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Managing Water in the West

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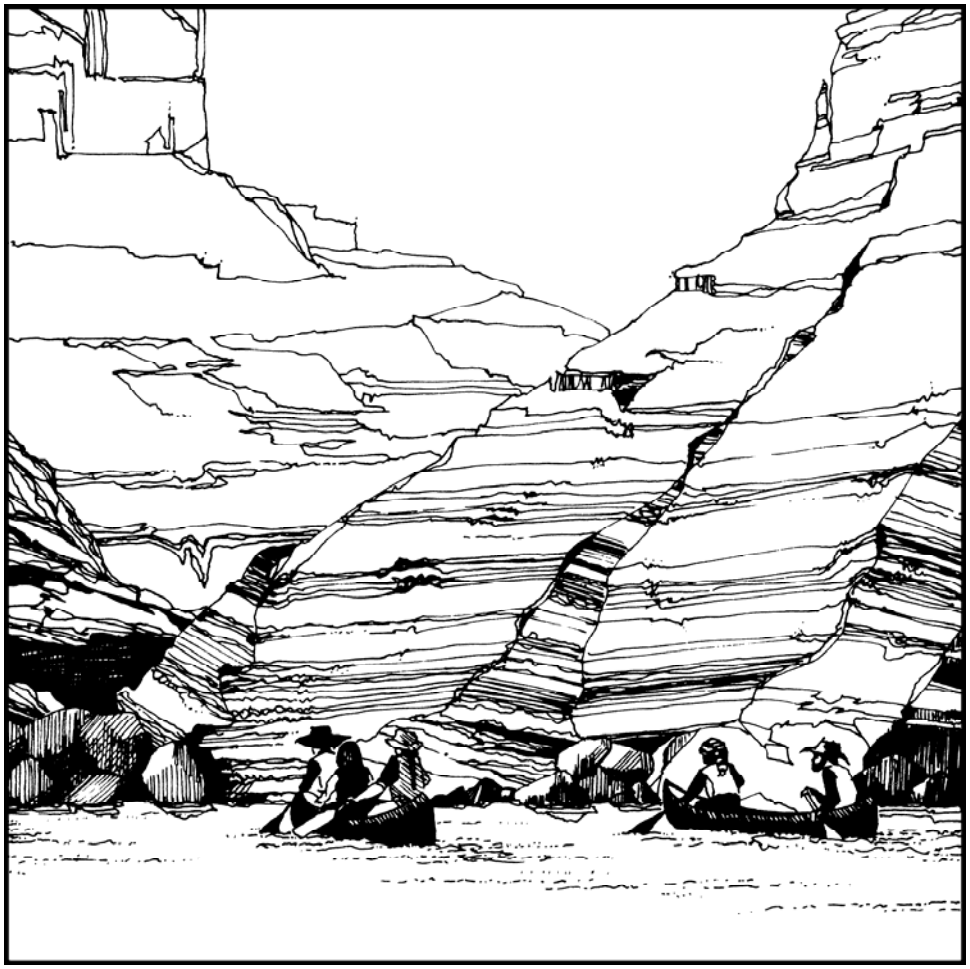
Upper Colorado River Basin Consumptive Uses and Losses Report 2001-2005



U.S. Department of the Interior
Bureau of Reclamation

July 2006

PROVISIONAL

Upper Colorado River Basin Consumptive Uses and Losses Report 2001-2005

(Currently updated through 2004)

PROVISIONAL

UPPER COLORADO RIVER BASIN

CONSUMPTIVE USES AND LOSSES

2001-2005

Provisional Data (Subject to change)

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FOREWORD

This report reflects the Department of the Interior's best estimate of actual consumptive uses and losses within the Upper Colorado River Basin. The reliability of the estimate is affected by the availability of data and the current capabilities of data evaluation.

