4.0 WATER DEMAND IN THE PROJECT SERVICE AREA

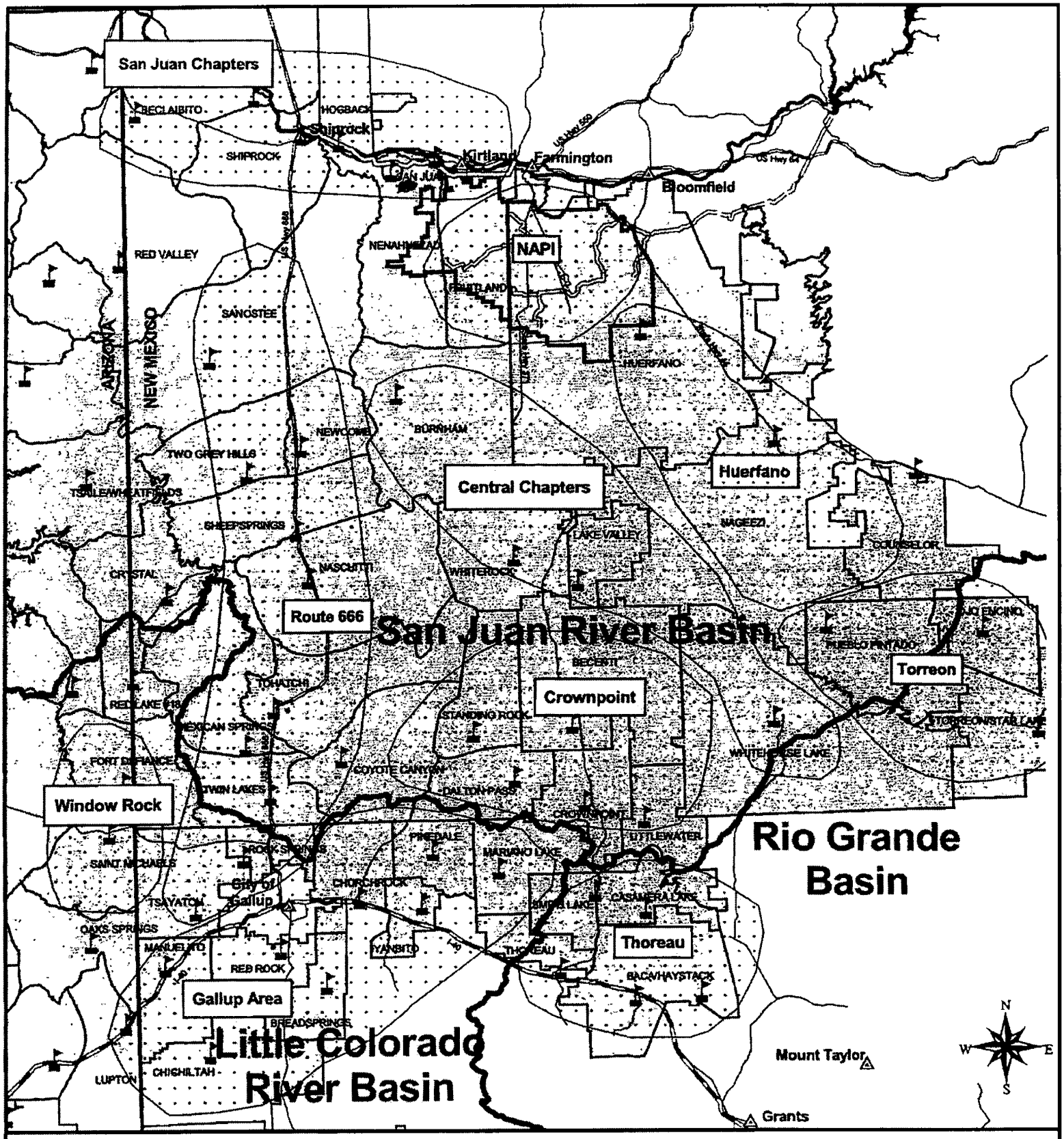
The Project service area includes two Navajo Chapters in Arizona and 41 in New Mexico. It also includes NAPI, the City of Gallup, and Navajo land adjacent to the City of Gallup. To better characterize the water supply and demand of the region and the Project's service area, the communities have been grouped into twelve municipal subareas as shown in Figure 4.1. The subareas include: (1) City of Gallup, (2) Central Project Chapters, (3) Crownpoint, (4) Gallup Area (Navajo land adjacent to the City of Gallup), (5) Huerfano, (6) Rock Springs, (7) Route 666 Chapters, (8) San Juan River Chapters, (9) Torreon, (10) NAPI, (11) Window Rock, and (12) Thoreau-Smith Lake. A list of the municipal subareas and the communities within those areas served is shown in Table 4.1.

