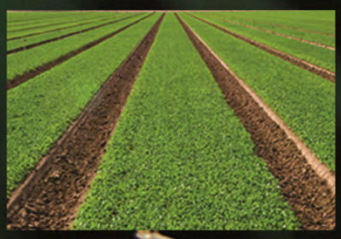
RECLAMATION

Managing Water in the West

Calendar Year 2013

Lower Colorado River Annual Summary of Evapotranspiration and Evaporation



U.S. Department of the Interior
Bureau of Reclamation
Lower Colorado Region
Boulder Canyon Operations Office

Revised June 2019

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Mission Statements

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Report Corrections

The 2013 Lower Colorado River Annual Summary of Evapotranspiration and Evaporation report, as herein revised, incorporates the following changes:

- **Riparian ET of 4,718 Acre-Feet originally reported in the Cocopah Indian Tribe - West Reservation in table 4 was moved to the Cocopah Indian Reseration, AZ (NCR) in table 6.**
- **Some values in the 2009-2013 graph on the Executive Summary fact sheet were corrected.**

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Acronyms

AF	Acre-Feet
AZ	Arizona
AZMET	Arizona Meteorological Network
CA	California
CIMIS	California Irrigation Management Information System
CVWD	Coachella Valley Water District
ET	Evapotranspiration
ET_o	Reference Evapotranspiration
GIS	Geographic Information System
IID	Imperial Irrigation District
LCRAS	Lower Colorado River Annual Summary (previously known as Lower Colorado River Accounting System)
NAIP	National Agriculture Imagery Program
NCR	Non-Colorado River
NV	Nevada
NWR	National Wildlife Refuge
NWS	National Weather Service
RS	Remote Sensing
SIB	Southerly International Boundary
TM	Thematic Mapper
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WMIDD	Wellton-Mohawk Irrigation and Drainage District
YMIDD	Yuma Mesa Irrigation and Drainage District
YPG	Yuma Proving Ground

Glossary

AZMET: A network of automated weather stations within the state of Arizona that provide reference evapotranspiration estimates.

CIMIS: A network of automated weather stations within the state of California that provide reference evapotranspiration estimates.

Crop Group: Crops with similar water use rates, grouped for the purpose of calculating evapotranspiration.

Crop Coefficient: The ratio of evapotranspiration observed for the crop studied over that observed for the reference crop under the same conditions.

Evapotranspiration: The combined effect of evaporation from the soil surface and transpiration from the plant canopy.

Fallowed/Idle Acres: The total number of acres that were left fallow or idle for the entire calendar year.

Geographic Information System: An information system that integrates, stores, edits, analyzes, shares, and displays geographic information.

Gross Cropped Acres: The total acres of crops grown, which includes multiple cropping on individual fields. Because permanent crops (i.e. alfalfa, bermuda grass, orchards and dates) may be pulled or replanted during the calendar year, the gross cropped acreage reported for permanent crops represents an average of the quarterly acreage values for a given water user. Gross cropped acres for a particular water user may be less than or greater than net cropped acres based on the following scenarios:

- When gross cropped acres are less than net cropped acres, it reflects a year in which permanent crops were pulled or replanted during the calendar year. Example: A given water user had 200 net acres of land. Of those, all 200 acres were planted in alfalfa in quarter 1. Beginning in quarter 2, 50 acres of alfalfa were pulled, leaving 150 acres of alfalfa in quarters 2, 3 and 4. In this scenario, the gross cropped acreage would be 162.5 acres (i.e. 200 + 150 + 150 + 150)/4 = 162.5 acres). The net cropped acreage would be 200 acres.
- When gross cropped acres are greater than net cropped acres, it reflects a year in which multiple crops were grown on a single field. Example: A given water user had 200 net acres of land. Of those, 200 acres of wheat were planted in the spring and 200 acres of lettuce were planted on the same fields in the fall. In this scenario, the gross cropped acreage would be reported as 200+200 = 400 acres. The net cropped acreage would be 200 acres.

Irrigable Acres: The total acres that can be irrigated and for which there exists adequate infrastructure to irrigate.

Moist Soil Unit: An area gradually flooded in winter to develop migratory waterfowl forage and not irrigated in summer.

Non-Colorado River (NCR): For water users designated as NCR, the origin of water used for agricultural irrigation and by riparian vegetation and open water is considered to come from sources other than the Colorado River.

Net Cropped Acres: The total acres on which one or more crops were grown, which does not include multiple cropping on individual fields. Does not include fallowed/idle acres. Because Reclamation's method uses the average annual acreage for permanent crops (i.e. alfalfa, bermuda, orchards and dates), gross cropped acres may be less than net cropped acres.

Program Area: The area in which Reclamation routinely monitors agricultural and riparian vegetation evapotranspiration and open water evaporation. Includes the lower Colorado River valley from Hoover Dam to the Southerly International Boundary with Mexico; the Wellton-Mohawk Irrigation and Drainage District on the Gila River in Arizona, and the Imperial Irrigation District and the Coachella Valley Water District in California.

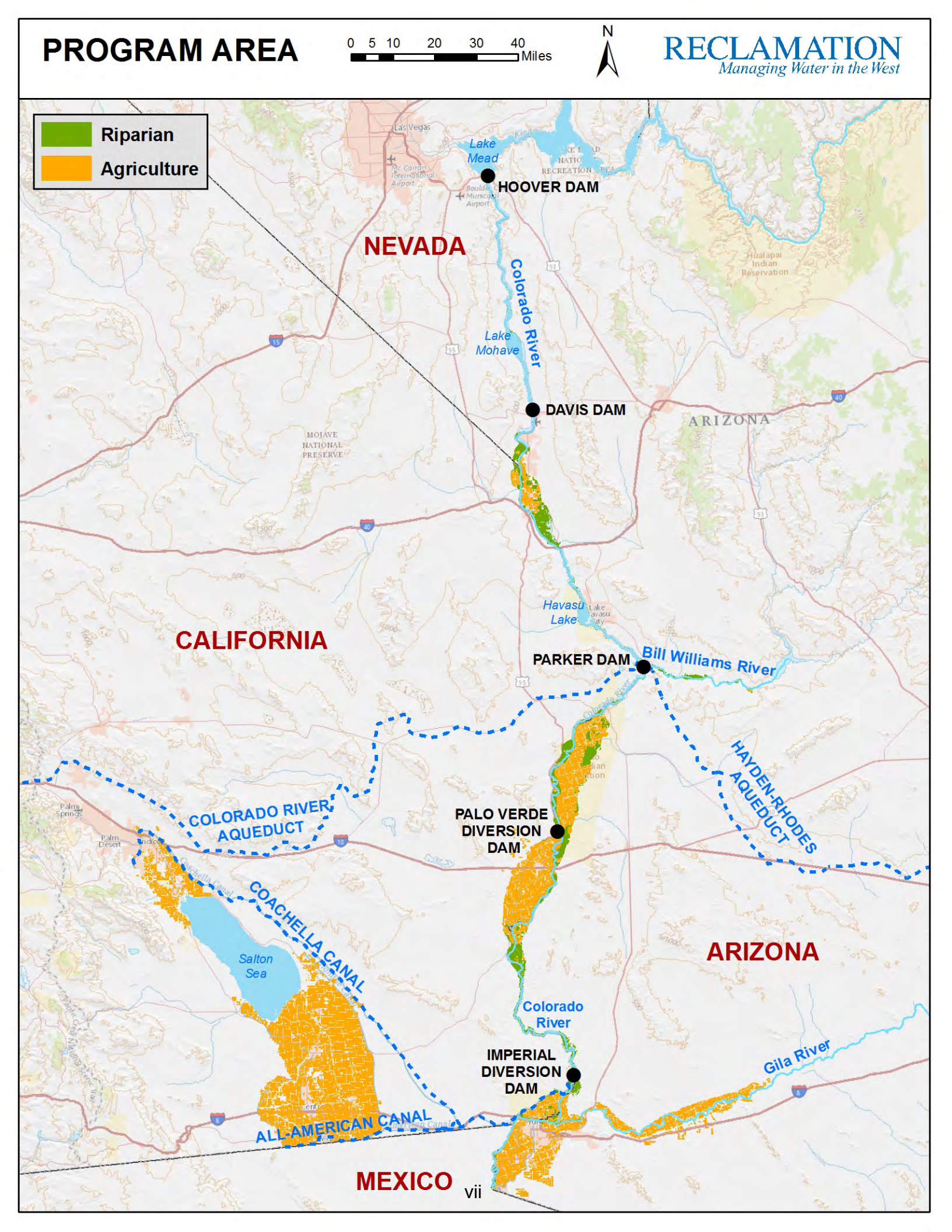
Remote Sensing: A technique for obtaining information from a surface without coming into physical contact with it, using sensors and imagers that are sensing the electromagnetic radiation coming from the surface at specific wavelengths.

Reference Evapotranspiration: The evapotranspiration rate from a reference surface. The reference surface is a hypothetical reference crop with specific characteristics.

Riparian Vegetation: Riparian vegetation refers to the vegetation that grows along the shores of freshwater rivers and lakes, or along some canals. As used in this report, riparian vegetation classes also include wetland types and natural vegetation within the lower Colorado River floodplain.

Spectral Characteristics: The amount of spectral reflectance from the Earth's surface recorded by the satellite sensors in different portions of the electromagnetic spectrum for different land cover types.

PROGRAM AREA



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Executive Summary

The Secretary of the Interior, as the "Watermaster" for the lower Colorado River, acts through the Bureau of Reclamation (Reclamation) to manage the waters of the Colorado River for the benefit of water users in the Southwestern United States and Mexico. A significant component of the Watermaster role, a component mandated by Article V of the Consolidated Decree of the United States Supreme Court in *Arizona* v. *California* (547 U.S. 150 (2006)), is to account for water use by each state and individual water user. In this capacity, Reclamation administers a number of programs, some of which utilize remote sensing technology to monitor and estimate annual agricultural and riparian vegetation water use, and open water evaporation along the lower Colorado River from Hoover Dam to the Southerly International Border with Mexico. Reclamation provides an annual summary of this information through publication of this report.[1]

Specifically, Reclamation calculates estimates of:

- Evapotranspiration (ET) from irrigated agricultural areas.
- ET from riparian vegetation.
- Evaporation from the mainstream channel and reservoirs of the lower Colorado River.
- Evaporation from major delivery canals, lakes, lagoons, and other open water areas along the river.
- Agricultural data, by water user, including the types of crops grown and acreages.

More than 3.5 million acres are monitored within the program area. This acreage includes:

- Irrigation districts, Indian reservations, Federal recreation areas, and wildlife refuges located along the mainstream of the lower Colorado River.
- The Bill Williams River below Alamo Dam.
- The Wellton-Mohawk Irrigation and Drainage District on the Gila River in Arizona.
- The Imperial Irrigation District and the Coachella Valley Water District in California.

The total estimated agricultural ET in 2013 is 2,954,361 acre-feet[2] (AF), representing a 1.3% decrease from the 2012 total of 2,990,807 AF.

Table ES-1 provides a summary of the predominant crops grown within the program area during calendar year 2013 and the acreages associated with each crop. More detailed information

[1] Copies of this and previous years' reports may be found on Reclamation's website at: www.usbr.gov/lc/region/g4000/wtracct.html.

[2] See Tables 4 and 5 for additional information. Note: In previous years' reports, this value included estimated ET from lands irrigated with non-Colorado River water (NCR). Beginning with the 2013 report, ET from NCRs is not included in the calculation of total ET. Table 6 separately tabulates the estimated ET for NCRs.

including water users' agricultural acreage (irrigable, gross cropped, net cropped, and fallowed/idle acres), crop types and acreages, agricultural ET by crop type, riparian vegetation acreage and ET, and open water acreage and evaporation has been included in Appendix 1. For select water users, the appendix also provides the historical 5-year trend (calendar years 2009-2013) of the user's total diversions, consumptive use (diversions less measured and unmeasured return flows, as reported in Reclamation's annual *Colorado River Accounting and Water Use Report: Arizona, California, and Nevada* reports), and agricultural ET (crop ET minus effective precipitation).

Table ES-1. Major Crops Grown in the Program Area in Calendar Year 2013.

Crop	**Gross Cropped Acres**
Alfalfa	280,966
Lettuce (Head, Leaf Red, Leaf Green, Spinach)	148,609
Small Grains (Wheat, Oats, Rye, Barley, Millet)	122,413
Sudan (Includes Sesbania and Clover)	97,597
Bermuda/Grass (Bermuda Overseeded with Rye, Klein, Timothy)	76,019
Crucifers	54,865
Other (e.g. Small Vegetables, Sugar Beets, Citrus, Crucifers, Dates, Field grains, Grapes, Melons, etc.)	234,009
Total	**1,014,478**

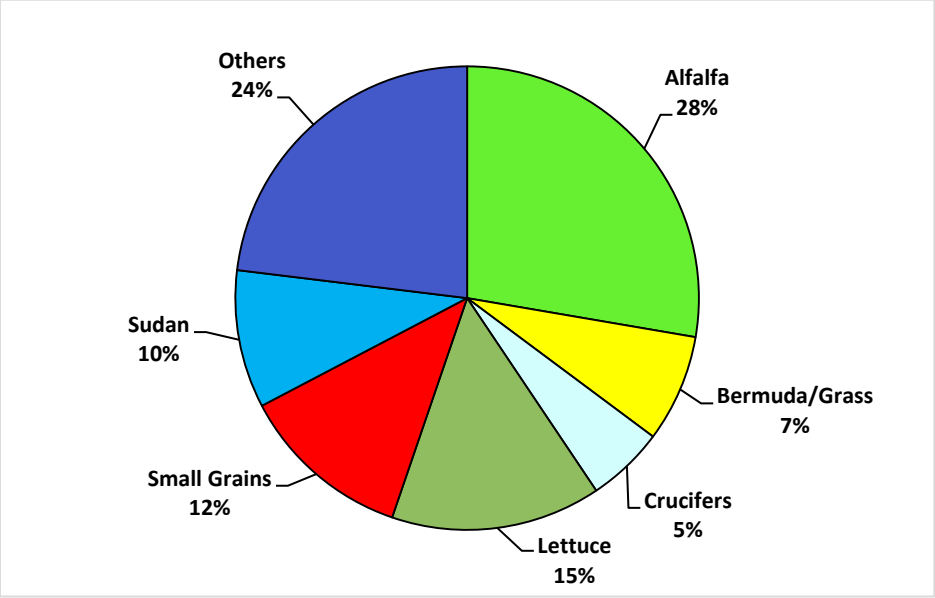


Figure ES-1. Major Crops Grown in the Program Area in Calendar Year 2013. (Based on Gross Cropped Acres.)

1.0 Introduction

The Colorado River has often been termed the "Lifeblood of the Southwest." Beginning in the Rocky Mountains of north central Colorado, the river travels more than 1,400 miles before it empties into the Gulf of California, commonly referred to the Sea of Cortez. Together with its tributaries, the Colorado River drains approximately 242,000 square miles in the United States, one-twelfth of the country's continental land area, and 2,000 square miles in Mexico.

The Colorado River and its tributaries provide water to nearly 40 million people for municipal use, supply water to irrigate nearly 5.5 million acres of land, and are the lifeblood for at least 22 federally recognized tribes, 7 National Wildlife Refuges, 4 National Recreation Areas, and 11 National Parks. In the Lower Division States of Arizona, California, and Nevada, the river serves major cities such as Phoenix, Los Angeles, and Las Vegas. The dry, arid climate of the lower Colorado River Basin (Lower Basin) lends itself to being one of the most productive agricultural regions in the nation. Agriculture use accounts for the largest component of the river's consumptive use in the Lower Basin, supporting an agricultural economy worth billions of dollars.

Figure 1. Map of the Colorado River hydrologic basin and areas adjacent to the hydrologic basin that receive Colorado River water.