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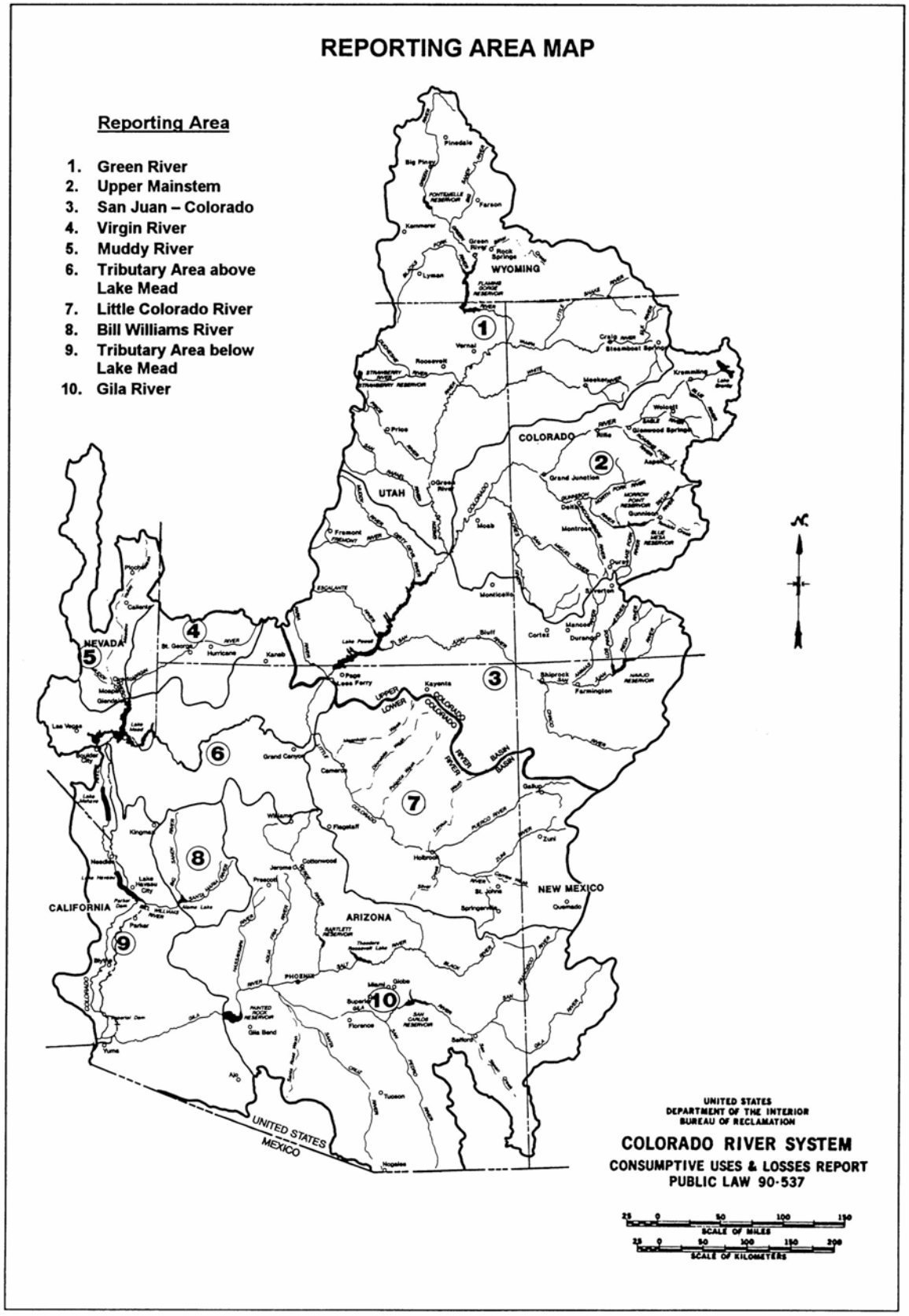
REPORTING AREA MAP
Reporting Area
1. Green River
2. Upper Mainstem
3. San Juan – Colorado
4. Virgin River
5. Muddy River
6. Tributary Area above Lake Mead
7. Little Colorado River
8. Bill Williams River
9. Tributary Area below Lake Mead
10. Gila River
WYOMING
UTAH
COLORADO
NEVADA
CALIFORNIA
ARIZONA
NEW MEXICO
UNITED STATES
MEXICO
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
COLORADO RIVER SYSTEM
CONSUMPTIVE USES & LOSSES REPORT
PUBLIC LAW 90-537
SCALE OF MILES
SCALE OF KILOMETERS

SUMMARY

This report shall present the provisional estimates of the consumptive uses and losses from the Upper Colorado River Basin for each calendar year from 2001 through 2005. Currently, this report contains data through 2004. As further data are available this report shall be updated. This report includes a breakdown of the beneficial consumptive use by major types of use, by major tributary streams, and, where possible, by individual States.

The Colorado River rises in the Rocky Mountains of Colorado, flows southwesterly about 1,400 miles and terminates in the Gulf of California. Its drainage area of 242,000 square miles in this country represents one-fifteenth of the area of the United States. Its water is used for irrigation, municipal and industrial purposes, electric power generation, mineral activities, livestock, fish and wildlife, and recreation. Large amounts are exported from the basin to adjoining areas. The following tables summarize annual water use from the basin by States. Distribution of water use by types of use from the various reporting areas is contained within the body of the report.

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Table: Summary

Upper Colorado River Basin: Water Use by States and Tributaries[1]

(1,000 acre-feet)

STATE OF USE	2001	2002	2003	2004	20005	Average 2001-04
ARIZONA						
Upper Basin	38	37	36	38		37
COLORADO						
Upper Basin	2,320	2,119	2,073	1,899		2,103
NEW MEXICO						
Upper Basin	392	281	361	391		356
UTAH						
Upper Basin	912	761	829	775		819
WYOMING						
Upper Basin	430	438	437	369		418
OTHER[2]						
Upper Basin Colorado River Storage Project Reservoir Evaporation	616	514	428	355		478
UPPER COLORADO RIVER BASIN						
Upper Basin	4,092	3,636	3,736	3,471		3,734
Other	616	514	428	355		478
TOTAL	4,708	4,150	4,164	3,827		4,212
UPPER COLORADO RIVER GRAND TOTAL	4,708	4,150	4,164	3,827		4,212

[1] Consumptive uses and losses; includes water uses satisfied by ground-water overdraft .
[2] Mainstem reservoir evaporation in the Upper Basin.

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UPPER COLORADO RIVER BASIN CONSUMPTIVE USES AND LOSSES 2001-2005

INTRODUCTION

The Colorado River System is composed of portions of seven States--Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming. It has a drainage area of about 242,000 square miles and represents about one-fifteenth of the area of the United States.

This report incorporates provisional annual estimates of consumptive uses and losses of water from the Upper Colorado River Basin from 2001 through 2005. Currently, this report contains data through 2004, and will be updated when data is available. Wherever available, water use reports prepared in accordance with legal requirements concerning the operation of the Colorado River were utilized. Base data needed to estimate onsite consumptive uses were taken largely from existing reports and studies and from ongoing programs. Where current data were not available, estimated values were developed by various techniques and reasoned judgment. In general, methodology followed the techniques normally used within the basin for estimating water use.