The water demand in the Project service area is based on three distinct components: (1) current population, (2) per capita water use, and (3) projected growth rates. The assumptions underlying those components are presented in this section.

4.1 Current population

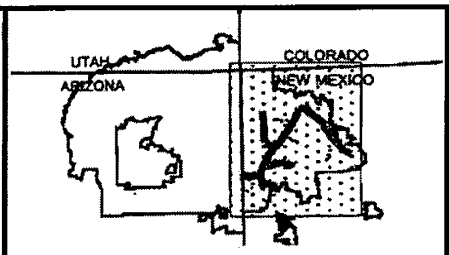
The Navajo population statistics for this analysis are based on 1990 census data as reported in the *1990 Census - Population and Housing Characteristics of the Navajo Nation* (Rodgers 1993). The Project service area includes more than 66,000 people in New Mexico (including the City of Gallup) and more than 11,000 in Arizona. The population totals for each municipal subarea and basin are shown in Table 4.1. Population totals for the specific chapters in the Project service area are shown in Tables 4.2. Population totals for the Thoreau-Smith Lake Subarea, which is outside of the Project service area but within the study area, are shown in Table 4.3. The projected populations within the Upper Colorado River, Lower Colorado River, and Rio Grande Basins at ten year intervals are shown in Table 4.4. The population statistics presented in this technical memorandum do not take into account that the U.S. Census Bureau believes that the actual population of Navajos in 1990 was approximately 13.9 percent greater than the official count. After reviewing housing statistics, the McKinley County staff believe that the undercount in the study area may be even greater, but the County has not definitively quantified the undercount.

The current population of the City of Gallup is approximately 23,000. Statistics from the Northwestern New Mexico Council of Governments show that 30 percent of the City of Gallup population is Navajo. Growth trends indicate that Navajos may comprise approximately 50 percent of the Gallup population by the year 2040.



LEGEND

- Chapter Houses
- Towns
- Farmington-Shiprock Pipeline
- NIIP Main Canal
- NAPI LMA Boundary
- San Juan River
- Watershed Boundary



Navajo-Gallup Water Supply Project

Navajo Nation
Department of Water Resources
P.O. Drawer 678
Fort Defiance, Arizona 86504
(520) 729-4004

c:robert/projects/ngwsp3.apr
by: R. L. Kirk

Figure 4.1
Municipal Sub-Areas

March 16, 2001

Table 4.1
Municipal Water Demand by Basin for the Navajo-Gallup Water Supply Project

Municipal Sub-Area	Basin of Use [2]	1990 Census Pop	2040 Pop [3]	2040 Demand [4] (Ac-ft/yr)	2040 G.W. Production & ALP [5] (Ac-ft/yr)	2040 SJR Diversion [6] (Ac-ft/yr)	2040 SJR Depletion [7] (Ac-ft/yr)
Central Area, NM	U.C.	1,493	5,082	911	77	834	834
City of Gallup, NM [8]	L.C.	19,154	47,197	8,459	1,439	7,500	7,500
Crownpoint, NM	U.C.	5,287	17,996	3,225	752	2,473	2,473
Gallup Area, NM	L.C.	7,904	26,903	4,822	506	4,316	4,316
Huerfano, NM	U.C.	1,492	5,078	910	46	864	864
NAPI Industrial, NM [9]	U.C.	n/a	n/a	7,274	0	700	700
Rock Springs, NM	L.C.	3,749	12,761	2,287	169	2,118	2,118
Route 666, NM	U.C.	10,099	34,374	6,161	795	5,366	5,366
San Juan River, NM [10]	U.C.	13,804	46,985	8,421	4,680	3,741	1,871
Torreon, NM [11]	U.C./ R.G.	3,797	12,924	2,316	77	2,240	2,240
NEW MEXICO UPPER COLORADO BASIN	U.C.	34,012	115,767	28,023	7,050	15,100	13,229
NEW MEXICO RIO GRANDE BASIN	R.G.	1,960	6,672	1,196	77	1,119	1,119
NEW MEXICO LOWER COLORADO BASIN	L.C.	30,807	86,861	15,568	2,114	13,934	13,934
TOTAL NEW MEXICO		66,779	209,300	44,788	9,241	30,153	28,282
TOTAL ARIZONA [11]	L.C.	11,767	40,052	7,179	767	6,411	6,411
PROJECT TOTAL		**78,546**	**249,352**	**51,967**	**10,008**	**36,564**	**34,693**

Notes:

1. Rounding error may cause subtotals to be off by 1
2. U.C.= Upper Colorado Basin, L.C.=Lower Colorado Basin, AND R.G.=Rio Grande Basin.
3. Annual growth for the City of Gallup is 1.82% and for Navajo Nation is 2.48%.
4. Per capita water demand is 160 gallons per person per day.
5. Estimated sustainable groundwater production.
6. Diversions = demand - groundwater use.
7. Depletions are based on zero return flow and use of sustainable groundwater.
8. The City of Gallup plans to recharge its aquifer and use groundwater for summer seasonal peaking.
9. NAPI depletions are 700 ac-ft/year including 400 ac-ft/year for the proposed french fry factory.
10. Approximately 4,680 acre-feet/yr of diversion and 2,340 acre-feet per year of depletion from the San Juan River Subarea's demand is met by the ALP Project and 1,871 acre-feet of depletion is met by the Navajo Gallup Water Supply Project. Assume 50 percent of the San Juan River municipal diversions return to the River.
11. Torreon includes use in the Rio Grande Basin. These depletions are counted toward New Mexico Upper Colorado River allocation.
12. Window Rock Subarea includes depletions which are counted toward the Arizona Lower Colorado allocation.

Table 4.2
Chapter Water Demand for the Navajo-Gallup Water Supply Project

Service Area	Chapter	1990 Population	2040 Population	2040 Demand (Ac-ft/yr)	2040 G.W. Production and ALP (Ac-ft/yr)	2040 SJR Depletion[1] (Ac-ft/yr)
City of Gallup, NM	City of Gallup	19,154	47,179	8,459	1,439	7,500
Central Area, NM	Burnham	246	837	150	0	150
	Lake Valley	436	1,484	266	46	220
	White Rock	201	684	123	See Lake Valley	123
	Whitehorse Lake	610	2,076	372	31	341
	SUBTOTAL	*1,493*	*5,082*	*911*	*77*	*834*
Crownpoint, NM	Becenti	193	657	118	See Crownpoint	118
	Coyote Canyon	1,234	4,200	753	61	692
	Crownpoint	2,658	9,047	1,622	614	1,008
	Dalton Pass	313	1,065	191	0	191
	Little Water	638	2,172	389	See Crownpoint	389
	Standing Rock	251	854	153	77	76
	SUBTOTAL	*5,287*	*17,996*	*3,225*	*752*	*2,473*
Gallup Area, NM	Bread Springs	1,219	4,149	744	77	667
	Chichiltah	1,555	5,293	949	See Bread Spr	949
	Church Rock	1,780	6,059	1,086	123	963
	Iyanbito	974	3,315	594	153	441
	Mariano Lake	726	2,471	443	92	351
	Pinedale	609	2,073	372	See Mariona Lk	372
	Red Rock	1,041	3,543	635	61	574
	SUBTOTAL	*7,904*	*26,903*	*4,822*	*506*	*4,316*
Huerfano, NM	Huerfano	511	1,739	312	31	281
	Nageezi	981	3,339	598	15	583
	SUBTOTAL	*1,492*	*5,078*	*910*	*46*	*864*
Rock Springs, NM	Manuelito	631	2,148	385	46	339
	Rock Springs	1,685	5,735	1,028	77	951
	Tsayatoh	1,433	4,878	874	46	828
	SUBTOTAL	*3,749*	*12,761*	*2,287*	*169*	*2,118*
Route 666, NM	Mexican Springs	711	2,420	434	See Tohatchi	434
	Naschitti	1,539	5,238	939	77	862
	Newcomb	651	2,216	397	12	385
	Sanostee	2,081	7,083	1,270	153	1,117
	Sheep Springs	660	2,246	403	15	388
	Tohatchi	1,607	5,470	980	307	673
	Twin Lakes	1,967	6,695	1,200	153	1,047
	Two Grey Hills	883	3,005	539	77	462
	SUBTOTAL	*10,099*	*34,374*	*6,161*	794	*5,367*
Torreon	Counselor	1,365	4,646	833	0	833
	Ojo Encino	596	2,029	364	15	349
	Pueblo Pintado	472	1,607	288	0	288
	Torreon	1,364	4,643	832	61	771
	SUBTOTAL	*3,797*	*12,924*	*2,316*	*76*	*2,240*
San Juan River[2]		13,804	46,985	8,421	2,340	1,871
NAPI Industrial[3]		n/a	n/a	7,274	0	700
TOTAL NEW MEXICO		*66,779*	*209,282*	*44,788*	*6,199*	*28,284*
Window Rock, AZ	Fort Defiance	6,187	21,059	3,774	767	3,007
	St. Michaels	5,580	18,993	3,404	See Fort Def	3,404
TOTAL ARIZONA		*11,767*	*40,052*	*7,179*	*767*	*6,412*
PROJECT TOTAL		*78,546*	*248,889*	*51,967*	*7,668*	*34,693*