As the Watermaster for the lower Colorado River, the Bureau of Reclamation must understand the disposition of water once it is released from Hoover Dam in order to effectively manage resources of the lower Colorado River. Because the agricultural sector comprises such a large component of the river's use in this region, it is important to have a comprehensive understanding of current agricultural practices and their associated water use. As competition for the Colorado River resource continues to escalate, water managers will increasingly rely on accurate and reliable sources of data upon which to make sound decisions regarding future water management policies to ensure a sustainable water supply is available to meet future demands.

This is particularly true for the Lower Division States, as each of these states has the ability to fully utilize its Colorado River apportionment.

2.0 Lower Colorado River Acreage and Water Use Estimates

This report provides estimates of agricultural, riparian vegetation, and open water acreages and water uses along the lower Colorado River from Hoover Dam to the Southerly International Border (SIB) with Mexico. Reclamation has reported these data since 1995, in reports previously entitled, *Lower Colorado River Accounting System Evapotranspiration and Evaporation Calculations* (LCRAS). A detailed history of the LCRAS program and the work that was performed related to its development is presented in the United States Geological Survey (USGS) Water Supply Paper 2407 (Owen-Joyce and Raymond, 1996). Beginning with the 2009 report, Reclamation reformatted the way in which the data are presented in an effort to provide a more user-friendly product that better serves the end-user. Beginning with the 2012 report this report has been entitled *Lower Colorado River Annual Summary of Evapotranspiration and Evaporation (LCRAS).*

This section provides a general overview of Reclamation's acreage and water use monitoring program, including a description of the program area and program elements. Section 3 provides a description of the procedures and methods; Section 4 provides the results of the 2013 monitoring program; and Section 5 discusses program improvements and/or changes that occurred in 2013.

2.1 Program Area

The area monitored by Reclamation includes the lower Colorado River valley from Hoover Dam to the SIB. Reclamation has routinely monitored agricultural and riparian vegetation ET and open water evaporation along the mainstream since 1994, and along the mainstream and Bill Williams River below Alamo Dam since 2001. Beginning in 2004, the program area was expanded to include the Wellton-Mohawk Irrigation and Drainage District (WMIDD) on the Gila River in Arizona, and the Imperial Irrigation District (IID) and the Coachella Valley Water District (CVWD) in California. With this expansion, the extent of the area analyzed more than doubled from approximately 1.2 million acres to nearly 3.5 million acres (Figure 2). Correspondingly, the number of fields analyzed also increased from approximately 50,000 fields to over 125,000 fields. Figure 2 illustrates the program area before and after the expansion.

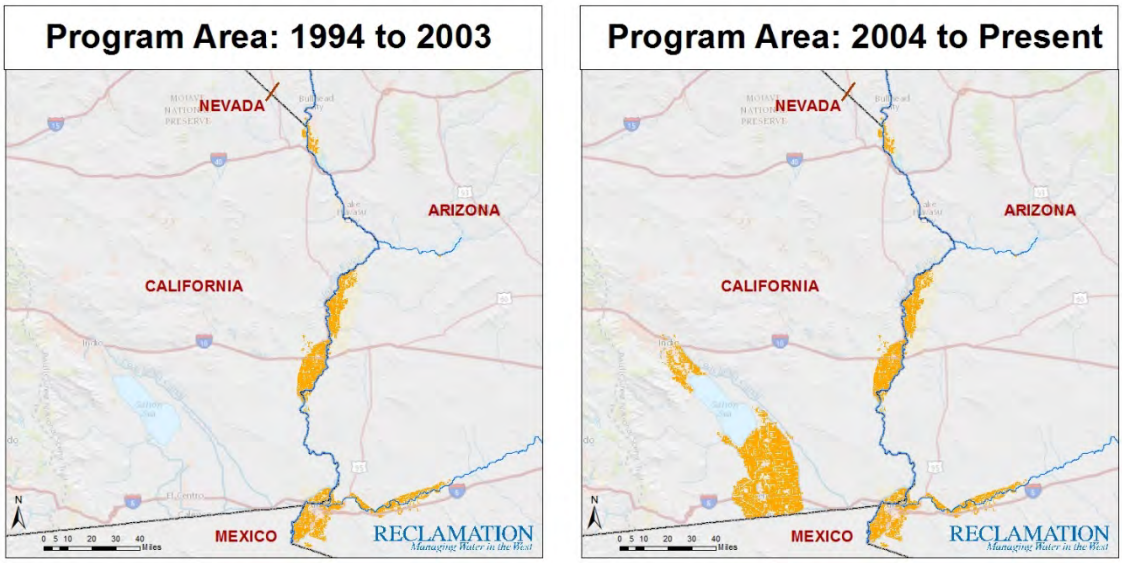


Figure 2. Program Area Extent: (1) 1994-2003 (original) and (2) 2004-Present (with the addition of WMIDD, IID, and CVWD). Program area includes riparian and open water areas, which are not shown here.

2.2 Program Elements

Reclamation's remotely-sensed data collection and monitoring program provides the following types of data:

1. Estimates of ET from irrigated agricultural areas.
2. Estimates of ET from riparian vegetation.
3. Estimates of evaporation from the mainstream channel and reservoirs of the lower Colorado River.
4. Estimates of evaporation from major delivery canals, lakes, lagoons, and other open water areas along the river.
5. Estimates of agricultural data, by water user, including the types of crops grown and acreages.

Reclamation uses this information to support a variety of program-related administrative requirements, including to monitor the current state of the river system, to assess potential impacts of changes to the river system, and as inputs to management decisions involving the administration of the federal laws, compacts, court decisions and decrees, contracts, and regulatory guidelines, collectively known as "The Law of the River," which govern the diversion and use of Colorado River water. Examples of how Reclamation uses this data include:

1. To assist in verifying Colorado River water users' success in meeting conservation targets under the Inadvertent Overrun and Payback Policy, Intentionally Created Surplus, and/or System Conservation programs.
2. To develop spatial databases representing locations of crops, riparian vegetation, and open water surfaces of the Colorado River, lakes, and canal systems.
3. To statistically quantify the types and acres of crops, riparian vegetation groups, and open water surface areas.
4. To perform economic analyses for land use conversions.
5. To refine and improve upon unmeasured return flow estimates.
6. To assist in making water entitlement and beneficial use determinations.
7. To assist in making determinations of unauthorized use.

Reclamation provides an annual summary of the land cover types, acreages, and associated evapotranspiration and evaporation for agricultural, riparian vegetation, and open water areas within the program area through publication of this report. Copies of this and previous years' reports can be found on Reclamation's website at: www.usbr.gov/lc/region/g4000/wtracct.html.

3.0 Procedures and Methods

Reclamation uses Remote Sensing (RS) and Geographic Information Systems (GIS) technologies to identify the location and quantify the acreages of crop groups, riparian vegetation groups, and open water areas in the program area. Riparian vegetation is monitored only in the Colorado River floodplain and along the Bill Williams River below Alamo Dam; it is not monitored in the IID, CVWD, or WMIDD areas. The spatial extent (location and area of coverage) of the crop groups, riparian vegetation groups, and open water areas is stored in digital spatial databases collectively referred to as a GIS database. Reclamation uses the data generated from the RS and GIS processes to calculate ET from crops and riparian vegetation, and evaporation from open water areas.

When RS processes alone are insufficient to map crop and riparian vegetation groups or open water areas, data collected on the ground (ground reference surveys) are also used. For example, orchards are mapped using data collected from ground reference surveys due to the difficulty of correctly identifying features related to this type of crop using RS processes alone. Once the data are entered into a GIS database, programs are used to calculate the number of acres of each crop group and riparian vegetation group for each water user, as well as the number of acres of open water areas. Acreage calculations are completed for areas located within the program area.

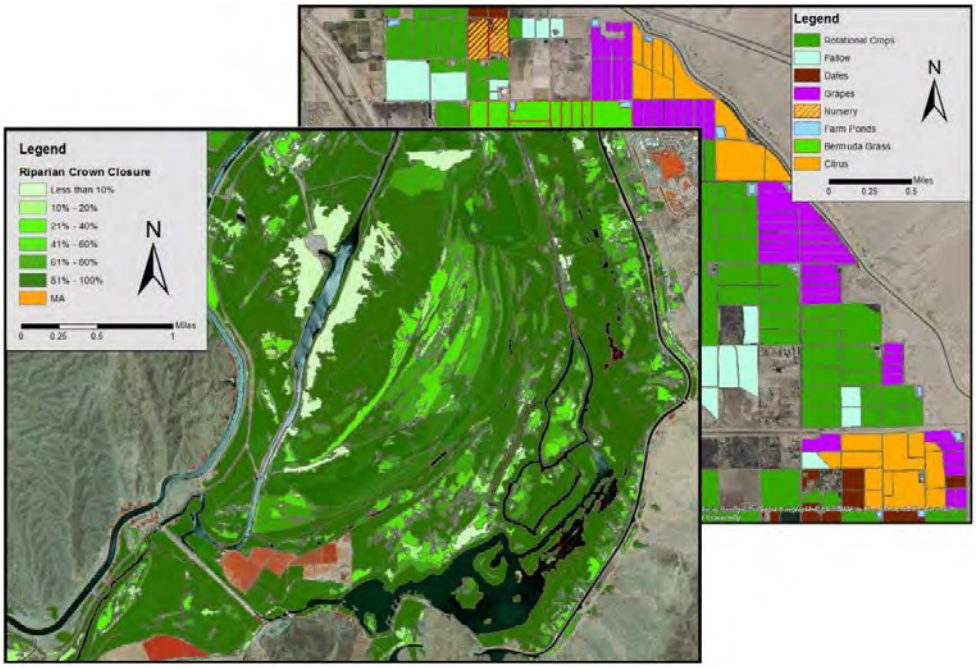


Figure 3. Reclamation uses RS and GIS processes to map crop and riparian vegetation groups and to estimate the evapotranspiration associated with these groups.

Once Reclamation maps the crop and riparian vegetation groups and open water areas (as discussed in the following sections), Reclamation calculates the ET from crops and riparian vegetation for each water user, and evaporation from open water areas. Currently, this analysis does not include estimates of ET or evaporation within the boundaries of domestic water users. Areas with identified crops and/or riparian vegetation located outside of a known water user boundary are mapped and labeled with the name of the state and river reach in which they are located (e.g. State of Arizona, Other Users, Davis Dam to Parker Dam).

The key components of ET and evaporation calculations include:

1. Identifying crop and riparian vegetation groups, and open water areas.
2. Calculating ET for crop groups and riparian vegetation groups.
3. Calculating evaporation from open water areas (i.e. the mainstream channel and reservoirs of the lower Colorado River, major delivery canals, lakes, lagoons, and other open water areas).

Sections 3.1 through 3.3 present a brief description of each of these components.

3.1 Identifying Crop Groups, Riparian Vegetation Groups, and Open Water Areas

This section provides an overview of the image classification processes and GIS technologies Reclamation uses to identify and map crop and riparian vegetation groups, and open water areas within the program area.

3.1.1 Collecting and Analyzing Remotely-Sensed Data

Satellite imagery is acquired from Landsat Thematic Mapper (TM) sensors and other satellite or airborne imaging systems as needed. For its analysis, Reclamation selects satellite images that adequately cover the program area, are cloud-free, and capture the variation in crop planting practices during the year.

3.1.2 Collecting Ground Reference Data

Correctly identifying and mapping crop and riparian vegetation groups using remotely-sensed data requires a thorough understanding of the spectral characteristics of vegetation types for representative (ground reference survey) sites throughout the program area. TM satellite image data contain digital values that represent the spectral characteristics of these crop and riparian vegetation groups. Reclamation analyzes these digital values within ground reference survey sites to generate spectral statistics for specific crop and riparian vegetation groups.

Reclamation collects ground reference survey data for approximately 12 percent of the irrigated fields in the program area. Reclamation uses 60 to 65 percent of the ground reference survey data for image classification processing (to identify crop groups) and the remaining 35 to 40 percent to assess the accuracy of the image classifications. Reclamation selects ground reference survey sites in each major irrigated area involved in this analysis. To provide a statistically valid data set, Reclamation selects irrigated fields from a GIS database using a stratified random sample and adds additional fields to the random sample, where necessary, to ensure representation of all major crop groups.

Table 1 provides a listing and description of the common crop groups identified within the program area. Although cropping patterns may vary yearly depending on market conditions, the types of crops grown within the program area generally remain consistent over the long-term.

Table 1. Crop Groups Identified within the Program Area.

Crop Group	Description
Alfalfa	Alfalfa
Aloe	Aloe
Bermuda/Grass	Bermuda, Bermuda Overseeded with Rye, Klein grass, Timothy grass
Cane/Bamboo	Cane/Bamboo
Citrus	Young (1-2 meters tall) Mature (2+ meters tall) Declining
Cotton	Cotton
Crucifers	Broccoli, Cauliflower, Cabbage, Bok-Choy, Mustard, Kale, Okra
Dates	Dates
Deciduous Orchards	Pecans, Peaches, Almonds
Fallow/Idle	Fields currently not in production; includes bare cultivated soil
Field grains	Field Corn, Sorghum, Milo
Grapes	Grapes
Jojoba	Jojoba
Legumes/Solanum Vegetables	Green, Dry and Garbanzo Beans; Peas, Peanuts, Fresh Peppers, Potatoes
Lettuce	Spring and Fall (Head, Leaf [Red], Leaf [Green], Spinach, Other Lettuce)
Maintained Marsh	Maintained Marsh
Melons	Spring and Fall (Watermelon, Honeydew, Cantaloupe, Squash, Cucumbers)
Miscellaneous Herbs	Anise, Mint, other
Moist Soil Unit	An area gradually flooded in winter to develop migratory waterfowl forage and not irrigated in summer
Nursery or Greenhouse	Citrus Nursery, Native Nursery, Greenhouse, Other Nursery
Oil Crops	Safflower, Canola, Sunflower, Sesame
Perennial Vegetables	Artichoke, Asparagus, Guayule
Restoration Areas	Irrigated lands where natural vegetation has been planted for purposes of increasing wildlife habitat along the lower Colorado River
Root Vegetables	Table Beets, Parsnip, Turnip, Rutabaga
Small Grains	Oats, Rye, Barley, Millet, Wheat
Small Vegetables	Carrots, Cilantro, Celery, Garlic, Dry Onions, Onions, Parsley, Radishes, Flowers
Sudan	Includes Sesbania and Clover
Sugar Beets	Summer and Winter
Tomatoes	Tomatoes
Wildlife Forage Maintained	Wildlife Forage Maintained

Table 2 provides a list and description of the riparian vegetation groups identified within the program area.

Table 2. Riparian Vegetation Groups Identified within the Program Area.

Riparian Group	Description
Barren	Less than 10% vegetation
Cottonwood/Willow	61% to 100% cottonwood and willow
Marsh	40% cattail, bulrush, and phragmites
Mixed Veg Low	Mixed vegetation types that may include salt cedar, mesquite, or arrowweed with crown closure greater than or equal to 10% and less than 40%
Mixed Veg Medium	Mixed vegetation types that may include salt cedar, mesquite, or arrowweed with crown closure greater than or equal to 40% and less than or equal to 80%
Salt Cedar Dense	Predominant salt cedar with crown closure greater than 80%

3.1.3 Delineating Cropped Areas

Reclamation has developed a spatial relational database that delineates field borders for all irrigated areas included in this analysis (field-border database). Reclamation has linked all ground reference survey data collected for image classification to this field-border database.

Reclamation routinely updates the field border database to reflect actual conditions observed in the field during collection of the ground reference sample data. Reclamation also uses 30 meter TM imagery, and 1- and 2-meter United States Department of Agriculture National Agricultural Imaging Program (NAIP) digital photography to update and create new field-border databases.