Nothing in this report is intended to interpret the provisions of the Colorado River Compact (45 Stat. 1057), the Upper Colorado River Basin Compact (63 Stat. 31), the Water Treaty of 1944 with the United Mexican States (Treaty Series 994; 59 Stat. 1219), the decree entered by the Supreme Court of the United States in Arizona vs. California, et al. (376 U.S. 340), the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774; 43 U.S.C. 618a), the Colorado River Storage Project Act, (70 Stat. 105; 43 U.S.C. 620), or the Colorado River Basin Project Act (82 Stat. 885; 43 U.S.C. 1501).

STUDY REPORTING AREAS

The drainage area of the Upper Colorado River Basin in the United States is approximately 110,000 square miles. The river originates in the Rocky Mountains of Colorado and Wyoming, flows southwest about 1,400 miles, and terminates at Lee Ferry, Arizona. The basin consists of portions of five states: Arizona, Colorado, New Mexico, Utah, and Wyoming. The drainage area was divided into three subbasins for the purposes of this report.

The Colorado River Compact, signed November 24, 1922, was established because the Upper Basin States were concerned that any storage on the river would be put to use more

rapidly by the Lower Basin States, thus allowing them to claim prior appropriative rights. The Upper Basin States wanted provisions for their future development.

The term "Upper Basin States" refers to the States of Colorado, New Mexico, Utah, and Wyoming. "Lower Basin States" refers to the States of Arizona, California, and Nevada. However, the Upper Colorado River Basin refers to the hydrologic boundaries. Lee Ferry is the division point between the Upper Colorado River Basin and the Lower Colorado River Basin.

The major tributary streams selected as reporting areas in the Upper Colorado River Basin are: Green River (Wyoming, Colorado, Utah), Upper Main Stem (Colorado, Utah), and San Juan-Colorado (Colorado, New Mexico, Utah, Arizona).

The boundaries of the reporting areas are shown on the map on page ii. A brief description of each reporting area follows.

Upper Colorado River Basin

Green River (Wyoming-Colorado-Utah)

The Green River reporting area comprises approximately 44,800 square miles in southwestern Wyoming, northwestern Colorado, and northeastern and east-central Utah.

Principal tributaries of the Green River are Blacks Fork, New Fork, and Big Sandy Creek in southwestern Wyoming, Yampa and White Rivers on the western slope of the Continental Divide in northwestern Colorado, and the Price, Duchesne, and San Rafael Rivers in eastern Utah. These streams are fed by numerous headwater lakes.

The largest towns in the reporting area are Rock Springs and Green River in Wyoming, Vernal and Price in Utah, and Craig, Steamboat Springs, and Meeker in Colorado.

Mineral production is the major industry. Oil and natural gas are of primary importance, as are coal, gilsonite, asphalt, and trona (soda ash). Thermal electric power production is becoming an increasingly important industry.

Agriculture ranks near mineral production in importance to the local economy. Agricultural development is centered around livestock production, primarily beef cattle and sheep. Because of a short growing season, crop production is limited largely to small grain, hay, and pasture. These crops are used as winter livestock feed and complement the vast areas of public grazing lands.

Irrigation consumptive use accounts for about 71 percent of the total water use in the Green River reporting area exclusive of any share of main stem evaporation. Nearly 705,000 acres of land are irrigated in an average year. Large exports of water are made to the Great Basin in Utah.

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Upper Main Stem (Colorado-Utah)

The Upper Main Stem reporting area is drained by the Colorado River and its tributaries above the mouth of the Green River. Principal tributaries are the Roaring Fork, Gunnison, and the Dolores Rivers. The Upper Main Stem reporting area consists of 26,200 square miles, with about 85 percent of the area in Colorado and the remainder in Utah.

Grand Junction, Montrose, and Glenwood Springs are the principal towns in the Colorado portion of the upper main stem of the Colorado River. Moab is the only major community in the Utah portion of the upper main stem of the Colorado River.

Mineral production is the predominant industry. This area is the Nation's chief source of molybdenum and is a major source of vanadium, uranium, lead, zinc, coal, and gilsonite. On the Upper Main Stem reporting area, as in that of the Green River, agriculture centers around production of livestock which feeds on irrigated lands to complement the large areas of rangeland. Somewhat increased diversification of crops occurs in the Upper Main Stem, however, with some major land areas devoted to corn, beans, potatoes, table vegetables, and fruit. This diversification is made possible by climatic and topographic conditions that create favorable air drainage and minimize frost damage.

Irrigation consumptive use accounts for about 55 percent of the water use in the Upper Main Stem reporting area exclusive of any share of main stem evaporation. In an average year approximately 555,000 acres of land are irrigated. A considerable amount (30 percent) of water is exported to serve agricultural and municipal needs on the Eastern slope of the Continental Divide in Colorado.

San Juan-Colorado (Colorado-New Mexico-Utah-Arizona)

The San Juan reporting area is drained by the Colorado River and its tributaries below the mouth of the Green River and above Lee Ferry, Arizona. The largest of the tributary streams is the San Juan River which heads on the western slope of the Continental Divide in southwestern Colorado. Principal tributaries of the San Juan River are the Navajo, Piedra, Los Pinos, Animas, and La Plata Rivers. The other main tributaries in the basin are the Dirty Devil, Escalante, and Paria Rivers, which drain a portion of the Eastern slope of the Wasatch Plateau in Utah. The reporting area includes about 38,600 square miles in portions of Utah, New Mexico, Arizona, and Colorado.