Table 4.3
Water Demand for the remaining Chapters in the Study Area

Municipal Subarea	Chapters	1990 Population	2040 Population	2040 Demand (Ac-ft/yr)	2040 SJR Depletion (Ac-ft/yr)
Thoreau-Smith Lake[1]	Baca/Haystack	731	2,488	446	0
	Casamera Lake	568	1,933	347	0
	Smith Lake	515	1,753	314	0
	Thoreau	1,786	6,079	1,090	0
TOTAL		*3,600*	*12,253*	*2,196*	*0*

Note:

1. The Thoreau-Smith Lake Subarea is outside of the Project service area, but is within the Study Area. These Chapters do not receive San Juan River water.

Table 4.4
Projected Population in the Project Service Area by Basin

Decade	New Mexico Upper Colorado Basin	New Mexico Lower Colorado Basin	New Mexico Rio Grande Basin	Arizona Lower Colorado Basin	Project Total
2000	43,453	37,828	2,504	15,033	98,818
2010	55,516	46,494	3,199	19,206	124,416
2020	70,926	57,205	4,087	24,538	156,756
2030	90,614	70,454	5,222	31,349	197,639
2040	115,767	86,861	6,672	40,052	249,352
2050	147,904	107,200	8,523	51,170	314,796
2060	188,960	132,439	10,889	65,374	397,662

Note:

1. Annual growth for the City of Gallup is 1.82 percent and for Navajo Nation is 2.48 percent.

4.2 Projected growth rates

The City of Gallup has estimated that its annual growth rate over the next five decades will be between 1.32 and 2.36 percent per year. The City of Gallup's 1991 *Water-Supply Study and the Forty-year Water Supply Master Plan* (Shomaker 1991) utilized a 1.82 percent growth rate for projecting the City's water demand. This rate is based on a stable population base and assumes that the economy does not encourage people to move into, or out of, Gallup.

Due to the difficulty in conducting an accurate census, determining the growth rate of the Navajo Nation is difficult. The Navajo Nation's reported annual increase in population changes dramatically from one census to the next. For instance, during the 1950's the reported annual growth rate of the Navajo Nation's population was 3.57 percent, during the 1960's it was 1.45 percent, during the 1970's it was 1.76 percent and during the 1980's it was 4.48 percent. In 1990 the Navajo Division of Community Development determined that the average annual growth of the Navajo Nation is about 2.48 percent per year and the average Navajo family has 4.52 people (*1990 Census - Population and Housing Characteristics of the Navajo Nation,* Rodgers,1993).

Several other analyses of the population growth rate have been conducted. In a 1996 population study for the New Mexico Interstate Stream Commission, the University of New Mexico Bureau of Business and Economic Research (BBER) estimated that the 1990 growth rate for Native Americans in McKinley and Cibola Counties was 1.86 percent. The BBER study included members of the Navajo Nation, and the Pueblos of Acoma, Laguna and Zuni. This BBER study did not adequately address how the current lack of critical infrastructure, including water facilities, is one of the greatest factors leading to stagnant economic growth and increased out-migration.

In 1984 Reclamation used a projected Project population growth rate of 2.5 percent (*1984 Plan Formulation and Environmental Statement*, Reclamation, 1984). The Institute of Distribution and Development Studies at Colorado State University (CSU) evaluated the changes in annual growth rates of the Navajo Nation. CSU concluded that a reasonable annual growth rate for planning purposes is 2.48 percent (*Employment and Incomes in the Navajo Nation: 1987 - 1988 Estimates and Historical Trends* Eckert et. al, 1989). In 1993 Northwest Economic Associates reached the same conclusion (*Support Documentation for Current and Projected Population of the Little Colorado River and N-Aquifer Basins*, NEA, 1993b). The CSU and NEA estimates take into consideration in-migration, out-migration, fertility, and survival rates of the Navajo population. This growth rate has also been accepted by the multi-agency federal team involved in the Little Colorado River settlement negotiations. The NDWR recommends using a 2.48 percent annual growth rate for projecting Navajo water demand through the year 2040. Based on a 2.48 percent annual growth rate for the Navajo Nation and 1.82 percent growth rate for the City of Gallup, by 2040 the service area will include more than 200,000 people in New Mexico and more than 40,000 in Arizona. By the year 2060, the service area will include more than 300,000 in New Mexico and 60,000 in Arizona. The projected populations for specific communities and basins are shown in Tables 4.1, 4.2, 4.3 and 4.4.