Delineated cropped areas include all areas known by Reclamation to divert or pump water along the mainstream of the lower Colorado River from Davis Dam to Mexico, WMIDD, IID, CVWD, and irrigated areas along the Bill Williams River from below Alamo Dam to Lake Havasu. (See Appendix 3, Exhibit 1 for an index of water user boundaries, and Exhibits 1 through 7 for illustrations of these areas.)

Using the RS technology with the GIS field border database, Reclamation identifies the crop(s) grown in each agricultural field throughout the calendar year. Post-classification accuracy assessments show that, overall, Reclamation routinely achieves an average accuracy of 90 percent or greater when mapping crop groups in the program area.

Reclamation completed a study with an independent statistician to quantify the effects of remote sensing-based crop classification error on accuracies of ET estimates. To review the results of this study, see Stehman, S.V. and Milliken, J.A. (2007), "Estimating the effect of crop classification error on evapotranspiration derived from remote sensing in the lower Colorado River basin, USA." *Remote Sensing of Environment*, 106, pp. 217 – 227.

Figure 4. Landsat satellite image showing agricultural fields in the Imperial Irrigation District with digitized field borders.

3.1.4 Delineating Riparian Vegetation Areas

Reclamation updates riparian vegetation areas along the Colorado River floodplain by comparing the current year Landsat TM summer satellite images to the previous year's images (change detection methods[3]). Reclamation field checks areas of spectral change to confirm that the change is actually due to a change in land cover. Reclamation then remaps areas of land cover change and uses these maps to update the riparian vegetation database.

3.1.5 Delineating Open Water Areas

Reclamation maintains an open water GIS database which contains the spatial boundaries of open water surfaces within the program area including: the mainstream of the Colorado River, reservoirs, major delivery canals, lakes, lagoons, and other backwater areas. Reclamation annually compares current-year satellite imagery to previous year imagery and updates the open water surface area as necessary.

Reclamation calculates evaporation from major delivery canals that serve water users within the Yuma area. Reclamation identifies bank-to-bank area (in acres) in these canals by digitizing canal banks from satellite and airborne imagery.

[3]See, Lower Colorado River Accounting System, Calendar Year 2001, Demonstration of Technology Report, Chapter 6, 6.23 - 6.26.

3.2 Calculating Crop and Riparian Vegetation ET

Reclamation calculates ET from crop groups and riparian vegetation groups using the following data:

1. Reference ET.
2. ET coefficients for each crop and riparian vegetation group.
3. Number of acres and location of each crop and riparian vegetation group.
4. Effective precipitation (used to calculate crop ET only).

The following sections describe the methods utilized by Reclamation to calculate these data.

3.2.1 Calculating Reference ET

Reference ET represents a fundamental measure of the rate of water use by vegetation (in linear units, such as inches) to which the rate of water use of all types of vegetation (as well as the rate of evaporation from a water body) can be related.

Reclamation calculates reference ET values using the standardized Penman-Monteith equation developed by the American Society of Civil Engineers (standardized equation), and climatological data provided by California Irrigation Management Information System (CIMIS) and Arizona Meteorological Network (AZMET) automated weather stations located in irrigated areas along the Colorado River from Davis Dam to Mexico. The standardized equation is widely accepted by science/engineering communities, and is considered the most accurate method currently available. The AZMET and CIMIS stations continuously collect maximum, minimum, and average air temperature and relative humidity; average soil temperature at depths of 2- and 4-inches, wind speed, and precipitation data; and calculate net solar radiation. These parameters, with the exception of precipitation, are used to calculate hourly and daily reference ET values.

Table 3 provides a list of the stations used to collect the reference ET data used in Reclamation's calculations and the corresponding geographical areas for which each station's data are applied. Appendix 2 contains the following additional information (averaged for each geographical area referenced in Table 3): monthly reference ET, monthly precipitation, and monthly ET rates for crop and riparian groups.

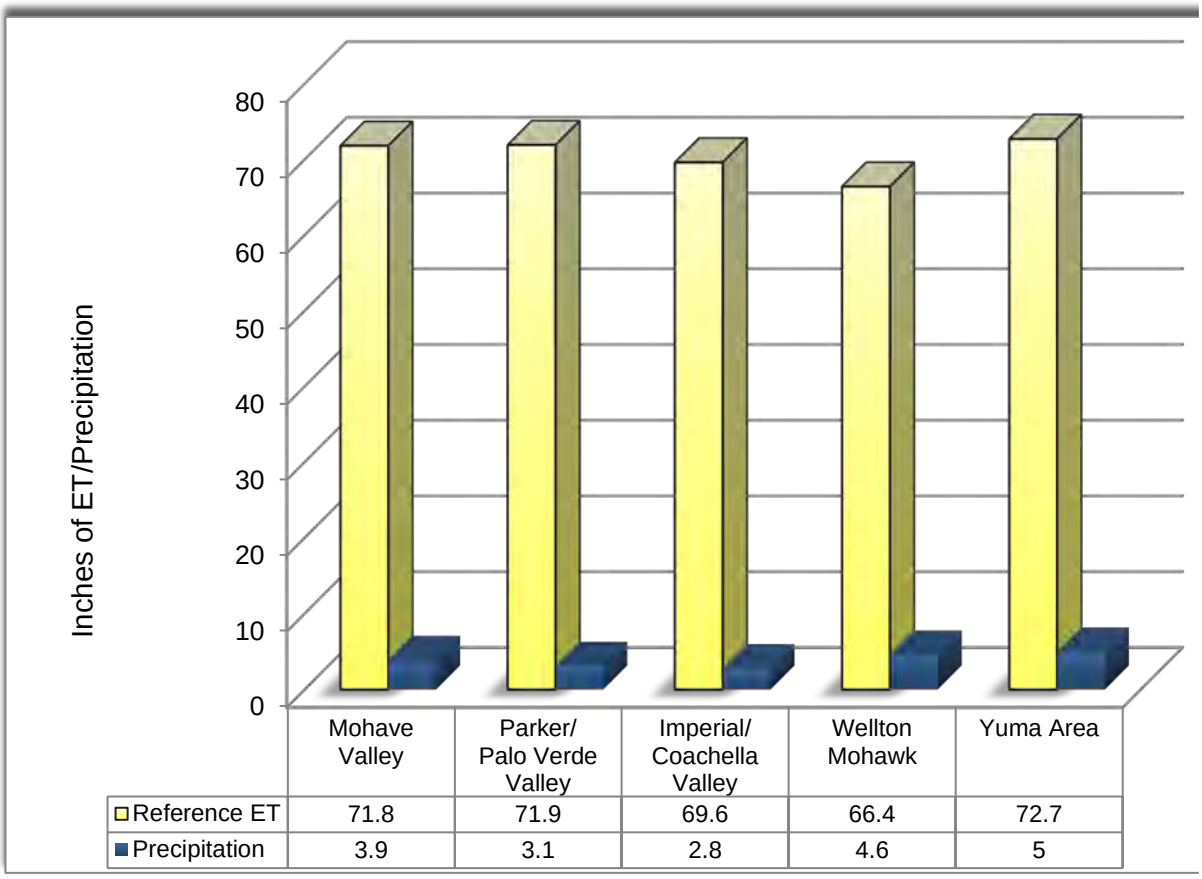
Table 3. Area Weather Stations Used for the Calculation of Average Reference ET and Precipitation.

Geographical Area	Weather Stations		
	AZMET	CIMIS	NWS*
Mohave Valley area	Mohave Mohave II Mohave ETo	--	Bullhead City Laughlin
Parker/Palo Verde valleys	Parker Parker II	Blythe NE Ripley Palo Verde II	Blythe-Airport Ehrenberg 2E Parker Blythe
Wellton-Mohawk area	Roll Roll ETo	--	Tacna 3 NE
Imperial/Coachella valleys	--	Calipatria/Mulberry Seeley Meloland La Quinta II Indio 2 Oasis Westmorland North	El Centro 2 SSW El Centro NAF, CA Imperial Indio FS Mecca FS Niland Desert Resorts Airport
Yuma area	Yuma North Gila Yuma South Yuma Valley Yuma Valley ETo	--	Yuma Proving Ground Yuma Quartermaster Yuma 9.7 ESE Yuma 13.8 ESE Yuma MCAS

*National Weather Station (NWS) stations collect precipitation data only.

Although the AZMET and CIMIS networks perform calculations of reference ET, it was discovered that there was a disparity in the values reported by each network for the lower Colorado River. Upon investigation, it was determined that the reason for the disparity was because the AZMET and CIMIS networks each use slightly different equations to calculate reference ET. Within the Parker and Palo Verde valleys, both CIMIS and AZMET stations are used to derive average reference ET values. By calculating reference ET using the standardized equation with the climatological data provided by the AZMET and CIMIS networks, this disparity is eliminated, and leaves only site conditions, equipment calibration, and micro-climatic differences between sites as sources of site to site variations in reference-ET values. Reclamation currently uses the reference ET values provided by the CIMIS network for the Imperial and Coachella valleys, and reference ET values from the AZMET network for the Mohave Valley and Wellton-Mohawk areas.

Reclamation develops area-specific reference ET values for the Mohave Valley, the Parker/ Palo Verde Valleys, the Imperial/Coachella valleys, the Wellton-Mohawk area (when more than one station is available), and the Yuma Area by averaging reference ET values from multiple sites within these areas. Figure 5 shows the reference ET and precipitation values used to develop the 2013 ET rates, which are then used to calculate ET from crop and riparian vegetation groups.



	Mohave Valley	Parker/ Palo Verde Valley	Imperial/ Coachella Valley	Wellton Mohawk	Yuma Area
Reference ET	71.8	71.9	69.6	66.4	72.7
Precipitation	3.9	3.1	2.8	4.6	5

Figure 5. Reference ET and precipitation. Units: Inches.

3.2.2 ET Coefficients for Crop and Riparian Vegetation Groups

ET coefficients are the values that relate reference ET to the ET rate of a specific crop or riparian vegetation group, as well as to the evaporation rate from a water body. Jensen, Marvin E. (1998*), Coefficients for Vegetative Evapotranspiration and Open Water Evaporation for the Lower Colorado River Accounting System,* presents the rationale used to develop the original crop and riparian vegetation groups along the lower Colorado River and the Bill Williams River, their respective ET coefficients, and open water evaporation coefficients. Jensen, Marvin E. (2003), *Vegetative and Open Water Coefficients for the Lower Colorado River Accounting System (LCRAS), Addendum to the 1998 Report,* presents the adjustments made to the crop and riparian vegetation groups and the ET and evaporation coefficients, which are used in this report. The ET coefficients developed for the Yuma area are used to calculate crop ET for WMIDD.

The ET coefficients used for crops grown in IID and CVWD are derived from coefficients reported in Jensen, Marvin E. and Walter, Ivan A. (1997), *Assessment of 1987-1996 Water Use by the Imperial Irrigation District using Water Balance and Cropping Data Special Report, June 1997.* These ET coefficients were compared with crop ET coefficients for CVWD developed by

Lord, J.M. (1994), reported in *Water Use Assessment, Coachella Valley Water District and Imperial Irrigation District, Phase I Report*, and found to be similar; therefore the same ET coefficients are used for IID and CVWD. For a more in-depth description of the ET coefficients used for IID and CVWD, see *Lower Colorado River Accounting System Evapotranspiration and Evaporation Calculations, Calendar Year 2004.*

3.2.3 Calculating Effective Precipitation

Effective precipitation is that portion of precipitation which infiltrates and remains in the soil so as to be available for crop consumptive use. A correction to the ET rate for crop groups is required to remove the impact of precipitation so the ET calculated reflects only the consumptive use of Colorado River water. Reclamation calculates effective precipitation as the product of recorded precipitation and an effective precipitation coefficient. Precipitation is recorded by rain gauges located at CIMIS and AZMET stations, and at stations operated by the NWS along the lower Colorado River. Table 3 provides a list of the stations used to collect the precipitation data used in Reclamation's calculations and the corresponding geographical areas for which each station's data are applied.

Reclamation developed a single daily, area-specific precipitation value for the Mohave Valley, the Parker/Palo Verde valleys, the Wellton-Mohawk area, the Imperial and Coachella valleys, and the Yuma area by averaging precipitation measured at the CIMIS, AZMET, and NWS stations in each area. Jensen, Marvin E. (1993), *Evaluating Effective Rainfall in CVWD*, contains the documentation for the effective precipitation coefficients used in this report. Reclamation uses the following equation to calculate effective precipitation:

$$\textit{Effective Precipitation} = \textit{Daily Precipitation} \times \textit{Monthly Effective Precipitation Coefficient}$$

Because the amount of precipitation in the Lower Basin is typically very small, the correction to the ET rate for precipitation is also typically very small.

3.2.4 Calculating Crop ET

To calculate ET from crops in the program area, Reclamation calculates an ET rate (in inches) for each crop group by multiplying the average daily reference ET values (inches) by each group's unique daily ET coefficient (dimensionless). (See Appendix, Part 2 of the *Lower Colorado River Accounting System Evapotranspiration and Evaporation Calculations, Calendar Year 2008* report for daily Kc values.) Reclamation considers the effect of rainfall on crop water use by subtracting effective precipitation (inches) from the ET rate for each crop group to yield a net ET rate (inches). Reclamation sums the daily ET rates to produce a monthly ET rate (inches) for each crop group.

Reclamation determines the acreage of each crop group within each water user's boundary using GIS technologies, RS, and field survey data as previously described. For multi-year crops that are present during only part of the year, such as alfalfa and orchards, Reclamation uses quarterly acreage estimates for the ET calculation.

Figure 6. AZMET weather station, Mohave 2, located in the Mohave Valley, AZ.

Reclamation calculates the ET (in acre-feet) within each water user's boundary by multiplying the ET rate for each crop group by the acreage of each crop group. These calculations are performed on a monthly time-step and the results summed to produce annual agricultural ET values within each water user's boundary. The following equation is used to calculate ET for a specific crop group:

$$\text{Annual ET} = \sum_{t=0}^{n} \frac{[(ET_o \times K_c) - \text{Effective PPT}]\ AC}{12 \text{ inches/foot}}$$

Where:

ET	=	Annual ET by crop group (acre-feet)
n	=	Time-step (monthly)
ET_o	=	Daily reference ET (inches)
K_c	=	Daily ET coefficient for a specific crop (dimensionless)
AC	=	Acres of crop
Effective PPT	=	Effective precipitation (inches)

3.2.5 Calculating ET from Riparian Vegetation

Reclamation calculates ET from riparian vegetation for this report the same way it calculates agricultural ET, except that no correction is made to the ET rates of riparian vegetation for effective precipitation. The sum of the ET from all riparian vegetation groups within a water user's boundary yields the riparian vegetation ET for that individual water user. Riparian vegetation is monitored only in the Colorado River floodplain and along the Bill Williams River below Alamo Dam; it is not monitored in the IID, CVWD, or WMIDD areas.

3.3 Calculating Evaporation from Open Water Areas

Reclamation calculates evaporation from open water areas within the program area using the following data:

1. Reference ET.
2. Monthly evaporation coefficients.
3. Number of acres and location of the open water area.
4. Precipitation.

The following sections describe the methods utilized by Reclamation to calculate open water evaporation from the mainstream and from major delivery canals.

3.3.1 Mainstream

Reclamation calculates evaporation from Lakes Mohave and Havasu, and the open water areas of the mainstream Colorado River channel and its adjacent backwaters (such as Topock Marsh and Mittry Lake) from below Hoover Dam to Mexico. The following equation is used to calculate evaporation from open water areas:

$$\text{Annual EVAP} = \sum_{t=0}^{n} \frac{[(ET_o \times K_c)\text{-PPT}]\ AC}{12 \text{ inches/foot}}$$

Where:

EVAP	=	Annual Evaporation by open water (acre-feet)
n	=	Time-step (monthly)
ET_o	=	Daily reference ET (inches)
K_c	=	Monthly Evaporation coefficient for water (dimensionless)
AC	=	Acres of water
PPT	=	Precipitation (inches)

Reclamation verified the open water area for this report using the method described in Section 3.1.5, “Delineating Open Water Areas.”