The largest towns are Durango and Cortez in Colorado, Monticello and Blanding in Utah, Farmington in New Mexico, and Page in Arizona.

Mining and agriculture form the economic base for the San Juan-Colorado reporting area. The agricultural development is similar to that of the Upper Main Stem where most of the cropland is devoted to livestock feeds except for the production of diversified market crops on lands with favorable air drainage. The main market crops are fruit, vegetables, and dry beans. Oil, natural gas, and coal are the most important minerals produced. Thermal electric power production is increasingly important to the economy of the area.

Irrigation accounts for the largest use of water, about 87 percent of the San Juan reporting area use, exclusive of any share of main stem evaporation. About 310,000 acres of land are irrigated in an average year.

TERMINOLOGY

The Colorado River is not only one of the most highly controlled rivers in the world, but is also one of the most institutionally encompassed. A multitude of legal documents, known collectively as the "Law of the River," effect and dictate its management and operation. Major documents include:

Colorado River Compact--1922
Boulder Canyon Project Act--1928
California Limitation Act--1929
California Seven Party Agreement--1931
Mexican Water Treaty--1944
Upper Colorado River Basin Compact--1948
Colorado River Storage Project Act--1956
United States Supreme Court Decree in Arizona vs. California--1964
Colorado River Basin Project Act--1968
Minute 242 of the International Boundary and Water Commission,
United States and Mexico--1973
Colorado River Basin Salinity Control Act--1974, amended 1984, 1995, and 1996

The Colorado River System is defined in the Colorado River Compact of 1922 as "...that portion of the Colorado River and its tributaries within the United States,", whereas the Colorado River Basin is defined as "...all of the drainage area of the Colorado River System and all other territory within the United States of America to which waters of the Colorado River System shall be beneficially applied.". The compact divided the Colorado River Basin into two subbasins--the "Upper Basin" and the "Lower Basin," with Lee Ferry as the division point on the river. Lee Ferry, located in Arizona, is a point in the main stem 1 mile below the mouth of the Paria River. For the purpose of this report, the Great Divide Basin, a closed basin in Wyoming, and the White River, also a closed basin, in Nevada have not been considered as part of the Colorado River System since flows from these basins never reach the Colorado River. Diversions from the system to areas outside its drainage area are considered herein as exports and have not been classified by types of use.

Beneficial consumptive use is normally construed to mean the consumption of water brought about by human endeavors and in this report includes use of water for municipal, industrial, agricultural, power generation, export, recreation, fish and wildlife, and other purposes, along with the associated losses incidental to these uses.

The storage of water and water in transit may also act as losses on the system although normally such water is recoverable in time. Qualitatively, what constitutes beneficial consumptive use is fairly well understood; however, an inability to exactly quantify these uses has led to various differences of opinion. The practical necessity of administering the various water rights, apportionments, etc., of the Colorado River has led to definitions of consumptive use or depletions generally in terms of "how it shall be measured." The Upper Colorado River Basin Compact provides that the Upper Colorado River Commission is to determine the apportionment made to each State by "...the inflow- outflow method in terms of manmade depletions of the virgin flow at Lee Ferry...".

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There is further provision that the measurement method can be changed by unanimous action of the Commission. Nearly all the water exported from the Upper Colorado River Basin is measured; however, the remaining beneficial consumptive use, for the most part, must be estimated using theoretical methods and techniques.

Reservoir evaporation loss is a consumptive use associated with the beneficial use of water for other purposes. For the purpose of this report, main stem reservoir evaporation is carried as a separate item for the Upper Basin.

Channel losses within the basin are normally construed to be the consumptive use by riparian vegetation along the stream channel (or conveyance route) and the evaporation from the stream's water surface and wetted materials. Seepage from the stream normally appears again downstream or reaches a ground-water aquifer where it may be usable again. A decided lack of data and acceptable methodology, along with the intermittent flow characteristics of many Southwest streams, combine to make a reasonable determination of channel loss difficult. Channel losses have not been estimated for this report within the Upper and Basin.

METHODOLOGY AND DATA ADEQUACY

This report is based almost entirely on data obtained from ongoing programs and current reports. Quantitative measurements of water use were used wherever available, but the majority of the basin water use was theoretically calculated. The following sections describe these calculations for both the Lower Colorado River Main Stem and the Upper and Lower Colorado River Basin tributaries.

Upper Colorado River Basin Tributaries

In the tributary areas of the basin, records of diversions and return flows are not complete enough to allow direct calculation of consumptive water use. Theoretical and indirect methods of estimating consumptive use must then be relied upon. In the New Mexico portion of the Colorado River Basin, the annual consumptive use of water is reported by the New Mexico Interstate Stream Commission. For the Arizona, Colorado, Utah and Wyoming portions of the Colorado River Basin, the annual consumptive use of water was estimated using the following methodologies.

Agriculture

The percentages of irrigation consumptive use range between 55 and 87 percent for the Upper Basin tributaries. The percent range excludes main stem evaporation. The annual irrigated acreage of most crops grown within each reporting area was estimated from information published in the yearly State Agriculture Statistics, 2002 National Census of Agriculture (since the State statistics do not include pasture land), and from Geographic Information System (GIS) irrigated acreage data available for Colorado, Utah, and Wyoming.