4.3 Average daily per capita water use

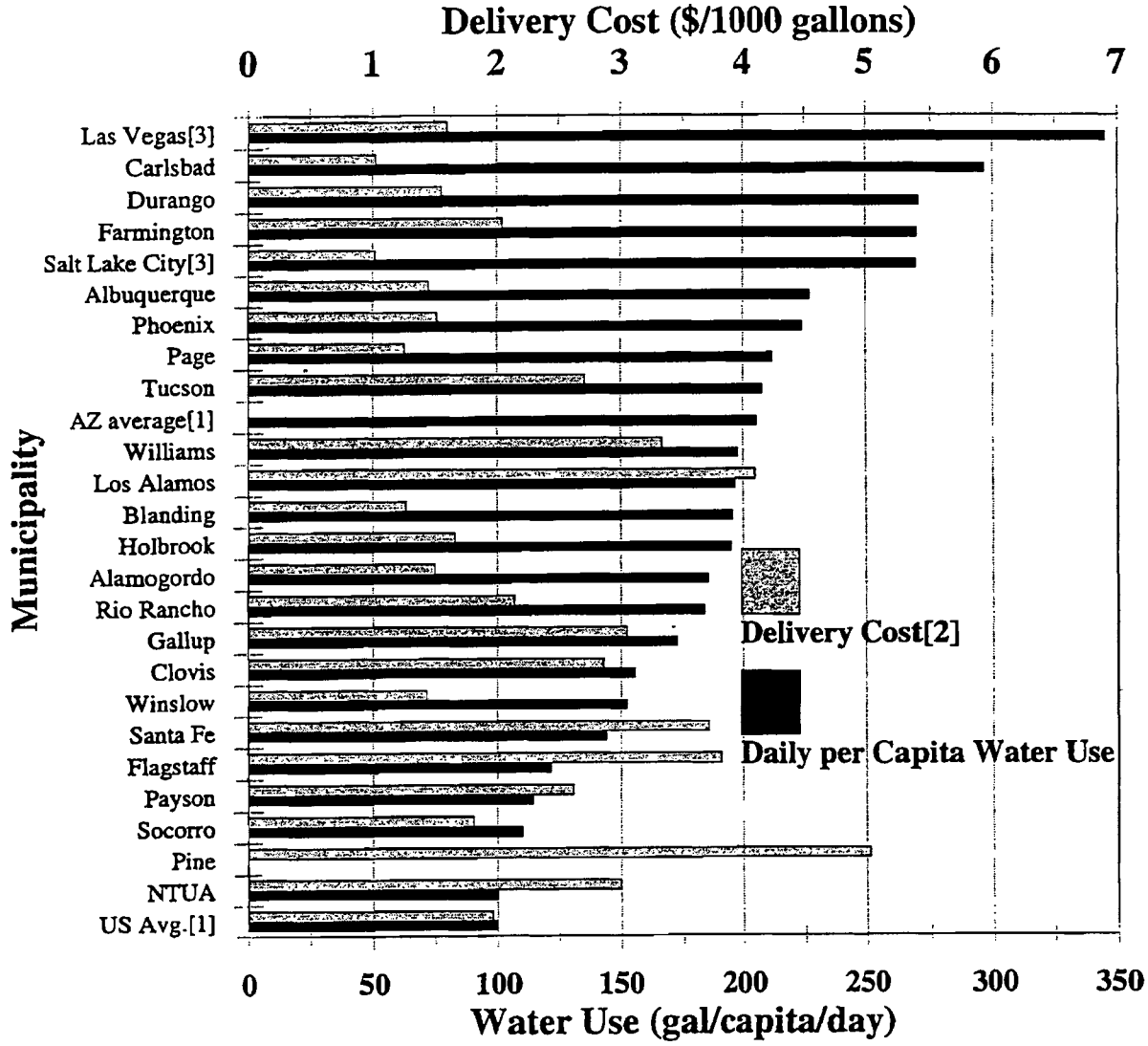
For the purposes of this technical memorandum, the per capita water use is the total community water use divided by the total population. Consequently, this definition includes some water use associated with commercial activity, schools, hospitals and other civic uses. These uses rarely exceed 500 acre-feet per individual user. This definition of per capita water use does not include specific large industrial allocations that may be needed for power plants or large factories.

According to the City of Gallup's 1991 Water Supply Master Plan, the City's average water consumption was 57 gallons per capita per day (gpcd) in 1950, 118 gpcd in 1970, and 160 gpcd in the late 1980's (Shomaker,1991). This 1991 water supply plan states that "since the historical trend of increasing consumption seems to have been arrested, since the future of mining and defense industries is uncertain, and since water conservation measures are expected to maintain or decrease current consumption, no increase in the gpcd was assumed." Consequently the City of Gallup uses 160 gpcd for current and future demand projections. The regional per capita water use comparisons shown in Figure 4.2 illustrate that the City's per capita water use is in the lower third and its water rates are in the top twenty percent.