3.3.2 Calculating Evaporation from Major Delivery Canals

Reclamation calculates evaporation from the All-American Canal, Gila Gravity Main Canal and other major delivery canals in the Yuma area using the same equation used to calculate evaporation from the mainstream. Reclamation categorized major delivery canals into two groups: (1) those that deliver water to a single water user (single-user canals) and, (2) those that deliver water to two or more water users (shared canals).

Evaporation from a shared canal is proportioned among the water users which receive water from the canal. Reclamation calculates each water user's proportionate share of evaporation using the following process:

1. Calculate the distance from the canal headworks to the user's point(s) of delivery. In cases where a user has more than one delivery point, Reclamation calculates a single point of delivery using a weighted average based on the user's diversion amounts at each point of delivery. These values have units of miles.
2. Multiply the mileage value from (1) by the user's total diversion to derive what is referred to as the pro-rata factor. These values have units of acre-foot miles.
3. Divide the pro-rata factor for each water user (derived in (2)) by the sum of the pro-rata factors for all water users that receive water from the canal. This value, which can be expressed as a fraction or percentage, represents each user's percentage use of the canal.
4. Multiply each user's percentage use of the canal by the total volume of evaporation from the canal to determine each user's share of evaporation from the canal.

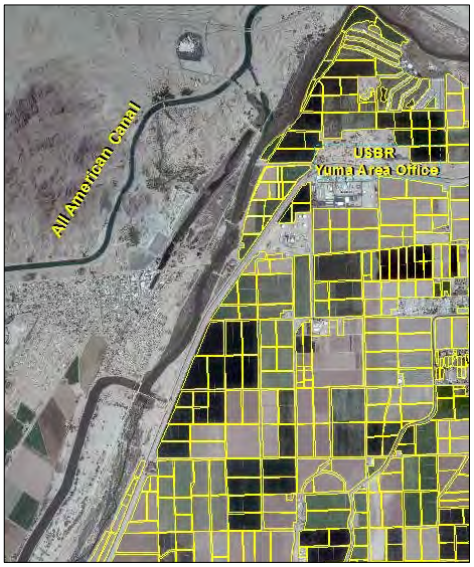


Figure 7. Digital image showing the All-American Canal, one of the canals from which Reclamation estimates evaporation.

4.0 Results

For each specified water user, Table 4 shows the ET from agriculture and riparian vegetation; and evaporation from the open water surfaces within that water user's boundary. As previously mentioned, areas with identified crops and/or riparian vegetation not located within a known water user boundary are mapped and labeled with the name of the state and river reach in which they are located. Table 4 includes water users which are not located on the river but are irrigated with water diverted from the Colorado River; specifically WMIDD in Arizona, and IID and CVWD in California.

The raw data used to develop the results presented in Tables 4 through 6 can be found on Reclamation's website at http://www.usbr.gov/lc/region/g4000/wtracct.html.

Table 4. Agricultural ET, Riparian Vegetation ET, and Open Water Evaporation by Water User, Lower Colorado River, Hoover Dam to Mexico. Units: Annual Acre-Feet.

Water User	Agricultural ET	Riparian Vegetation ET[4]	Open Water Evaporation
Nevada (below Hoover Dam)			
Fort Mojave Indian Reservation	2,223	5,294	54
Lake Mead National Recreation Area (Hoover Dam to Davis Dam)	0	2,049	11
Lake Mead National Recreation Area (Davis Dam to Parker Dam)	0	0	0
State of Nevada (Davis Dam to Parker Dam)	0	9,311	287
Nevada Totals*	**2,223**	**16,654**	**352**
California			
Arizona State Trust Lands, CA	5,453	1,678	100
Chemehuevi Indian Reservation	0	2,189	31
Cibola National Wildlife Refuge	0	13,225	613
Coachella Valley Water District	153,725	0	5,588
Colorado River Indian Reservation	3,603	33,049	691
Fort Mojave Indian Reservation	11,360	2,668	0
Fort Yuma Indian Reservation	210	10,682	328
Fort Yuma Indian Reservation Ranch 1	253	0	0
Fort Yuma Indian Reservation Ranch 2 Parcel 3	218	0	0
Fort Yuma Indian Reservation Ranch 3	9	14	0
Fort Yuma Indian Reservation Ranch 4	480	0	0
Fort Yuma Indian Reservation Ranch 5	692	0	0
Fort Yuma Indian Reservation Ranch 7	209	0	0
Fort Yuma Indian Reservation Ranch 15	11	10	0
Fort Yuma Indian Reservation Ranch 17	66	0	0
Havasu National Wildlife Refuge	0	3,716	425
Imperial Irrigation District	1,468,642	0	12,761

[4] Riparian Vegetation ET is monitored only in the Colorado River floodplain.

Water User	Agricultural ET	Riparian Vegetation ET[4]	Open Water Evaporation
Imperial National Wildlife Refuge (Parker Dam to Imperial Dam)	0	10,400	1,081
Lake Enterprises of California, LLC	0	656	13
Palo Verde Irrigation District	360,237	8,389	1,252
State of California, Other Users (Davis Dam to Parker Dam)	0	9,355	410
State of California, Other Users (Parker Dam to Imperial Dam)	1,701	18,833	5,224
State of California, Other Users (Imperial Dam to Mexico)	0	8,317	369
Yuma Project Reservation Division, Bard Unit	21,971	807	167
Yuma Project Reservation Division, Indian Unit	17,213	657	119
California Totals*	**2,046,053**	**124,646**	**29,171**
Arizona			
Arizona Game and Fish Commission/Mohave County Water Authority	3,967	239	0
Arizona State Land Department (Parker Dam To Imperial Dam)	1,128	1,953	0
Arizona State Land Department (Imperial Dam To Mexico)	3,431	555	64
Beattie Farms Southwest	861	237	0
Bill Williams National Wildlife Refuge	0	7,588	219
BLM	205	131	0
BLM (Monty Lee)	98	0	0
BLM (Pratt)	128	0	0
Cha Cha, LLC	1,352	26	10
Cibola National Wildlife Refuge	9,524	27,844	1,972
Cibola Valley Irrigation and Drainage District	4,696	3,170	0
City of Yuma (Yuma East Wetlands)	0	392	97
Cocopah Indian Tribe, Fee Lands	447	52	0
Colorado River Indian Reservation	323,197	90,649	953
Curtis, Armon	84	18	0
Cocopah Indian Tribe – East Reservation	12	0	0

Water User	Agricultural ET	Riparian Vegetation ET[4]	Open Water Evaporation
Cocopah Indian Tribe - North Reservation	1,204	93	28
Cocopah Indian Tribe – West Reservation	3,281	7	0
Fort Mojave Indian Reservation	39,910	20,860	51
Fort Yuma Indian Reservation	213	4,378	142
Fort Yuma Indian Reservation, Ranch 5	307	2	0
Fort Yuma Indian Reservation, Yuma East Wetlands	0	624	2
Gila Monster Farms	4,000	160	50
Griffin, R.	36	0	0
Griffin Ranches	169	1	0
GSC Farm, LLC	1,070	0	0
Havasu National Wildlife Refuge	0	43,403	15,431
Hopi Tribe	3,098	1,091	0
Imperial National Wildlife Refuge	225	21,026	3,244
JRJ Partners, LLC	897	11	0
Lake Havasu State Park	0	1,315	238
Lake Mead National Recreation Area (Hoover Dam to Davis Dam)	0	2,083	33
Lake Mead National Recreation Area (Davis Dam to Parker Dam)	0	102	5
Mittry Lake Management Area	0	14,698	2,632
Mohave Valley Irrigation and Drainage District	14,062	15,421	468
North Baja Pipeline, LLC	128	2	0
North Gila Valley Irrigation District	20,663	2,360	68
Ogram Boys Enterprises, Inc.	517	11	0
Ogram, George	390	0	0
Pilot Knob Power Plant and Wasteway	0	0	459
Pasquinelli, Gary & Barbara	109	0	0
Peach, John	243	0	0
Phillips, Milton	95	0	0

Water User	Agricultural ET	Riparian Vegetation ET[4]	Open Water Evaporation
Power	139	0	0
Power, Victor	81	2	0
Rayner Ranches	2,507	2	0
State of Arizona, Other Users (Davis Dam to Parker Dam)	0	2,148	348
State of Arizona, Other Users (Parker Dam to Imperial Dam)	594	21,808	3,748
State of Arizona, Other Users (Imperial Dam to Mexico)	2,871	8,170	507
State of Arizona, Other Users (Down Gradient of YMIDD)	33,633	0	0
State of Arizona, Other Users (Limitrophe)	2,569	4,037	0
Unit B Irrigation and Drainage District	7,165	0	118
University of Arizona	251	0	0
Wellton-Mohawk Irrigation and Drainage District	195,351	0	692
Yuma County Water Users Association	121,606	1	1,864
Yuma Irrigation District	31,321	654	352
Yuma Mesa Irrigation and Drainage District	68,252	0	1,027
Yuma Proving Ground	0	259	0
Arizona Totals*	**906,087**	**297,580**	**34,823**
Hoover Dam to Mexico Totals*	**2,954,361**	**438,881**	**64,346**

*Due to rounding, totals shown may differ from the sum of the individual values.

Table 5 provides a summary, by river reach, of ET and evaporation results along the lower Colorado River from Hoover Dam to Mexico. (Note: Bill Williams River National Wildlife Refuge (NWR) is included in the Davis Dam to Parker Dam reach; WMIDD, IID, and CVWD are included in the Imperial Dam to Mexico reach.)

Table 5. Summary of ET and Evaporation along the lower Colorado River from Hoover Dam to Mexico. Units: Annual Acre-Feet.

ET Category/Evaporation	Hoover Dam to Davis Dam	Davis Dam to Parker Dam	Parker Dam to Imperial Dam	Imperial Dam To Mexico	Total: Hoover Dam To Mexico*
Agricultural ET	0	67,555	715,674	2,171,133	2,954,361
Riparian Vegetation[4]	4,132	123,369	252,334	59,047	438,881
Evaporation – Open Water	44	17,968	18,791	27,542	64,346
Evaporation – Mainstream	133,179	98,227	48,387	3,698	283,489

**Due to rounding, totals shown may differ from the totals shown in Table 4.

Table 6 shows the ET from agriculture and riparian vegetation and evaporation from open water areas along the Bill Williams River[5], the Bill Williams River NWR[6], the Gila River Valley[7], Hillander C Irrigation District[8], and portions of the Cocopah Indian Tribe – West Reservation,

Table 6. Agricultural ET, Riparian Vegetation ET, and Open Water Evaporation by Non-Colorado River Water Users. Units: Annual Acre-Feet.

Water User Name	Agricultural ET	Riparian Vegetation ET[4]	Open Water Evaporation
State of Arizona (Alamo Dam to Bill Williams NWR)	1,520	15,545	537
Bill Williams River NWR	0	1,612	49
State of Arizona (Gila River Valley)	2,871	0	39
Cocopah Indian Reservation, AZ	1,962	4,718	0
Hillander C Irrigation District	3,168	0	0
Totals	**9,521**	**21,875**	**624**

*Due to rounding, totals shown may differ from the sum of the individual values.

[5] Bill Williams River, from Alamo Dam to the eastern boundary of the Bill Williams River NWR.

[6] Bill Williams River NWR, from the eastern extent of the Colorado River aquifer to the eastern extent of the refuge boundary.

[7] Agricultural land outside of WMIDD that is irrigated with wells pumping Gila River Valley groundwater.

[8] Hillander C Irrigation District is located on the South Yuma Mesa and is irrigated with groundwater not available for other users in the United States or to meet the 1944 Mexican Treaty obligation.

[9] Includes only those fields that are within the Cocopah Indian Tribe – West Reservation that are irrigated with groundwater.

AZ[9]. The origin of the water used for agricultural irrigation and by riparian vegetation in these areas is considered to come from sources other than the Colorado River.

5.0 Data Comparisons in Appendix 1

Additional information on the water users identified in Tables 4 through 6, including agricultural acreage (irrigable, gross cropped, net cropped, and fallowed/idle acres), crop types and acreages, agricultural ET by crop type, riparian vegetation acreage and open water acreage has been included in Appendix 1. For select water users, the appendix also provides the historical 5-year trend (calendar years 2009-2013) of the user's total diversions and consumptive use (as reported in Reclamation's *Colorado River Accounting and Water Use Report: Arizona, California, and Nevada (*Water Accounting Report)), and agricultural ET (crop ET minus effective precipitation).

5.1 Differences between LCRAS Report and Water Accounting Report Values

Estimates of ET from irrigated agricultural areas presented in the LCRAS report may differ from the consumptive use values contained in the Water Accounting Report. In the LCRAS report, the terms "consumptive use" and "ET" are used interchangeably and represent the estimates of consumptive use of Colorado River water from agriculture, riparian vegetation, and permanent open water. These estimates are based on computations of ET and evaporation using weather data, crop acreage, crop type, regionally estimated planting and harvest dates, and crop-specific ET coefficients.

In the Water Accounting Report, tabulated consumptive use values are computed as diversions minus the sum of measured and unmeasured return flows, and incorporate the following types of consumptive use that are not included in the LCRAS report:

1. The total volume of water exported from the mainstream (e.g. Imperial Irrigation District and Coachella Valley Water District).
2. Municipal and industrial diversions.
3. Delivery system losses within and along irrigation canals from the point of diversion to the agricultural fields.
4. Irrigations performed outside of a standard crop cycle (e.g. irrigations to remove salt from the soil column and dust control irrigations during times of fallowing).

6.0 Program Improvements for Calendar Year 2013

Reclamation annually reviews each application of the methodology and incorporates "lessons learned" into subsequent reports. Reclamation also modifies each application of the methodology in response to information provided by water users and as modified processes

become available after analysis of long-term questions and issues. The following paragraphs describe the program improvements implemented beginning with this calendar year 2013 report.

6.1 Adjustments to Water User Names and Boundaries

For the 2013 report, certain fields within the Cocopah Indian Tribe – West Reservation (see Appendix 3, exhibit 5) were determined to be irrigated solely with groundwater. Since groundwater in this region is not considered to be Colorado River water, ET from these fields (representing 703 acres) is only included in Table 6.

6.2 Refinement of Open Water Areas

In 2013, changes in open water acreage were identified by inspecting the most recent imagery available, including NAIP, Landsat, Google Earth, and ESRI imagery. The 2012 open water data set was compared to these image sources and updated by adding or removing open water areas where differences occurred.

Evaporation calculations for open water surfaces along the main stem of the Lower Colorado River use unique evaporation coefficients for each geographical area (Jensen, 2003), which have been included in Appendix 2.

7.0 References

Bureau of Reclamation. 1997. *Lower Colorado River Accounting System, Calendar Year 1995, Demonstration of Technology Report*.

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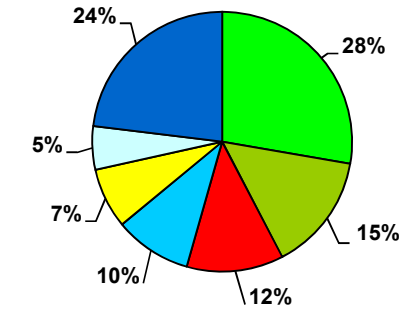
Appendix 1: Water User Fact Sheets

This appendix is intended to supplement the information contained in Table 4, and includes the following information for each water user: agricultural acreage (irrigable acres, gross cropped acres, net cropped acres and fallowed/idle acres); crop types and acreages; agricultural ET by crop type; riparian vegetation acreage and ET; and open water acreage and evaporation. For select users, the appendix also provides a historical 5-year trend (calendar years 2009-2013) of the user's total Colorado River diversions and consumptive use (diversions less measured and unmeasured return flows) – as reported in Reclamation's annual *Colorado River Accounting and Water Use Report: Arizona, California, and Nevada* reports– and agricultural ET (crop ET minus effective precipitation – as reported in Reclamation's annual *Lower Colorado River Annual Summary of Evapotranspiration and Evaporation* (LCRAS) reports. Copies of these reports may be found on Reclamation's website at: www.usbr.gov/lc/region/g4000/wtracct.html.