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Since most of these data were presented on a county basis, it was necessary to separate them into smaller reporting areas for computational purposes. This was accomplished using land inventory maps and relationships developed for the comprehensive framework study.

These subbasins generally follow tributary stream basin and State boundaries. A representative climatic station was selected for each subbasin. Using historical records of temperature, precipitation, and frost dates, a consumptive use rate was computed for each major crop in each of the reporting years. For the purpose of this report, the consumptive use rates were computed using the modified Blaney-Criddle evapotranspiration formula in the version described in the Soil Conservation Service Technical Release No. 21, "Irrigation Water Requirements," revised September 1970. Irrigation consumptive rates were determined by subtracting the effective precipitation from the consumptive use rates. Effective precipitation for the Upper Basin was computed using the Soil Conservation Service method. This method is referenced in "SCS Technical Release No. 21." (It should be noted that this method estimates less effective precipitation than the Reclamation method. Previous reports used the Reclamation method of computing effective precipitation.) The values of irrigation consumptive use rates were applied to the estimates of irrigated acreage to yield the final values of irrigation consumptive use.

These theoretical consumptive use calculations were based on the assumption of full water supply during the crop growing season. However, it is estimated that in an average year, about 37 percent of the irrigated lands in the Upper Basin receive less than a full supply of water, either due to lack of distribution facilities or junior water rights. The degree to which these lands suffer shortages varies widely from year to year, depending in large part on the magnitude of runoff. For this study, an estimate of the short supply service lands was made for each subbasin, primarily on the basis of reports and investigations collected for the comprehensive framework study. A streamflow gauging station was selected within each subbasin and the magnitude of the recessional portion of the annual hydrograph was used as an index to select the date at which consumptive use calculations should be terminated for the short supply lands.

Comprehensive framework studies of the incidental consumptive use of water associated with irrigation indicated that this use varied between 5 and 29 percent of the irrigation consumptive use, depending upon the location of the study area within the Colorado Basin. These percentages were used in the Upper Basin to adjust the calculated consumptive use.

The agricultural data is generally adequate for use in this report. Each state prepared annual county irrigated acreage estimates of the harvested crops during the reporting period. These statistics are assumed to be reliable. GIS irrigated acreage data were used to estimate irrigated pasture lands. Other areas of agricultural data collection that need to be updated and verified are: (1) the consumptive water use of lands that receive less than a full seasonal supply of irrigation water and the areal extent of these lands, and (2) the amount of incidental seepage and phreatophytic losses associated with irrigation.

Reservoir Evaporation

A comprehensive listing was developed of all reservoirs in the Upper Colorado River Basin that included the latitude, longitude, elevation, and surface area at total capacity for each reservoir.

Monthly evaporation estimates or content records were obtained for those reservoirs for which records are available. The average annual water-surface area was determined for each year of the reporting period. For those reservoirs lacking records, a "fullness factor" was estimated on the basis of reservoir use and historical hydrologic conditions. These "fullness factors" were then used to obtain estimates of average annual water surface area for the unreported reservoirs. For all reservoirs without monthly evaporation estimates, annual free water surface (FWS) evaporation rates were used to determine reservoir evaporation.

The FWS evaporation value was taken from NOAA Technical Report NWS 33, “Evaporation Atlas for the Contiguous 48 United States”, June 1982, Map 3 of 4 : Annual FWS Evaporation based on the reservoir location information. An account was taken of precipitation and runoff salvage to determine net evaporation rates. The net evaporation rates were applied to the estimates of average annual water-surface area to yield the values of annual reservoir evaporation.

An exception to this procedure was the determination of evaporation from what are called the main stem reservoirs shown in table UC-1. Predetermined average evaporation rates were applied to historical surface areas to yield values of evaporation on a monthly basis.

Ground Water

Currently, all ground-water pumping is counted as consumptive use charged against the Colorado River Basin. Obviously, this is not necessarily true. Depending on the location and depth of the well and what types of soils are present in the area, it is possible that little or none of the water pumped would have contributed to the Colorado River System for hundreds or even thousands of years. It has recently been proposed that an interagency study team be put together consisting of personnel from various State Engineers Offices, Bureau of Reclamation, and any other pertinent agencies. This study team would establish guidelines for computing what amounts of ground water pumped should be charged against the Colorado River Basin. These guidelines will need to be established on an area by area basis rather than one set percentage for the entire basin. Results of this study will be incorporated in future Consumptive Uses and Losses Reports. However, until these guidelines are established, the Consumptive Uses and Losses Reports will continue to report all ground-water pumping as depletion from the basin.

Although significant ground-water usage occurs in Arizona, and New Mexico, for purposes of this report ground-water overdraft has not been taken into account in the computation of tributary consumptive use.

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Stockpond Evaporation and Livestock

Stockpond surface areas were estimated from the May 1975 Soil Conservation Service (SCS) publication, "Livestock Water Use." The subbasin stockpond areas were subdivided by State and basin using the livestock population distribution. The same procedure used to calculate the unmeasured reservoir evaporation was used to estimate the stockpond evaporation.

Livestock population data was taken from annual State Agriculture Statistics and the 1997 and 2002 Census of Agriculture. Livestock population data included cattle, sheep, horses, and hogs. Consumption rates for the various livestock were derived from various reports, including the SCS publication, "Livestock Water Use," May 1975.

Stockpond and livestock data are adequate to prepare an estimate of this consumptive use. Considering the small amount of water use, any refuting effort would be best spent on the irrigation or evaporation categories.