Per capita water use on the Navajo Reservation varies depending on the accessibility of the water supply. The willingness to pay surveys conducted in 1994 report that 44 percent of the Navajo households in the service area are without direct access to a public water supply system and use very little water. In a 1982 water resource report *Navajo Water Resources Evaluation Volumes 1 - 8*, (Morrison Maierle Inc., 1982), the per capita water use for homes without running water is estimated to be 10 gallons per day. This same rate of water use is cited in *Estimated Use of Water in the United States* (Murray, Richard C., 1965). In 1993, NEA estimated that families which haul water for domestic purposes spend the equivalent of $22,000 per acre-foot compared with $600 per acre-foot for a typical suburban water user in the region (*Cost of Water Hauling, Relocation, and Water Mining and the Value of Family Garden Plots in the N-Aquifer Basin*, NEA, 1993a).

Billing data from NTUA indicates that the average water use on the NTUA systems is approximately 100 gallons per capita per day. According to data from other metered systems, water use on the non-NTUA systems ranges from 20 to 100 gallons per person per day. These low usage rates are often limited by system and supply constraints, not demand. Historic data for non-reservation communities in the region show that water use has increased over time and is currently approximately 160 gallons per capita per day. The increase in per capita water use is correlated with community growth, development and an improved standard of living. Therefore, a per capita water use of 160 gallons per capita per day is recommended for water resource planning on the Navajo Nation.

Figure 4.2
Southwestern Water Use and Water Rate Comparison



Notes:

1 U.S. average per capita use from APWA, Arizona average per capita use from USGS Circular 1200, U.S. average water use rate from Western States Water Circular #1283.

2 Average delivery cost is based on 18,700 gallons per month (25 cubic feet) for residential use. Seasonally variable rates were averaged over the entire year.

3 Salt Lake City and Las Vegas service areas extend beyond their city limits. Per capita water use is the reported value, and not a value calculated by NDWR.

As shown in Figure 4.2, the recommended water use rate is well within the rates of other municipalities in the Southwest. This rate allows for increasing water use as the Navajo water systems are developed, and as the Navajo water users achieve parity with non-Indian water users in Arizona and New Mexico. The 160 gallon per capita per day rate has also been accepted by the multi-agency federal team overseeing the Little Colorado River settlement negotiations and it has been used for regional water plans in Arizona. This per capita water use is also cited in the City of Albuquerque's long-term water strategy (Brown, 1996).

The water demand projections using this rate per capita water use rate are shown in Tables 4.1, 4.2, and 4.3. The projected municipal demands (excluding NAPI) in the service area within the Upper Colorado River, Lower Colorado River, and Rio Grande Basins at ten year intervals are shown in Table 4.5. By the year 2040, the overall municipal water demand in the service area, excluding NAPI, is 44,700 acre-feet per year.

Table 4.5
Projected Municipal Demand (excluding NAPI) in the Project Service Area by Basin (Acre-feet)

Decade	New Mexico Upper Colorado Basin	New Mexico Lower Colorado Basin	New Mexico Rio Grande Basin	Arizona Lower Colorado Basin	Project Total
2000	7,789	6,780	448	2,695	17,712
2010	9,951	8,333	573	3,442	22,299
2020	12,672	10,253	773	4,398	28,096
2030	16,241	12,628	936	5,619	35,424
2040	20,749	15,568	1,196	7,179	44,692
2050	26,509	19,214	1,528	9,171	56,422
2060	33,869	23,738	1,951	11,717	71,275

The 1998 groundwater production in the service area was approximately 6,800 acre-feet per year. Of that amount approximately 2,500 acre-feet was for the Navajo public water systems. These estimates are presented in greater detail in Chapter 5. In *Navajo Gallup Water Supply Evaluation of Groundwater and Conjunctive Use Alternatives* (NDWR, February 1998), the NDWR estimated the sustainable groundwater yield that might be available in 2040 for each municipal subarea. For instance, the Window Rock Subarea relies on the alluvial system for approximately 70 percent of its current water supply. NTUA should be able to maintain 760 acre-feet of water production during most years. The groundwater production in the Crownpoint Subarea is projected to double to approximately 750 acre-feet per year.

By the year 2040 groundwater production in the service area is estimated to be 4,600 acre-feet per year. Of that amount, 3,200 acre-feet per year will be for the Navajo Nation public water systems and 1,440 acre-feet will be for the City of Gallup for summer peaking demands. These estimates are presented in greater detail in Chapter 5. These assumptions are very similar to the conclusions reached by Turney and Associates in that water needs assessment (Turney, 1976). Without the Project severe municipal water shortages will ensue. Figure 4.3 shows the depletion schedule for the Project including groundwater withdrawals. Table 4.6 presents the projected San Juan River Project depletions by Basin. Detailed information on the Project depletions is shown in Appendix ___.