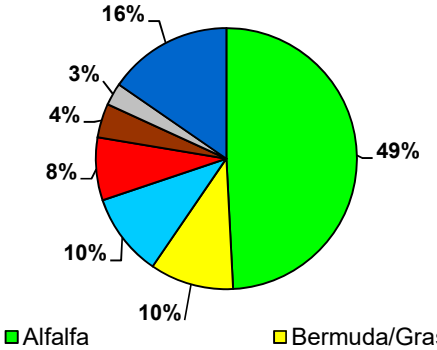
Executive Summary
2013

River Reach:	Hoover Dam to Mexico
Agriculture	
Irrigable Acres:	846,493
Gross Cropped Acres:	1,014,478
Net Cropped Acres:	776,418
Fallowed/Idle Acres:	70,075
Agricultural Evapotranspiration (acre-feet):	2,954,361
Riparian	
Riparian Vegetation - Acres:	136,006
Riparian Evapotranspiration (acre-feet):	438,881
Open Water	
Open Water - Acres:	11,969
Open Water - Evaporation (acre-feet):	64,346
Mainstream (Lake and River)	
Acres:	57,487
Evaporation (acre-feet):	283,489

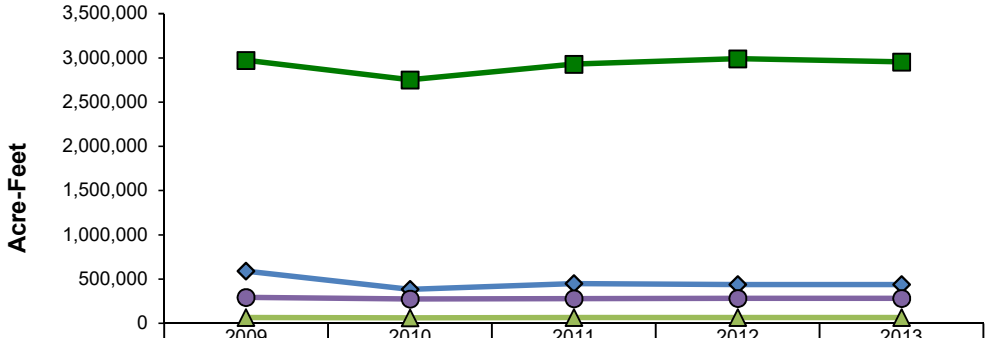
Major Crop Types



Annual Agricultural ET



Evapotranspiration and Evaporation, 2009-2013



	2009	2010	2011	2012	2013
Agricultural ET	2,972,983	2,753,765	2,929,707	2,990,807	2,954,361
Riparian Vegetation ET	591,209	383,480	450,667	438,039	438,881
Open Water Evaporation	65,870	63,074	64,780	64,750	64,346
Mainstream Evaporation	293,043	274,507	278,615	284,264	283,489

Executive Summary
2013

Crop Type	Gross Cropped Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	280,966	28	1,452,624	49
Aloe	25	<1	52	<1
Bermuda/Grass	76,019	7	306,716	10
Cane/Bamboo	65	<1	355	<1
Citrus	24,589	2	80,696	3
Cotton	43,669	4	125,178	4
Crucifers	54,865	5	34,499	1
Dates	14,596	1	82,118	3
Deciduous Orchards	1,844	<1	7,864	<1
Field Grain	13,150	1	36,246	1
Grapes	7,999	1	22,982	1
Legume/Solanum Veg.	9,535	1	9,395	<1
Lettuce	148,609	15	73,902	3
Marsh Maintained	303	<1	1,679	<1
Melons	15,064	1	25,771	1
Miscellaneous herbs	991	<1	2,508	<1
Moist Soil Unit	1,624	<1	7,950	<1
Nursery/Greenhouse	2,548	<1	5,367	<1
Oil Crops	373	<1	932	<1
Perennial Vegetables	746	<1	3,271	<1
Root Vegetables	463	<1	457	<1
Small Grains	122,413	12	229,542	8
Small Vegetables	45,167	4	58,190	2
Sudan	97,597	10	303,952	10
Sugar Beets	47,583	5	71,710	2
Tomatoes	1,161	<1	2,604	<1
Wildlife Forage Maintained	1,079	<1	2,388	<1
Restoration Area	1,434	<1	5,415	<1
Total*	**1,014,478**	**100%**	**2,954,361**	**100%**

*Due to rounding, totals may differ from the sum of the individual values.

Hoover Dam to Davis Dam
2013

Agriculture
There is no agricultural use in this reach.

Riparian	
Riparian Vegetation Acres:	1,356
Riparian Evapotranspiration (acre-feet):	4,132

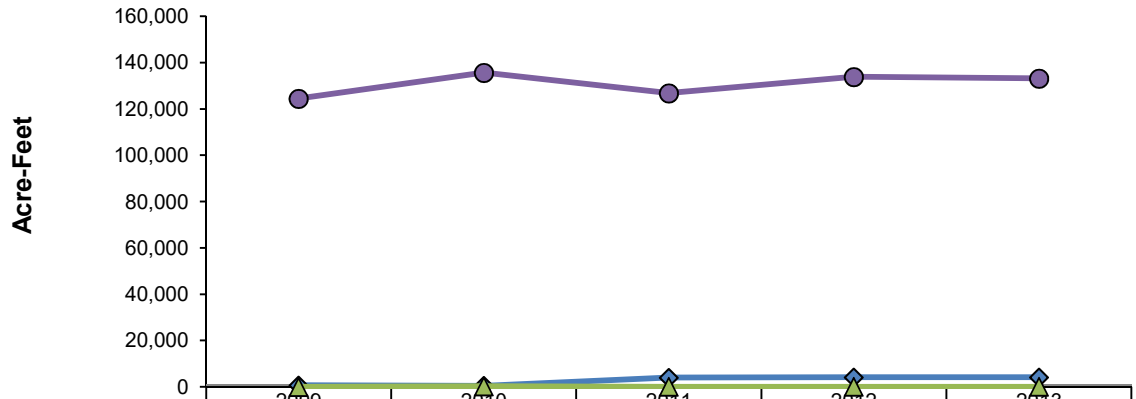
Open Water	
Open Water Acres:	9
Open Water Evaporation (acre-feet):	44

Mainstream (Lake and River)	
Acres:	27,365
Evaporation (acre-feet):	133,179

Water Users within Reach
Lake Mead National Recreation Area - AZ & NV

Crop Types within Reach	Acres	Annual ET (acre-feet)
Note: There were no crops grown in this reach.		

Evapotranspiration and Evaporation, 2009-2013



	2009	2010	2011	2012	2013
Riparian Vegetation ET	667	474	3,984	4,149	4,132
Open Water Evaporation	20	237	56	57	44
Mainstream Evaporation	124,469	135,666	126,813	133,823	133,179

Davis Dam to Parker Dam

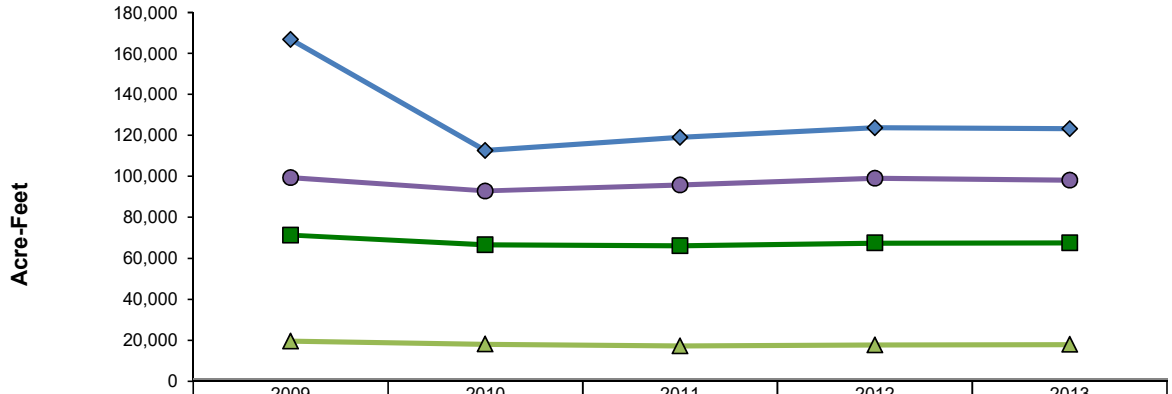
2013

Agriculture	
Irrigable Acres:	18,229
Gross Cropped Acres:	17,641
Net Cropped Acres:	16,677
Fallowed/Idle Acres:	1,552
Agricultural Evapotranspiration (acre-feet):	67,555
Riparian	
Riparian Vegetation Acres:	38,369
Riparian Evapotranspiration (acre-feet):	123,369
Open Water	
Open Water Acres:	3,694
Open Water Evaporation (acre-feet):	17,968
Mainstream (Lake and River)	
Acres:	20,183
Evaporation (acre-feet):	98,227

Water Users within Reach
Bill Williams River National Wildlife Refuge - AZ
Chemehuevi Indian Reservation - CA
Fort Mojave Indian Reservation - AZ, CA, & NV
Havasu National Wildlife Refuge - AZ & CA
Lake Havasu State Park - AZ
Lake Mead National Recreation Area - AZ & NV
Mohave Valley Irrigation & Drainage District - AZ
State of Arizona (Other Users)
State of California (Other Users)
State of Nevada (Other Users)

Crop Types within Reach	Acres	Annual ET (acre-feet)
Alfalfa	8,515	45,698
Bermuda/Grass	991	2,972
Cotton	4,834	12,868
Field Grain	299	756
Lettuce	50	35
Small Grains	2,060	2,111
Sudan	892	3,115
Total	**17,641**	**67,555**

Evapotranspiration and Evaporation, 2009-2013



	2009	2010	2011	2012	2013
Agricultural ET	71,353	66,672	66,097	67,487	67,555
Riparian Vegetation ET	166,893	112,657	119,044	123,827	123,369
Open Water Evaporation	19,632	18,128	17,243	17,747	17,968
Mainstream Evaporation	99,426	92,906	95,782	99,146	98,227

Parker Dam to Imperial Dam

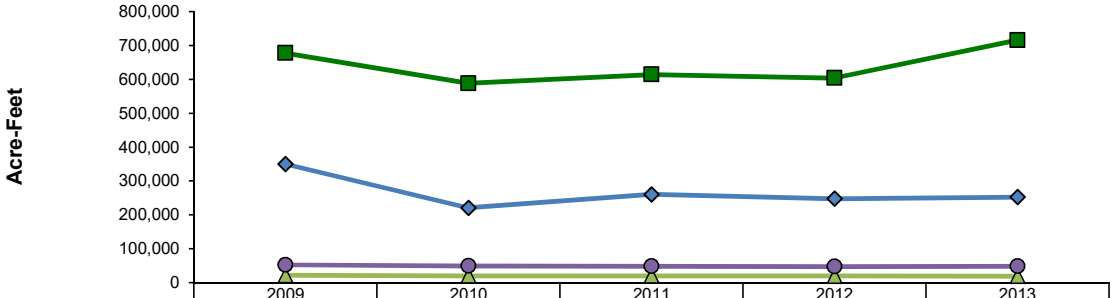
2013

Agriculture	
Irrigable Acres:	174,033
Gross Cropped Acres:	169,311
Net Cropped Acres:	162,461
Fallowed/Idle Acres:	11,572
Agricultural Evapotranspiration (acre-feet):	715,674
Riparian	
Riparian Vegetation Acres:	79,303
Riparian Evapotranspiration (acre-feet):	252,334
Open Water	
Open Water Acres:	3,609
Open Water Evaporation (acre-feet):	18,791
Mainstream (Lake and River)	
Acres:	9,300
Evaporation (acre-feet):	48,387

Water Users within Reach
Arizona Game and Fish Commission/Mohave County Water Authority - AZ
Arizona State Land Department - AZ
Cibola National Wildlife Refuge - AZ & CA
Cibola Valley Irrigation & Drainage District - AZ
Colorado River Indian Reservation - AZ & CA
GSC Farm, LLC - AZ
Hopi Tribe - AZ
Imperial National Wildlife Refuge - AZ
Lake Enterprises of California, LLC - CA
North Baja Pipeline, LLC - AZ
Palo Verde Irrigation District - CA
Rayner Ranches - AZ
State of Arizona (Other Users)
State of California (Other Users)

Crop Types within Reach	Acres	Annual ET (acre-feet)
Alfalfa	100,513	541,331
Bermuda/Grass	6,528	21,137
Citrus	2,023	6,950
Cotton	27,017	74,797
Crucifers	2,370	1,390
Dates	465	2,687
Deciduous Orchards	559	2,221
Field Grain	1,963	5,047
Grapes	42	84
Legume/Solanum Veg.	385	197
Lettuce	1,601	914
Melons	2,422	5,046
Moist Soil Unit	321	1,616
Nursery/Greenhouse	9	19
Small Grains	15,789	30,178
Small Vegetables	1,511	993
Sudan	4,382	15,758
Restoration Area	1,413	5,311
Total	**169,311**	**715,674**

Evapotranspiration and Evaporation, 2009-2013



	2009	2010	2011	2012	2013
Agricultural ET	677,540	587,900	614,318	603,491	715,674
Riparian Vegetation ET	349,722	220,474	260,370	247,804	252,334
Open Water Evaporation	21,516	20,220	19,950	19,500	18,791
Mainstream Evaporation	52,259	49,248	48,700	47,031	48,387

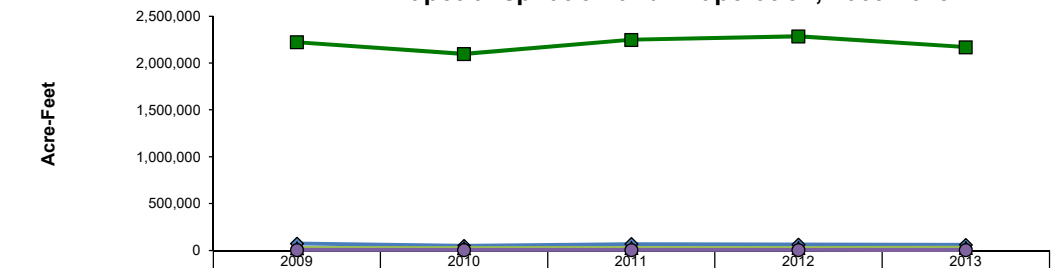
Imperial Dam to Mexico

2013

Agriculture	
Irrigable Acres:	654,231
Gross Cropped Acres:	827,526
Net Cropped Acres:	597,280
Fallowed/Idle Acres:	56,951
Agricultural Evapotranspiration (acre-feet):	2,171,133
Riparian	
Riparian Vegetation Acres:	16,977
Riparian Evapotranspiration (acre-feet):	59,047
Open Water	
Open Water Acres:	4,656
Open Water Evaporation (acre-feet):	27,542
Mainstream (Lake and River)	
Acres:	638
Evaporation (acre-feet):	3,698