Mineral Resources

The Upper Basin uses water in the production of numerous minerals in addition to energy-related materials such as oil and natural gas.

Estimates of the water consumptively used were based largely on phone surveys conducted by the U.S. Geological Survey in 1995 and 2000 that quantified water use in the basin. Estimates for 2001-2005 were based on the trend in water consumption between 1995 and 2000.

Thermal Electric Power

The net use of water for the production of thermal electric energy from the tributaries of the Colorado River Basin was estimated from records obtained from the various power companies in the Basin. These records were complete and were judged to be accurate.

Municipal and Industrial

The basis for estimating municipal and industrial uses was the urban and rural population within the reporting areas. Preparation of annual population estimates was guided by the 2000 census and the growth rates between 1995 and 2000. Water supply withdrawal for urban, rural, commercial, industrial, and public uses were taken from data collected by the USGS and summarized in “Estimated Use of Water in the United States in 1995", USGS Circular 1200 and “Estimated Use of Water in the United States in 2000", USGS Circular 1268. This information was reported by hydrologic unit, county and state for 1995 and by county and state for 2000.

The population of the Upper Colorado River Basin, estimated at nearly 630 thousand in 1990, has increased to approximately 805 thousand in 2000. Twenty percent of the Upper Basin population was classified as rural with a significantly smaller per capita use of water. Both the urban and rural areas have the mutual problem of providing an adequate current

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and future water supply for a growing population in a water-short area. As a result of almost continuous studies concerning these problems, adequate production and effluent records are usually available to adequately assess water use.

Transbasin Diversions

Nearly all the transbasin diversions both out of and into the Upper Colorado River Basin were measured and reported by the Geological Survey, or local water commissioners and users. The remainder were estimated on the basis of past records and capacity of facilities. Due to the high degree of measurement, this area of basin consumptive use is considered to be quite accurately determined.

BENEFICIAL CONSUMPTIVE USES AND LOSSES

A summary table of the Upper Colorado River Basin total annual water uses, 2001 through 2005, by states is shown on page iv. Water use within the selected reporting areas is discussed below.

Upper Colorado River Basin Tributaries

Summaries of estimated annual consumptive uses and losses in the Upper Colorado River Basin for each of the reporting years, broken down by State, reporting area, and type of use are shown in tables UC-2 through UC-6.

Estimated main stem reservoir evaporation is shown in table UC-1. Technically, these are not all main stem reservoirs but are reservoirs that participate in the Colorado River Storage Project (CRSP). The Upper Colorado River Commission designates which reservoirs in the CRSP have evaporation losses charged to the State and which have losses charged to the basin as a whole. Reservoirs listed in table UC-1 are those to be charged to the basin as a whole. These reservoir evaporation losses amount to about 11 percent of all Upper Basin losses.

Upper Basin consumptive use varied between 4.7 million and 3.8 million and averaged 4.2 million acre-feet per year for the reporting period, 2001 through 2004. Agricultural uses accounted for about 67 percent of the total Upper Basin consumptive uses and losses. Variation in consumptive use during the reporting period was largely due to year-to-year changes in climatic conditions.

Transbasin exports, the second largest Upper Basin use, on the average accounted for 20 percent of Upper Basin total use, showed year by year variation during the reporting period ranging from a high of 913,700 acre-feet in 2001 to a low of 670,800 acre-feet in 2002. Water uses for thermal electric power generation remained fairly constant, averaging about 166,900 acre-feet per year, which represents about 4 percent of consumptive use in the Upper Basin.

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Table UC-1
Upper Colorado River Basin
Estimated Main Stem Reservoir Evaporation [1]
2001-2005

(1,000 acre-feet)

	Evaporation					
Reservoir	2001	2002	2003	2004	2005	Average
Flaming Gorge	74.4	69.8	68.2	68.2	64.0	68.9
Blue Mesa	8.1	6.5	6.4	7.8	7.6	7.3
Morrow Point	0.8	0.8	0.8	0.8	0.8	0.8
Lake Powell	533.0	436.5	352.8	278.3	289.0	377.9
TOTAL	616.3	513.6	428.2	355.2	361.4	454.9

[1] Undistributed by States. Evaporation determined using average historical evaporation rates.

Table UC-2
Upper Colorado River Basin
Estimated Water Use within States, by Major Tributaries and Types of Use
2001 - provisional data (Subject to change)

(1,000 acre-feet)