Figure 4.3
Projected Annual Depletions in the Navajo-Gallup Project Service Area

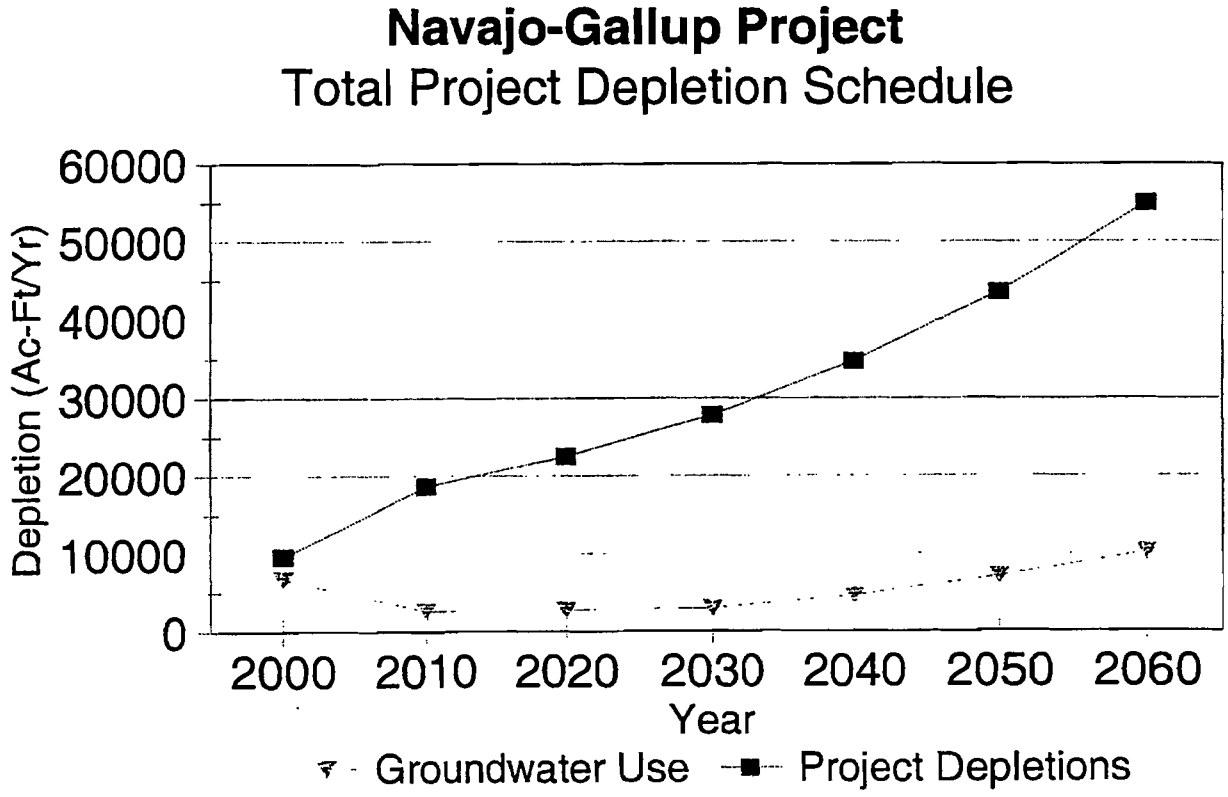


Table 4.6
Projected Navajo Gallup Water Supply Project San Juan River Depletions (including NAPI) in the Project Service Area by Basin
(Acre-feet)

Decade	New Mexico Upper Colorado Basin	New Mexico Lower Colorado Basin	New Mexico Rio Grande Basin	Arizona Lower Colorado Basin	Project Total
2000	5,242	2,352	336	1,652	9,582
2010	5,202	10,503	470	2,469	18,644
2020	6,996	11,360	638	3,493	22,487
2030	9,722	12,479	850	4,783	27,834
2040	13,229	13,934	1,119	6,411	34,693
2050	17,820	15,907	1,451	8,404	43,583
2060	23,686	18,429	1,875	10,950	54,939

4.4 Seasonal and daily peak per capita water use

Over the course of a day, week, month and year significant fluctuations occur in a municipal water system's demand. .To avoid rationing and customer disruptions, and to assist with fire protection, municipal water systems should have adequate production capacity to meet the estimated requirements during peak demand days. The NDWR reviewed several water use studies to determine the appropriate peaking factors for this Project.

The daily peaking factor is the peak daily water use divided by the average daily water use. Daily municipal peaking factors from comparable municipalities and projects are shown in Table 4.7. These daily peaking factors range from 1.70 to 2.50.