Water Users within Reach	Crop Types within Reach	Acres	Annual ET (acre-feet)
Arizona State Land Department - AZ	Alfalfa	171,938	865,595
AZ State Trust Lands, CA	Aloe	25	52
Beattie Farms Southwest - AZ	Bermuda/Grass	68,500	282,607
BLM, BLM (Monte Lee) & BLM (Pratt) - AZ	Cane/Bamboo	65	355
Cha Cha, LLC - AZ	Citrus	22,567	73,746
City of Yuma (Yuma East Wetlands), AZ	Cotton	11,818	37,513
Coachella Valley Water District - CA	Crucifers	52,496	33,109
Cocopah Indian Reservation (incl. East, North & West Reservations) - AZ	Dates	14,132	79,430
Curtis, Armon - AZ	Deciduous Orchards	1,285	5,644
Fort Yuma Indian Reservation (inc. Ranches & Yuma East Wetlands) - AZ & CA	Field Grain	10,889	30,442
Gila Monster Farms, AZ	Grapes	7,957	22,899
Griffin Ranches & Griffin, R. - AZ	Legume/Solanum Veg.	9,150	9,198
Imperial Irrigation District - CA	Lettuce	146,958	72,954
JRJ Partners, LLC - AZ	Marsh Maintained	303	1,679
Mittry Lake Management Area - AZ	Melons	12,641	20,725
North Gila Valley Irrigation District - AZ	Miscellaneous herbs	991	2,508
Ogram Boys Enterprises, Inc. & Ogram, George - AZ	Moist Soil Unit	1,302	6,334
Pasquinelli, Gary & Barbara - AZ	Nursery/Greenhouse	2,539	5,349
Peach, John - AZ	Oil Crops	373	932
Phillips, Milton - AZ	Perennial Vegetables	746	3,271
Power & Power, Victor - AZ	Root Vegetables	463	457
State of Arizona (Downgradient of YMIDD, Limitrophe, Other Users)	Small Grains	104,564	197,254
State of California (Other Users)	Small Vegetables	43,656	57,197
Unit B Irrigation and Drainage District - AZ	Sudan	92,323	285,079
University of Arizona - AZ	Sugar Beets	47,583	71,710
Wellton Mohawk Irrigation and Drainage District - AZ	Tomatoes	1,161	2,604
Yuma County Water Users' Association - AZ	Wildlife Forage Maintained	1,079	2,388
Yuma Irrigation District - AZ	Restoration Area	21	104
Yuma Mesa Irrigation and Drainage District - AZ			
Yuma Project Reservation Division, Bard Unit & Indian Unit - CA			
Yuma Proving Ground - AZ	**Total**	**827,526**	**2,171,133**

Evapotranspiration and Evaporation, 2009-2013



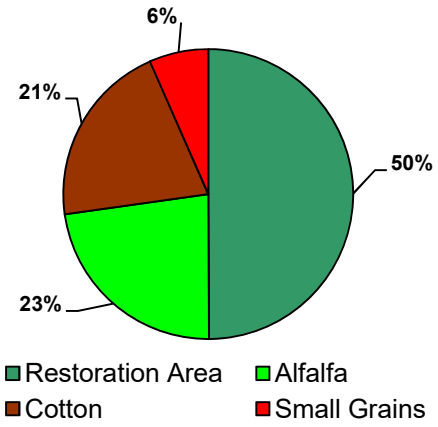
	2009	2010	2011	2012	2013
Agricultural ET	2,224,090	2,099,192	2,249,292	2,286,916	2,171,133
Riparian Vegetation ET	73,927	49,875	67,269	62,259	59,047
Open Water Evaporation	24,702	24,489	27,532	27,446	27,542
Mainstream Evaporation	5,692	5,539	4,328	4,264	3,698

*The Imperial Dam to Mexico reach includes water diverted from the Colorado River to the Wellton-Mohawk Irrigation and Drainage District in Arizona, and to the Imperial Irrigation District and Coachella Valley Water District in California.

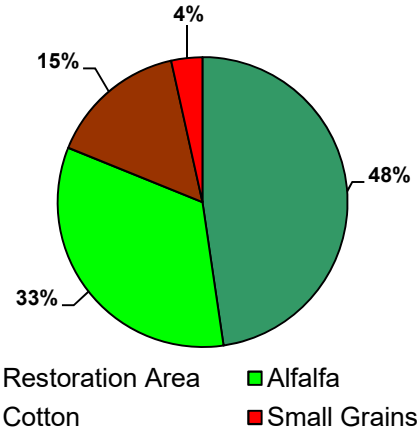
Arizona Game and Fish Commission/Mohave County Water Authority
2013

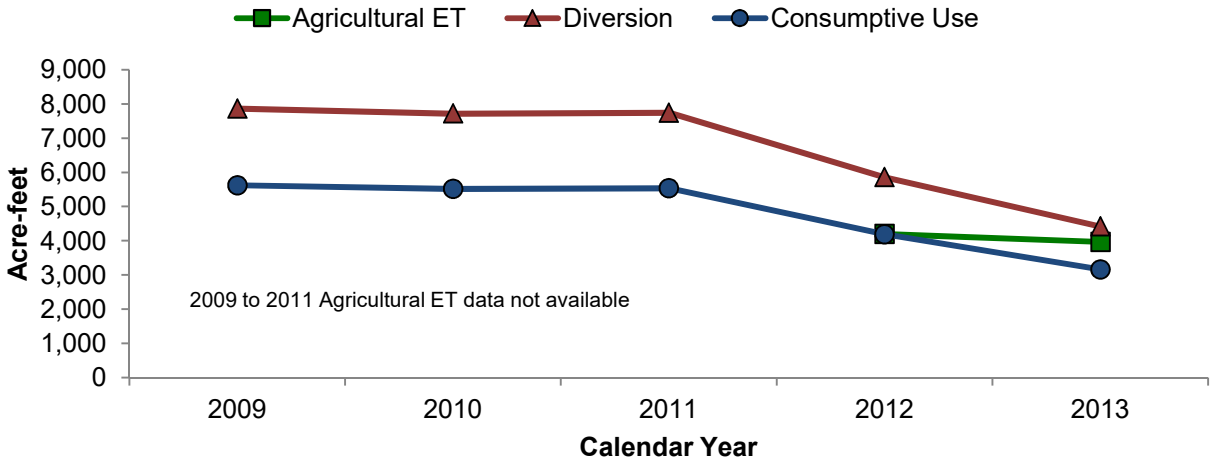
River Reach:	Parker Dam to Imperial Dam
Agriculture	
Irrigable Acres:	1,178
Gross Cropped Acres:	1,070
Net Cropped Acres:	1,097
Fallowed/Idle Acres:	81
Agricultural Evapotranspiration (acre-feet):	3,967
Riparian	
Riparian Vegetation Acres:	71
Riparian Evapotranspiration (acre-feet):	239
Open Water	
Open Water Acres:	0
Open Water Evaporation (acre-feet):	0

Major Crop Types



Annual Agricultural ET





Arizona Game and Fish Commission/Mohave County Water Authority 2013

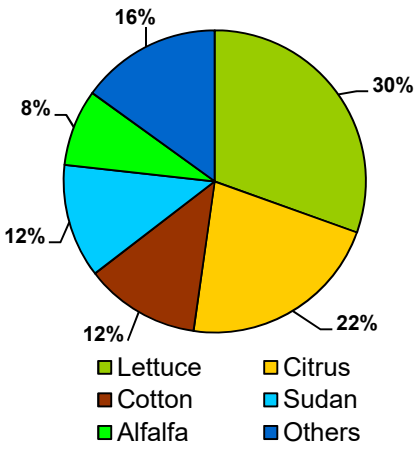
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	245	23	1,326	33
Cotton	221	21	611	15
Restoration Area	534	50	1,891	48
Small Grains	71	6	138	4
Total*	**1,070**	**100%**	**3,967**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

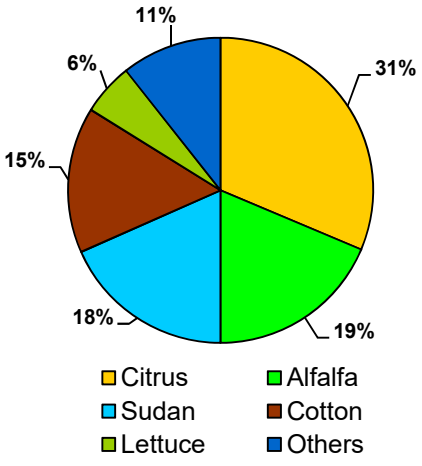
Arizona State Land Department - AZ
2013

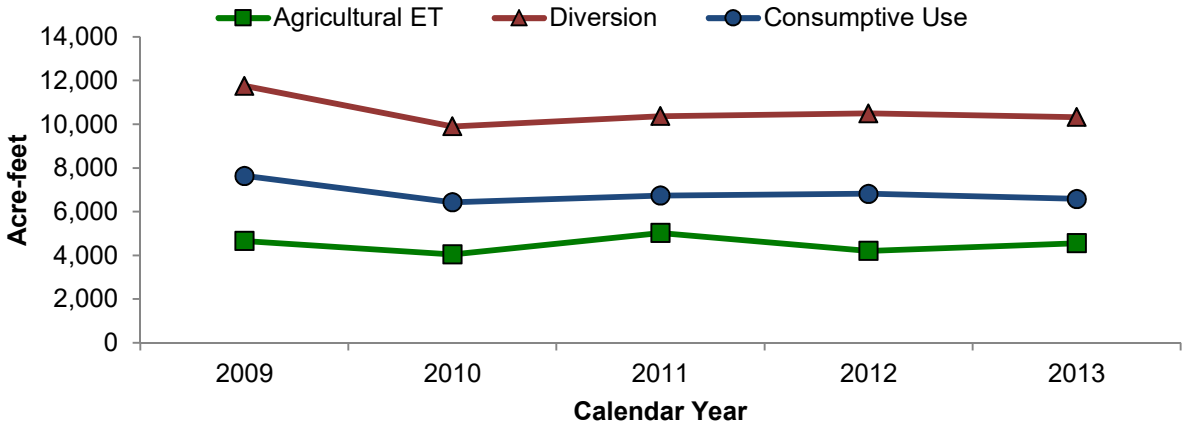
River Reach:	Parker Dam to Mexico
Agriculture	
Irrigable Acres:	1,452
Gross Cropped Acres:	1,986
Net Cropped Acres:	1,433
Fallowed/Idle Acres:	19
Agricultural Evapotranspiration (acre-feet):	4,559
Riparian	
Riparian Vegetation Acres:	908
Riparian Evapotranspiration (acre-feet):	2,508
Open Water	
Open Water Acres:	11
Open Water Evaporation (acre-feet):	64

Major Crop Types



Annual Agricultural ET





Arizona State Land Department - AZ

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	163	8	852	19
Citrus	432	22	1,429	31
Cotton	245	12	705	15
Crucifers	39	2	20	<1
Dates	13	1	77	2
Lettuce	606	30	251	6
Melons	101	5	170	4
Root Vegetables	8	<1	8	<1
Small Grains	130	7	198	4
Small Vegetables	8	<1	12	<1
Sudan	242	12	837	18
Total*	**1,986**	**100%**	**4,559**	**100%**

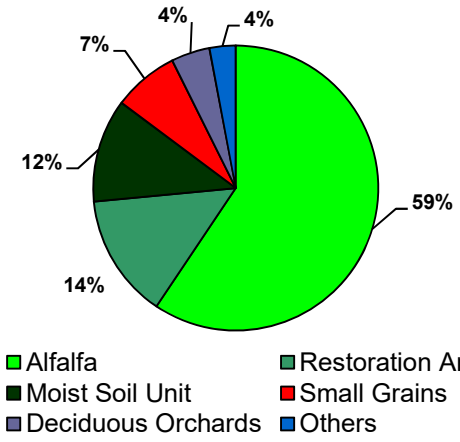
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Cibola National Wildlife Refuge - AZ

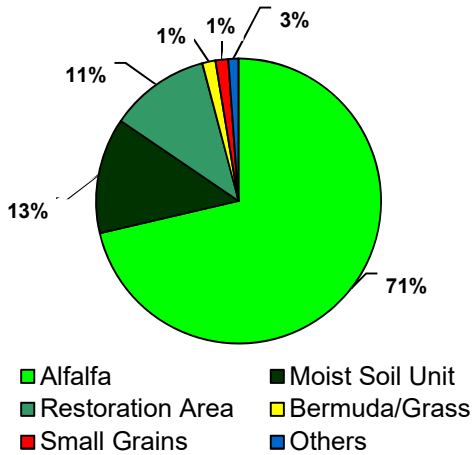
2013

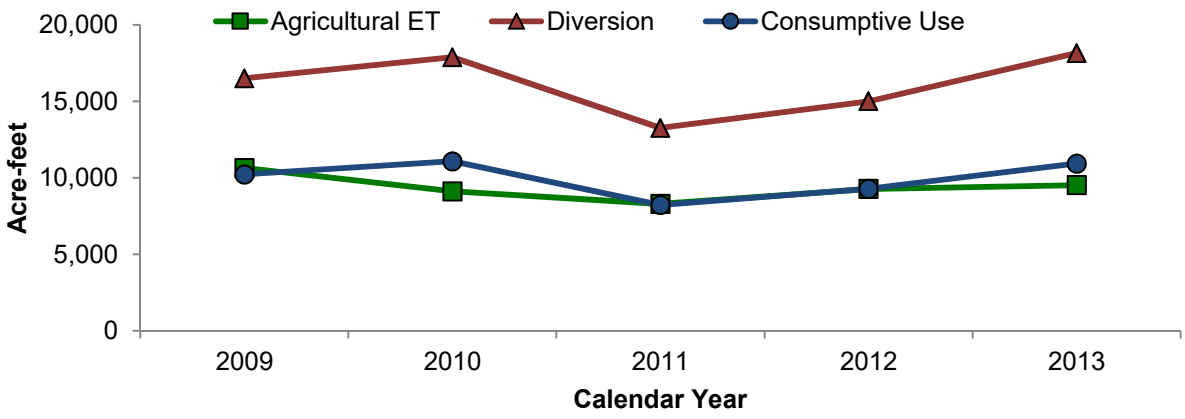
River Reach:	Parker Dam to Imperial Dam
Agriculture	
Irrigable Acres:	2,497
Gross Cropped Acres:	2,123
Net Cropped Acres:	2,325
Fallowed/Idle Acres:	172
Agricultural Evapotranspiration (acre-feet):	9,524
Riparian	
Riparian Vegetation Acres:	9,067
Riparian Evapotranspiration (acre-feet):	27,844
Open Water	
Open Water Acres:	379
Open Water Evaporation (acre-feet):	1,972

Major Crop Types



Annual Agricultural ET





Cibola National Wildlife Refuge - AZ

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	1,261	59	6,797	71
Bermuda/Grass	44	2	142	1
Deciduous Orchards	93	4	65	1
Field Grain	18	1	47	<1
Moist Soil Unit	249	12	1,251	13
Restoration Area	299	14	1,086	11
Small Grains	158	7	136	1
Total*	**2,123**	**100%**	**9,524**	**100%**

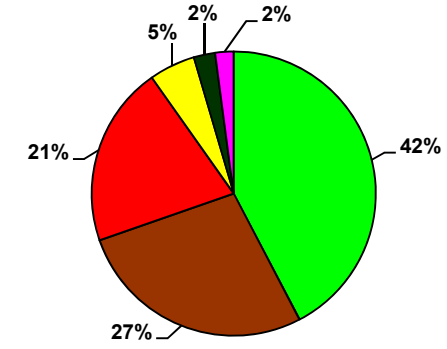
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Cibola Valley Irrigation and Drainage District - AZ