			Agriculture			Municipal and Industrial				Export		
State	Tributary	Reservoir Evaporation[1]	Irrigation	Stockpond Evaporation & Livestock	Subtotal	Mineral Resources	Thermal Electric Power	Other[2]	Subtotal	Outside System	Within System	TOTAL
Arizona	San Juan - Colorado Rivers	4.1	0.9	1.2	2.1	0.0	27.6	3.9	31.5	0.0	0.0	37.7
Colorado	Green River	8.4	179.9	3.5	183.4	0.5	17.8	3.2	21.5	0.0	2.1	215.4
	Upper Main Stem	60.9	1,002.9	7.0	1,009.9	3.1	1.6	28.8	33.5	627.7	177.7	1,909.7
	San Juan - Colorado Rivers	9.5	353.1	5.1	358.2	0.2	0.0	5.9	6.1	0.9	(179.8)	194.9
	TOTAL	78.8	1,535.9	15.6	1,551.5	3.8	19.4	37.9	61.1	628.6	0.0	2,320.0
New Mexico	San Juan - Colorado Rivers	28.5	181.2	4.4	185.6	0.8	48.3	18.2	67.3	110.6	0.0	392.0
Utah	Green River	44.7	542.7	4.5	547.2	1.9	32.7	11.2	45.8	165.2	0.0	802.9
	Upper Main Stem	1.4	21.9	0.2	22.1	0.8	0.0	1.6	2.4	0.0	0.0	25.9
	San Juan - Colorado Rivers	6.7	72.8	3.7	76.5	2.0	0.0	3.8	5.8	(5.7)	0.0	83.3
	TOTAL	52.8	637.4	8.4	645.8	4.7	32.7	16.6	54.0	159.5	0.0	912.1
Wyoming	Green River	27.1	336.7	5.0	341.7	0.8	40.3	5.2	46.3	15.0	0.0	430.1
Upper Basin	Green River	80.2	1,059.3	13.0	1,072.3	3.2	90.8	19.6	113.6	180.2	2.1	1,448.4
	Upper Main Stem	62.3	1,024.8	7.2	1,032.0	3.9	1.6	30.4	35.9	627.7	177.7	1,935.6
	San Juan - Colorado Rivers	48.8	608.0	14.4	622.4	3.0	75.9	31.8	110.7	105.8	(179.8)	707.9
	TOTAL	191.3	2,692.1	34.6	2,726.7	10.1	168.3	81.8	260.2	913.7	0.0	4,091.9

[1] Excludes reservoir evaporation from Colorado River main stem reservoirs listed in Table UC-1.

[2] Includes rural, urban, and other industrial uses.

Table UC-3
Upper Colorado River Basin
Estimated Water Use within States, by Major Tributaries and Types of Use
2002 - provisional data (Subject to change)

(1,000 acre-feet)

			Agriculture			Municipal and Industrial				Export		
State	Tributary	Reservoir Evaporation[1]	Irrigation	Stockpond Evaporation & Livestock	Subtotal	Mineral Resources	Thermal Electric Power	Other[2]	Subtotal	Outside System	Within System	TOTAL
Arizona	San Juan - Colorado Rivers	3.4	0.7	0.9	1.6	0.0	28.4	4.0	32.4	0.0	0.0	37.4
Colorado	Green River	8.4	217.5	3.1	220.6	0.4	17.6	3.3	21.3	0.0	0.9	251.2
	Upper Main Stem	56.8	947.0	6.5	953.5	3.1	1.5	29.9	34.5	486.3	84.9	1,616.0
	San Juan - Colorado Rivers	8.1	317.3	5.5	322.8	0.2	0.0	6.1	6.3	0.1	(85.9)	251.4
	TOTAL	73.3	1,481.8	15.1	1,496.9	3.7	19.1	39.3	62.1	486.4	(0.1)	2,118.6
New Mexico	San Juan - Colorado Rivers	22.8	182.8	4.2	187.0	0.8	45.6	18.9	65.3	6.3	0.0	281.4
Utah	Green River	42.3	414.5	4.5	419.0	1.7	35.5	11.3	48.5	173.2	0.0	683.0
	Upper Main Stem	1.4	10.1	0.2	10.3	0.7	0.0	1.7	2.4	0.0	0.0	14.1
	San Juan - Colorado Rivers	6.7	53.4	3.7	57.1	2.1	0.0	3.8	5.9	(6.2)	0.0	63.5
	TOTAL	50.4	478.0	8.4	486.4	4.5	35.5	16.8	56.8	167.0	0.0	760.6
Wyoming	Green River	30.0	347.8	4.7	352.5	0.8	38.6	5.2	44.6	11.1	0.0	438.2
Upper Basin	Green River	80.7	979.8	12.3	992.1	2.9	91.7	19.8	114.4	184.3	0.9	1,372.4
	Upper Main Stem	58.2	957.1	6.7	963.8	3.8	1.5	31.6	36.9	486.3	84.9	1,630.1
	San Juan - Colorado Rivers	41.0	554.2	14.3	568.5	3.1	74.0	32.8	109.9	0.2	(85.9)	633.7
	TOTAL	179.9	2,491.1	33.3	2,524.4	9.8	167.2	84.2	261.2	670.8	(0.1)	3,636.2

[1] Excludes reservoir evaporation from Colorado River main stem reservoirs listed in Table UC-1.

[2] Includes rural, urban, and other industrial uses.

Table UC-4
Upper Colorado River Basin
Estimated Water Use within States, by Major Tributaries and Types of Use
2003 - provisional data (Subject to change)

(1,000 acre-feet)

