150,398
1996	52,067	1,298	193,100	17,243	7,416	168,441
1997	50,379	1,298	156,800	15,697	7,785	133,318
1998	46,748	2,523	165,400	8,052	8,283	149,065
1999	45,535	2,523	113,762	6,243	8,053	99,466
2000	42,313	2,468	147,774	5,958	7,249	134,567
2001	44,070	2,468	140,605	6,096	7,559	126,950
2002	49,847	2,558	191,563	6,099	8,698	176,766
2003	55,352	2,483	178,567	1,265	9,325	167,977
2004	57,452	3,637	185,373	583	10,041	174,749
2005	57,313	3,878	162,797	1,040	10,837	150,920
2006	58,942	2,483	192,228	1,129	10,329	180,770
2007	60,008	3,676	191,343	2,814	10,976	177,553
2008	60,630	3,330	206,823	5,104	14,417	187,302
2009	61,534	3,253	209,947	8,217	13,160	188,570
2010	63,832	336	196,369	2,949	12,484	180,936

Notes:

¹ Navajo Indian Irrigation Project historic water budget data are available from the US Bureau of Indian Affairs through 2010.

² Includes lands on which crops were grown during the year with intended irrigation to meet full demand.

³ Includes lands irrigated for plant maintenance only, including groundcover maintenance or wildlife habitat.

⁴ Diversion minus return flow. Excludes incidental losses on return flow between the Navajo Indian Irrigation Project boundaries and the San Juan River.

Table 2. Historic Irrigated Acres under the Hogback-Cudei Irrigation Projects and the Fruitland-Cambridge Irrigation Projects Based on Data Available to the State of New Mexico

<u>Year</u>	<u>Acres Irrigated under Hogback-Cudei Projects</u>			<u>Acres Irrigated under Fruitland - Cambridge Projects</u>		
	<u>Hogback Project</u>	<u>Cudei Project</u>	<u>Total</u>	<u>Fruitland Project</u>	<u>Cambridge Project</u>	<u>Total</u>
1908	767					
1936	2,910			495		
1937	2,279	380	2,659	549		
1938						
1939	2,589	569	3,158	730		
1940						
1941	2,859	172	3,031	1,534	78	1,612
1942	2,233	124	2,357	1,461	40	1,501
1943	2,724	150	2,874	1,525	52	1,577
1944	2,323	267	2,590	1,513	29	1,542
1945	2,368	272	2,640	1,436	32	1,468
1946		259		2,108		
1947	2,808	320	3,128	2,102	43	2,145
1948	2,670	310	2,980	2,210	50	2,260
1949	2,440	289	2,729	2,250	68	2,318
1950	2,683	306	2,989	2,519	63	2,582
1951	2,592	337	2,929	2,479	55	2,534
1952	2,574	356	2,930	2,620	65	2,685
1953	3,227	226	3,453		67	
1954						
1955	3,042	234	3,276		61	
1956				2,739		
1957	5,088	263	5,351	2,253	40	2,293
1958	3,066	114	3,180	1,974	36	2,010
1959	3,498	190	3,688	2,296	44	2,340
1963			4,503			2,574
1964			4,925			2,542
1965			5,729			3,120
1966			6,327			2,661
1967			5,314			2,562
1968			3,463			2,519
1994	3,065	336	3,401	2,299	29	2,328
2000	2,832	312	3,144	2,084	55	2,139
2003	2,776	393	3,169	1,982	33	2,015
2004	2,578	298	2,876	1,941	64	2,005
2005	2,827	285	3,112	1,925	22	1,947
2006	2,796	266	3,062	1,649	48	1,697
2007	3,517	375	3,892	1,985	46	2,031
2008	2,706	176	2,882	1,667	55	1,722
2009	2,448	286	2,734	1,689	52	1,741
2010	2,234	262	2,496	1,708	58	1,766

Table 2 Data Sources:

1908: Report of Herbert V. Clotts, dated June 30, 1943.

1936-1959: Annual Crop Reports prepared by the US Bureau of Indian Affairs (the reported net area irrigated shown herein may differ from the sum of the reported acres by crop type).

1963-1968: Annual Irrigation Land Data reports prepared by the US Bureau of Indian Affairs.

1994: 1994 San Juan Basin Water-Related Land Use Inventory for New Mexico prepared by the US Bureau of Reclamation as part of its Upper Colorado Irrigated Lands Assessment.

2000 and 2003-2010: Interstate Stream Commission field survey and inventory of irrigated crops. See the following memoranda:

- (1) Memorandum on 2000 San Juan River Basin Acreage Inventory, prepared by Patricia Turney and dated November 6, 2000, last revised December 7, 2004;
- (2) Memorandum on 2003 San Juan River Basin Acreage Inventory, prepared by Patricia Turney and dated September 13, 2004, last revised December 7, 2004;
- (3) Memorandum on 2004 San Juan River Basin Acreage Inventory, prepared by Patricia Turney and dated May 19, 2005, last revised October 6, 2005;
- (4) Memorandum on 2005 San Juan River Basin Acreage Inventory, prepared by Patricia Turney and dated April 5, 2006;
- (5) Memorandum on 2006 San Juan River Basin Acreage Inventory, prepared by Patricia Turney and dated October 18, 2007;
- (6) Memorandum on 2007 San Juan River Basin Acreage Inventory, prepared by Patricia Turney and dated August 7, 2008, revised September 4, 2008; and
- (7) Memorandum on 2008 San Juan River Basin Acreage Inventory, prepared by Patricia Turney and Paul Harms, and dated July 9, 2009.