2013

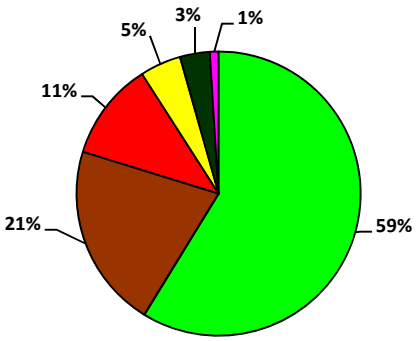
River Reach:	Parker Dam to Imperial Dam
Agriculture	
Irrigable Acres:	1,208
Gross Cropped Acres:	1,303
Net Cropped Acres:	1,200
Fallowed/Idle Acres:	8
Agricultural Evapotranspiration (acre-feet):	4,696
Riparian	
Riparian Vegetation Acres:	1,095
Riparian Evapotranspiration (acre-feet):	3,170
Open Water	
Open Water Acres:	0
Open Water Evaporation (acre-feet):	0

Major Crop Types

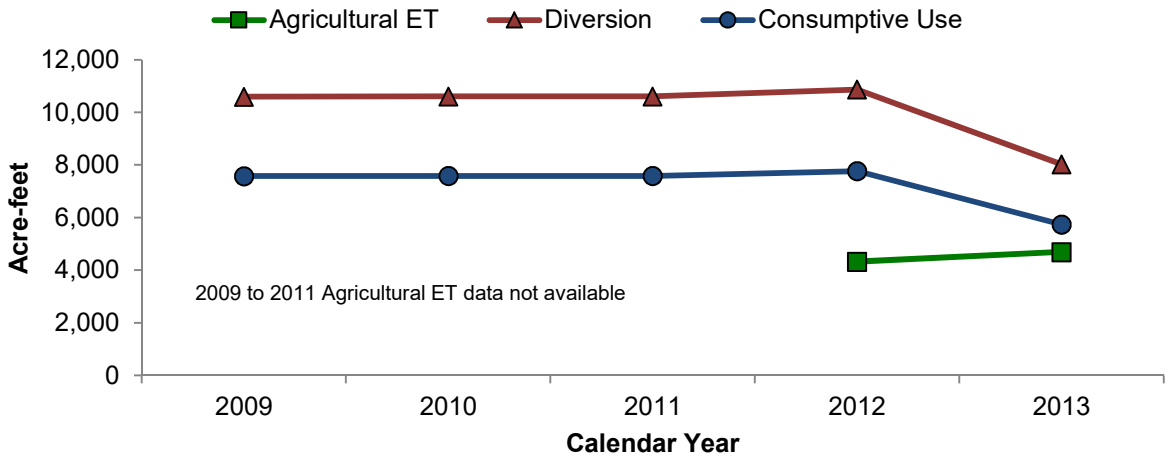


Alfalfa, Cotton, Small Grains, Bermuda/Grass, Moist Soil Unit, Melons

Annual Agricultural ET



Alfalfa, Cotton, Small Grains, Bermuda/Grass, Moist Soil Unit, Melons



Cibola Valley Irrigation and Drainage District - AZ

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	552	42	2,760	59
Bermuda/Grass	68	5	220	5
Cotton	356	27	986	21
Melons	27	2	46	1
Moist Soil Unit	32	2	160	3
Small Grains	268	21	525	11
Total*	**1,303**	**100%**	**4,696**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

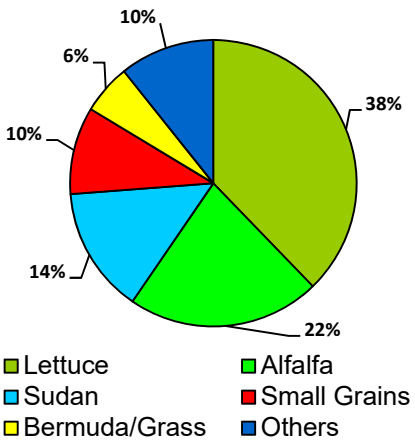
Cocopah Indian Tribe - AZ

(Includes East, North and West Reservations)

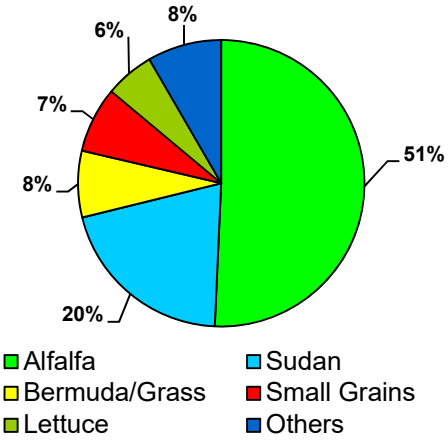
2013

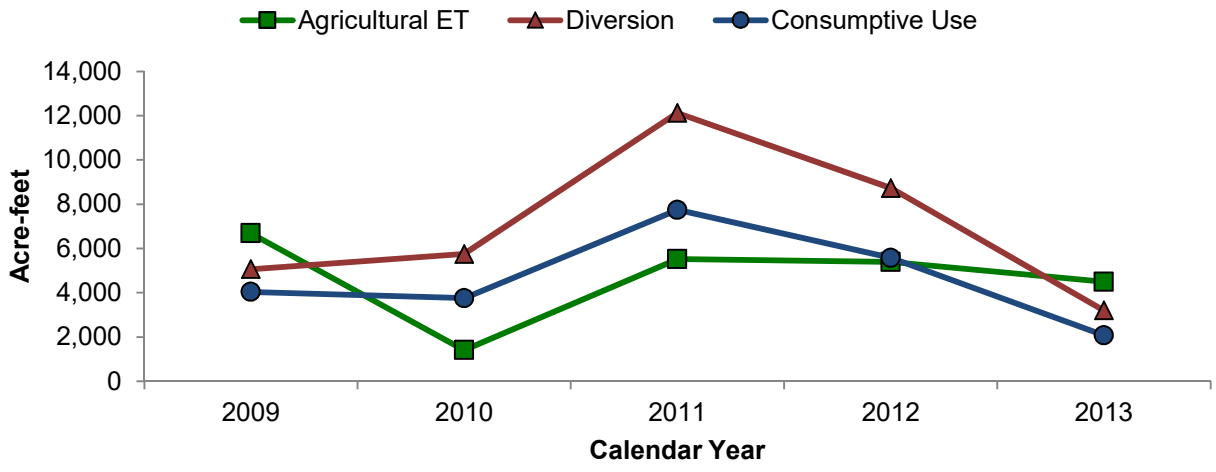
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	1,228
Gross Cropped Acres:	1,863
Net Cropped Acres:	1,161
Fallowed/Idle Acres:	67
Agricultural Evapotranspiration (acre-feet):	4,496
Riparian	
Riparian Vegetation Acres:	179
Riparian Evapotranspiration (acre-feet):	100
Open Water	
Open Water Acres:	5
Open Water Evaporation (acre-feet):	28

Major Crop Types



Annual Agricultural ET





Cocopah Indian Tribe - AZ

(Includes East, North and West Reservations)

2013

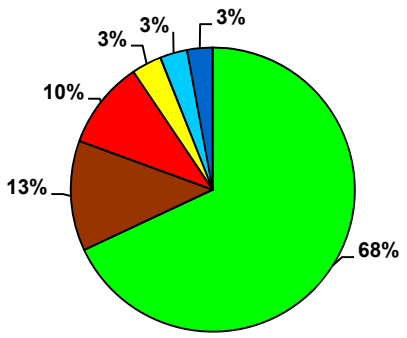
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	405	22	2,281	51
Bermuda/Grass	105	6	338	8
Cotton	59	3	193	4
Crucifers	77	4	32	1
Field Grain	60	3	146	3
Lettuce	704	38	249	6
Small Grains	184	10	334	7
Small Vegetables	4	<1	6	<1
Sudan	266	14	918	20
Total*	**1,863**	**100%**	**4,496**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Colorado River Indian Reservation - AZ
2013

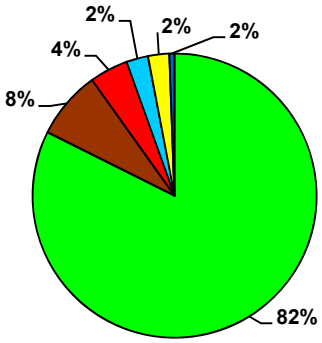
River Reach:	Parker Dam to Imperial Dam
Agriculture	
Irrigable Acres:	74,984
Gross Cropped Acres:	72,273
Net Cropped Acres:	71,149
Fallowed/Idle Acres:	3,835
Agricultural Evapotranspiration (acre-feet):	323,197
Riparian	
Riparian Vegetation Acres:	31,712
Riparian Evapotranspiration (acre-feet):	90,649
Open Water	
Open Water Acres:	183
Open Water Evaporation (acre-feet):	953

Major Crop Types

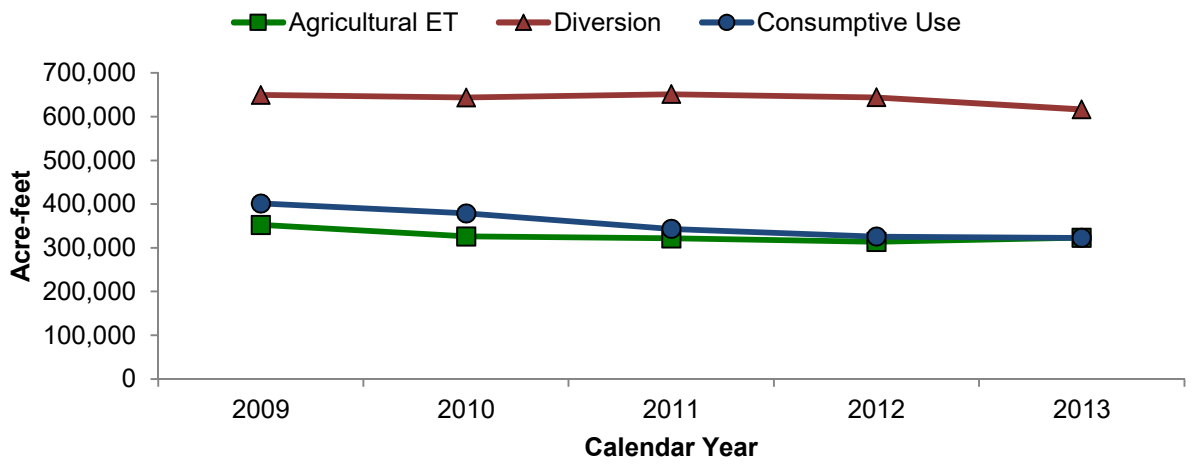


Alfalfa
Cotton
Small Grains
Bermuda/Grass
Sudan
Others

Annual Agricultural ET



Alfalfa
Cotton
Small Grains
Sudan
Bermuda/Grass
Others



Colorado River Indian Reservation - AZ

2013

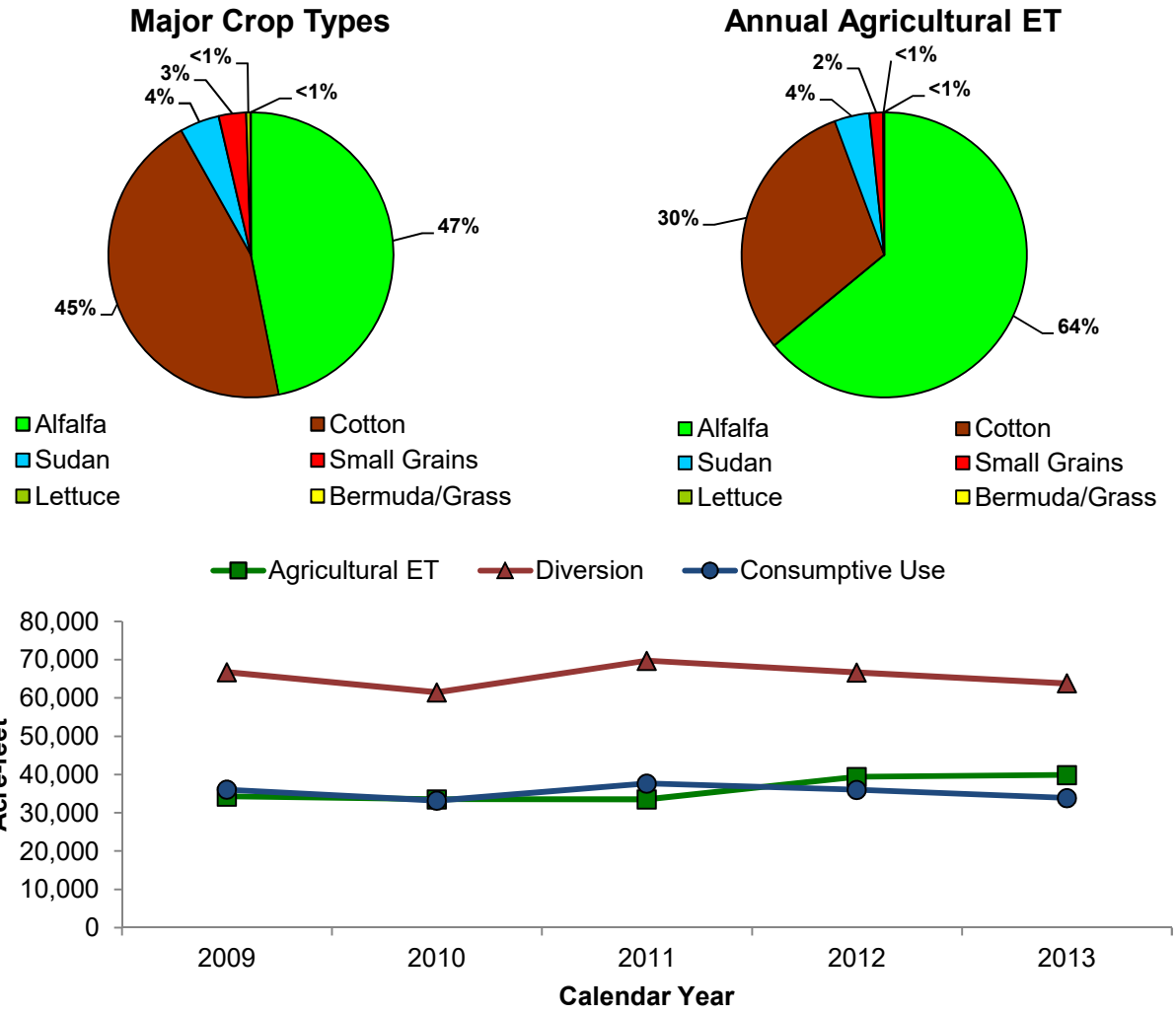
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	49,160	68	266,212	82
Bermuda/Grass	2,465	3	7,814	2
Cotton	9,074	13	25,121	8
Crucifers	144	<1	135	<1
Deciduous Orchards	6	<1	27	<1
Grapes	5	<1	15	<1
Lettuce	325	<1	185	<1
Restoration Area	109	<1	515	<1
Small Grains	7,235	10	14,130	4
Small Vegetables	1,511	2	993	<1
Sudan	2,239	3	8,050	2
Total*	**72,273**	**100%**	**323,197**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Fort Mojave Indian Reservation - AZ

2013

River Reach:	Davis Dam to Parker Dam
Agriculture	
Irrigable Acres:	10,021
Gross Cropped Acres:	10,106
Net Cropped Acres:	9,924
Fallowed/Idle Acres:	97
Agricultural Evapotranspiration (acre-feet):	39,910
Riparian	
Riparian Vegetation Acres:	7,506
Riparian Evapotranspiration (acre-feet):	20,860
Open Water	
Open Water Acres:	11
Open Water Evaporation (acre-feet):	51



Fort Mojave Indian Reservation - AZ

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	4,737	47	25,555	64
Bermuda/Grass	3	<1	11	<1
Cotton	4,547	45	12,105	30
Lettuce	50	<1	35	<1
Small Grains	314	3	622	2
Sudan	453	4	1,583	4
Total*	**10,106**	**100%**	**39,910**	**100%**