			Agriculture			Municipal and Industrial				Export		
State	Tributary	Reservoir Evaporation[1]	Irrigation	Stockpond Evaporation & Livestock	Subtotal	Mineral Resources	Thermal Electric Power	Other[2]	Subtotal	Outside System	Within System	TOTAL
Arizona	San Juan - Colorado Rivers	4.1	0.6	1.0	1.6	0.0	26.3	4.0	30.3	0.0	0.0	36.0
Colorado	Green River	8.4	180.5	3.2	183.7	0.4	17.0	3.4	20.8	0.0	2.6	215.5
	Upper Main Stem	57.4	935.5	6.3	941.8	3.1	1.5	31.0	35.6	484.5	142.6	1,661.9
	San Juan - Colorado Rivers	8.8	320.0	5.1	325.1	0.2	0.0	6.3	6.5	0.6	(145.2)	195.8
	TOTAL	74.6	1,436.0	14.6	1,450.6	3.7	18.5	40.7	62.9	485.1	0.0	2,073.2
New Mexico	San Juan - Colorado Rivers	19.0	207.6	4.1	211.7	0.8	47.0	19.6	67.4	62.7	0.0	360.8
Utah	Green River	42.2	480.8	4.3	485.1	1.6	34.8	11.4	47.8	167.2	0.0	742.3
	Upper Main Stem	1.4	12.6	0.2	12.8	0.7	0.0	1.7	2.4	0.0	0.0	16.6
	San Juan - Colorado Rivers	6.7	60.3	3.6	63.9	2.1	0.0	3.9	6.0	(6.3)	0.0	70.3
	TOTAL	50.3	553.7	8.1	561.8	4.4	34.8	17.0	56.2	160.9	0.0	829.2
Wyoming	Green River	31.2	337.0	4.7	341.7	0.8	38.3	5.2	44.3	19.4	0.0	436.6
Upper Basin	Green River	81.8	998.3	12.2	1,010.5	2.8	90.1	20.0	112.9	186.6	2.6	1,394.4
	Upper Main Stem	58.8	948.1	6.5	954.6	3.8	1.5	32.7	38.0	484.5	142.6	1,678.5
	San Juan - Colorado Rivers	38.6	588.5	13.8	602.3	3.1	73.3	33.8	110.2	57.0	(145.2)	662.9
	TOTAL	179.2	2,534.9	32.5	2,567.4	9.7	164.9	86.5	261.1	728.1	0.0	3,735.8

[1] Excludes reservoir evaporation from Colorado River main stem reservoirs listed in Table UC-1.

[2] Includes rural, urban, and other industrial uses.

Table UC-5
Upper Colorado River Basin
Estimated Water Use within States, by Major Tributaries and Types of Use
2004 - provisional data (Subject to change)

(1,000 acre-feet)

			Agriculture			Municipal and Industrial				Export		
State	Tributary	Reservoir Evaporation[1]	Irrigation	Stockpond Evaporation & Livestock	Subtotal	Mineral Resources	Thermal Electric Power	Other[2]	Subtotal	Outside System	Within System	TOTAL
Arizona	San Juan - Colorado Rivers	4.7	0.8	1.1	1.9	0.0	27.4	4.1	31.5	0.0	0.0	38.1
Colorado	Green River	8.4	131.1	3.1	134.2	0.4	17.0	3.4	20.8	0.0	1.9	165.3
	Upper Main Stem	60.4	858.0	5.7	863.7	3.1	1.5	32.1	36.7	490.7	161.9	1,613.4
	San Juan - Colorado Rivers	9.1	262.6	4.3	266.9	0.2	0.0	6.5	6.7	1.4	(163.7)	120.4
	TOTAL	77.9	1,251.7	13.1	1,264.8	3.7	18.5	42.0	64.2	492.1	0.1	1,899.1
New Mexico	San Juan - Colorado Rivers	22.3	209.3	4.1	213.4	0.8	49.0	20.1	69.9	84.9	0.0	390.5
Utah	Green River	41.9	454.7	4.4	459.1	1.4	35.0	11.5	47.9	148.8	0.0	697.7
	Upper Main Stem	1.4	12.2	0.2	12.4	0.6	0.0	1.7	2.3	0.0	0.0	16.1
	San Juan - Colorado Rivers	6.7	50.8	3.7	54.5	2.1	0.0	3.9	6.0	(6.3)	0.0	60.9
	TOTAL	50.0	517.7	8.3	526.0	4.1	35.0	17.1	56.2	142.5	0.0	774.7
Wyoming	Green River	33.6	271.3	4.8	276.1	0.8	37.3	5.2	43.3	16.0	0.0	369.0
Upper Basin	Green River	83.9	857.1	12.3	869.4	2.6	89.3	20.1	112.0	164.8	1.9	1,232.0
	Upper Main Stem	61.8	870.2	5.9	876.1	3.7	1.5	33.8	39.0	490.7	161.9	1,629.5
	San Juan - Colorado Rivers	42.8	523.5	13.2	536.7	3.1	76.4	34.6	114.1	80.0	(163.7)	609.9
	TOTAL	188.5	2,250.8	31.4	2,282.2	9.4	167.2	88.5	265.1	735.5	0.1	3,471.4

[1] Excludes reservoir evaporation from Colorado River main stem reservoirs listed in Table UC-1.

[2] Includes rural, urban, and other industrial uses.

Table UC-6
Upper Colorado River Basin
Estimated Water Use within States, by Major Tributaries and Types of Use
2005 - provisional data (Subject to change)

(1,000 acre-feet)

			Agriculture			Municipal and Industrial				Export		
State	Tributary	Reservoir Evaporation[1]	Irrigation	Stockpond Evaporation & Livestock	Subtotal	Mineral Resources	Thermal Electric Power	Other[2]	Subtotal	Outside System	Within System	TOTAL
Arizona	San Juan - Colorado Rivers											
Colorado	Green River											
	Upper Main Stem											
	San Juan - Colorado Rivers											
	TOTAL											
New Mexico	San Juan - Colorado Rivers											
Utah	Green River											
	Upper Main Stem											
	San Juan - Colorado Rivers											
	TOTAL											
Wyoming	Green River											
Upper Basin	Green River											
	Upper Main Stem											
	San Juan - Colorado Rivers											
	TOTAL											

[1] Excludes reservoir evaporation from Colorado River main stem reservoirs listed in Table UC-1.

[2] Includes rural, urban, and other industrial uses.