However, it may not be economical to design the main conveyance system of this project large enough to meet the daily peak demands. It may be more economical to design the main conveyance system to meet the seasonal demands, and to meet the daily peak water demands with local storage tanks. The daily average water demand for a municipal system during the maximum month is typically 1.2 times the daily average demand during the entire year. The daily average demand during the maximum week is typically 1.4 times the average daily demand during the year (Davis et.al., 1985).

Table 4.7
Daily Municipal Peaking Factors from Comparable Municipalities and Projects

Community	Daily Peaking Factor
Bloomfield	1.70
Shiprock (NTUA)	1.70
Gallup	1.80
Standing Rock and Fort Tolten	1.80
Mid-Dakota Rural System	2.10
Mni Wiconi and Fort Berthold	2.22
Farmington	2.40
Aztec	2.50

In 1993 Molzen-Corbin and Associates (MCA) prepared a report entitled *Navajo Tribal Utility Authority Shiprock Water Supply Study*. According to that study "At minimum, water systems should have enough capacity to meet sustained production needs during the peak 7-day period demand which is the greatest volume of water required over any seven-day period." MCA reviewed daily water production data between 1988 and 1992 for the NTUA's Shiprock system. The ratio between the peak seven day demand and the average daily demand is 1.28 which MCA rounded to 1.3. The greatest demand period for the City of Gallup occurs during the first half of July. The summer peaking factor for the City is 1.35 (DePauli, 2000). These peaking factor values are within the range of values cited by Davis.

At a minimum the Project should have enough capacity to meet sustained production for a seven-day period. In a letter dated August 28, 2000, from David Ruiz (City Manager) and Arvin Trujillo (Executive Director, Division of Natural Resources) to Rege Leach (Project Manager, Reclamation), the participants recommend that the Project be sized to handle a seasonal peaking factor of at least 1.3. Daily peak water demands of approximately 1.8 will be handled by local storage tanks. The peaking factor used in this technical memorandum is 1.3.

4.5 NAPI's water demand for future projects

In a June 30, 1993 letter from Tsosie Lewis, General Manager of NAPI, to Peterson Zah, President of the Navajo Nation, the General Manager described the positive benefits of the Project for NIIP including: (1) additional support for the construction of additional water storage, (2) a much needed supply of treated water that would be required for future agricultural processing projects, and (3) additional opportunity for NAPI to diversify its business activities which will increase profits and employment. In that letter, NAPI describes a variety of future projects that will be possible when NIIP is completed. These projects, listed in Table 4.8, may require a total of 7,274 acre-feet of treated water and 3,420 acre-feet of untreated water. The untreated water demands for NAPI have not been included in the demand tabulations.

All of these projects have been further evaluated. The project that has reached the most advanced state of planning is the potato chip and frozen french-fry factory. As recently proposed, this project will be a joint venture partnership with R.D. Offutt and Son, Incorporated. The proposed factory venture would create 500 jobs and the growing venture would create 100 jobs. The factory will process 600 million pounds of potatoes into 300 million pounds of frozen potato product with annual sales of $100 million and $15 million in pretax profits. The factory venture will use between 2,000 and 4,000 acre-feet of water per year. Most of the effluent from the factory will be used to irrigate fields. Approximately 400 acre-feet of the factory's water supply will be depleted. The BIA successfully consulted with the USFWS on this depletion as required under Section 7 of the Endangered Species Act. In addition to this 400 acre-feet of depletion, an additional 300 acre-feet of depletion, for a total of 700 acre-feet, have been included in the Navajo-Gallup Project for NAPI to pursue additional industrial diversification.

Table 4.8
Future NAPI Processing Water Demand

Future Project	Treated Water (Acre-feet)	Untreated Water (Acre-feet)
1. Dairy Farm Operation	112	
2. Hog Farm Operation	10	
3. Poultry Operation	336	
4. Vegetable Canning Plant	1,120	
5. Milk Packaging	1,120	
6. Ethanol-Gasohol		1,120
7. Animal Slaughter Plant	1,120	
8. Meat Packaging	1,120	
9. Potato Chip & French Fry Plant	1,120	
10. Frozen Vegetable Plant	1,120	
11. Dehydrated Onions	20	
12. Compressed Hay Bales		
13. Nursery Stock and Products		1,200
14. Christmas Trees		1,000
15. Aquiculture		100
16. Carrot Fresh Pack	22	
17. Truck Stop	22	
18. Farmer Market	5	
TOTAL	7,274	3,420

Source: Letter dated June 30, 1993 from Tsosie Lewis, General Manager of NAPI to Peterson Zah, President of the Navajo Nation.