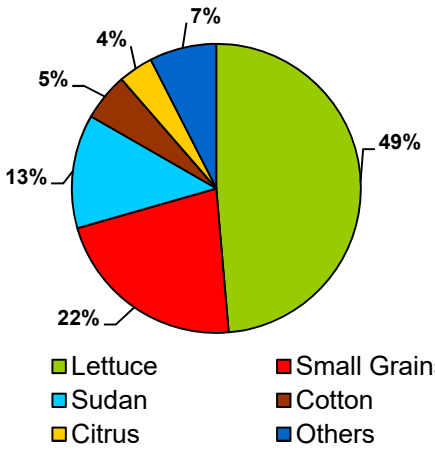
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Gila Monster Farms - AZ

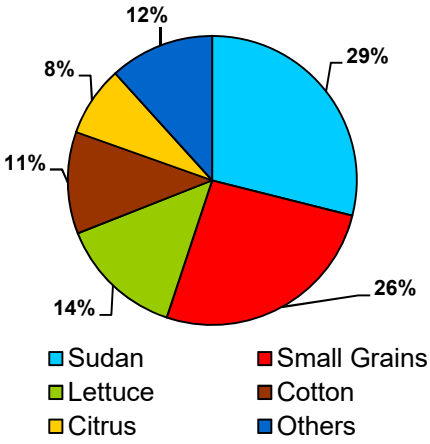
2013

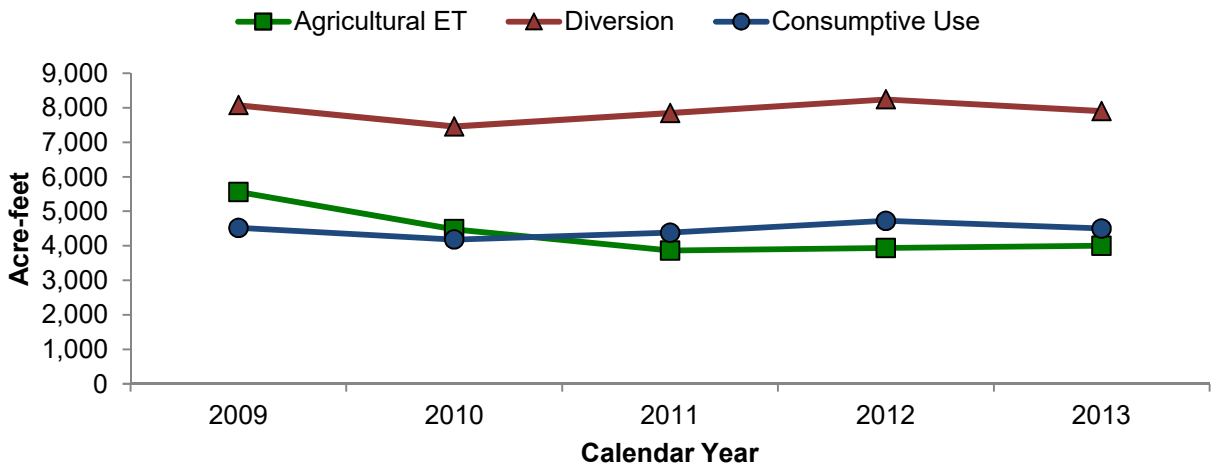
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	1,375
Gross Cropped Acres:	2,624
Net Cropped Acres:	1,361
Fallowed/Idle Acres:	14
Agricultural Evapotranspiration (acre-feet):	4,000
Riparian	
Riparian Vegetation Acres:	39
Riparian Evapotranspiration (acre-feet):	160
Open Water	
Open Water Acres:	9
Open Water Evaporation (acre-feet):	50

Major Crop Types



Annual Agricultural ET





Gila Monster Farms - AZ

2013

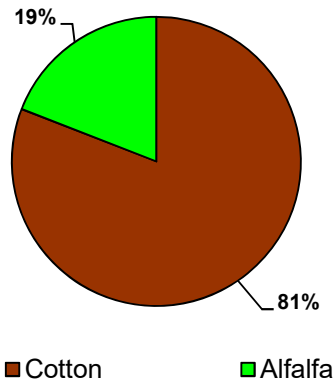
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	50	2	292	7
Bermuda/Grass	11	<1	34	1
Citrus	102	4	313	8
Cotton	140	5	456	11
Crucifers	98	4	50	1
Legume/Solanum Veg.	38	1	93	2
Lettuce	1,276	49	557	14
Small Grains	576	22	1,048	26
Sudan	335	13	1,157	29
Total*	**2,624**	**100%**	**4,000**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

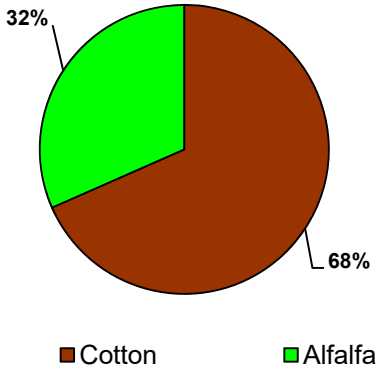
Hopi Tribe
2013

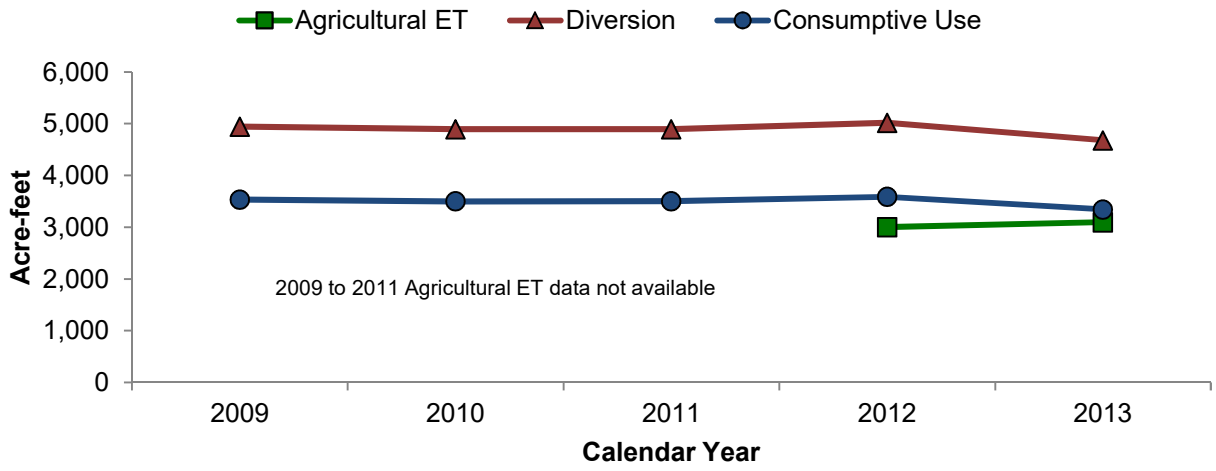
River Reach:	Parker Dam to Imperial Dam
Agriculture	
Irrigable Acres:	986
Gross Cropped Acres:	946
Net Cropped Acres:	946
Fallowed/Idle Acres:	40
Agricultural Evapotranspiration (acre-feet):	3,098
Riparian	
Riparian Vegetation Acres:	393
Riparian Evapotranspiration (acre-feet):	1,091
Open Water	
Open Water Acres:	0
Open Water Evaporation (acre-feet):	0

Major Crop Types



Annual Agricultural ET





Hopi Tribe

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	181	19	979	32
Cotton	765	81	2,119	68
Total*	**946**	**100%**	**3,098**	**100%**

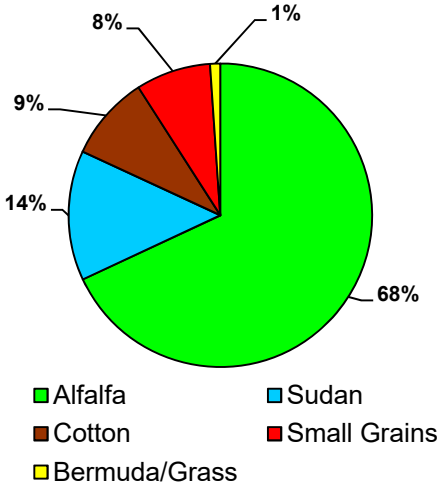
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Mohave Valley Irrigation and Drainage District - AZ

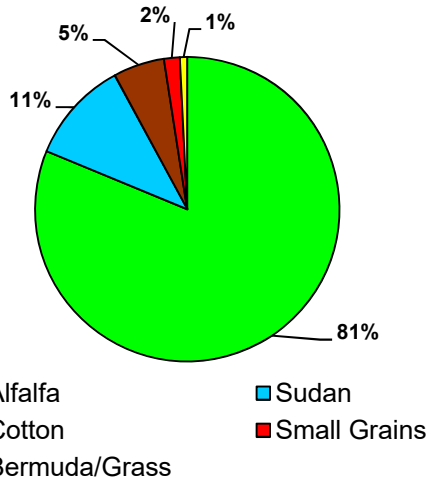
2013

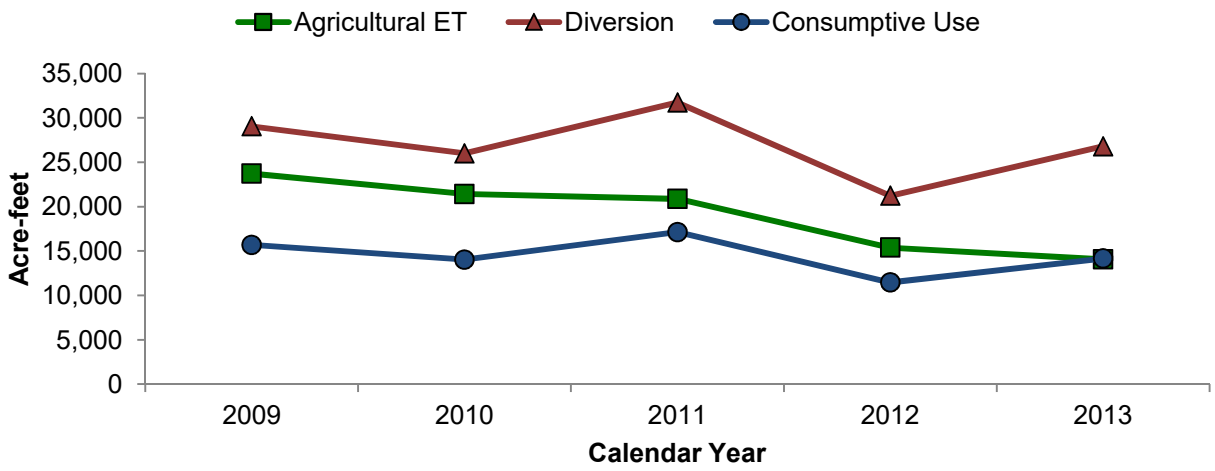
River Reach:	Davis Dam to Parker Dam
Agriculture	
Irrigable Acres:	4,136
Gross Cropped Acres:	3,169
Net Cropped Acres:	3,254
Fallowed/Idle Acres:	882
Agricultural Evapotranspiration (acre-feet):	14,062
Riparian	
Riparian Vegetation Acres:	5,420
Riparian Evapotranspiration (acre-feet):	15,421
Open Water	
Open Water Acres:	96
Open Water Evaporation (acre-feet):	468

Major Crop Types



Annual Agricultural ET





Mohave Valley Irrigation and Drainage District - AZ

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	2,157	68	11,421	81
Bermuda/Grass	34	1	111	1
Cotton	287	9	763	5
Small Grains	253	8	236	2
Sudan	439	14	1,532	11
Total*	**3,169**	**100%**	**14,062**	**100%**

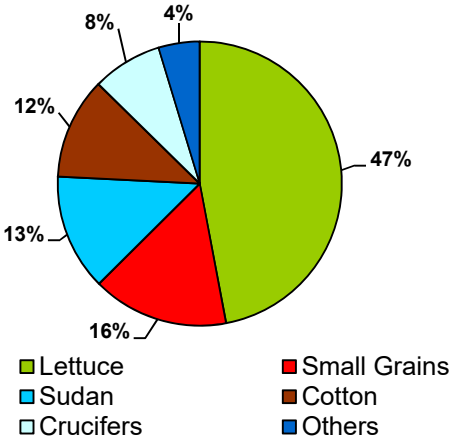
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

North Gila Valley Irrigation District - AZ

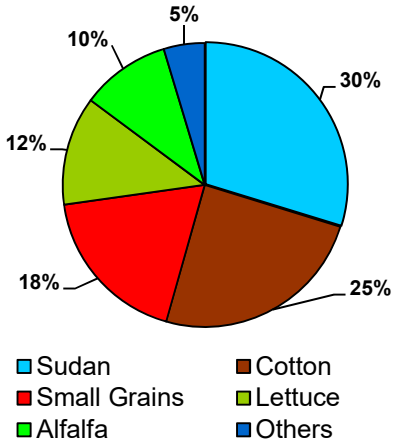
2013

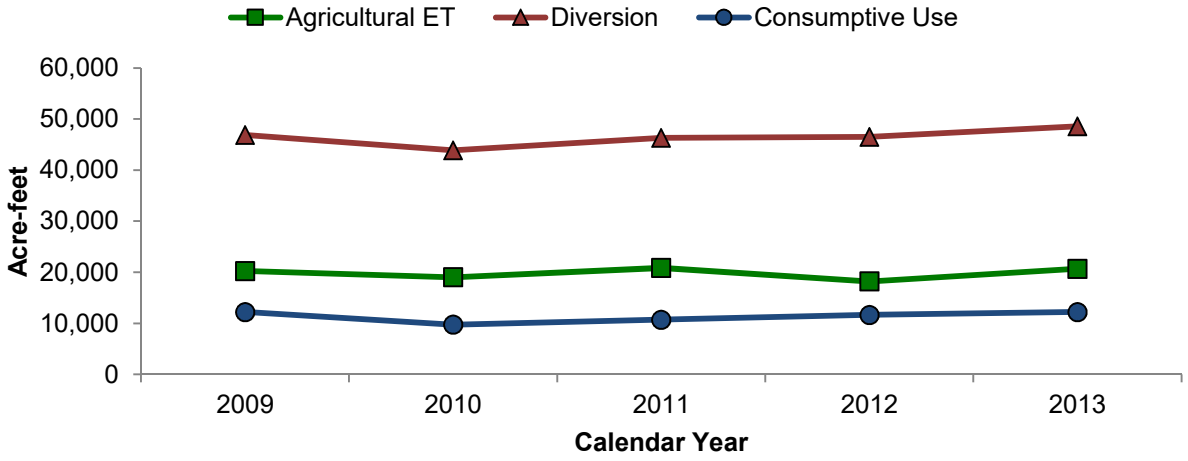
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	5,928
Gross Cropped Acres:	13,454
Net Cropped Acres:	5,917
Fallowed/Idle Acres:	11
Agricultural Evapotranspiration (acre-feet):	20,663
Riparian	
Riparian Vegetation Acres:	682
Riparian Evapotranspiration (acre-feet):	2,360
Open Water	
Open Water Acres:	12
Open Water Evaporation (acre-feet):	68

Major Crop Types



Annual Agricultural ET





North Gila Valley Irrigation District - AZ

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	388	3	2,106	10
Bermuda/Grass	8	<1	27	<1
Citrus	13	<1	44	<1
Cotton	1,556	12	5,086	25
Crucifers	1,071	8	415	2
Dates	15	<1	86	<1
Lettuce	6,327	47	2,563	12
Melons	68	1	126	1
Perennial Vegetables	22	<1	98	<1
Root Vegetables	25	<1	25	<1
Small Grains	2,089	16	3,802	18
Small Vegetables	93	1	137	1
Sudan	1,778	13	6,148	30
Total*	**13,454**	**100%**	**20,663**	**100%**

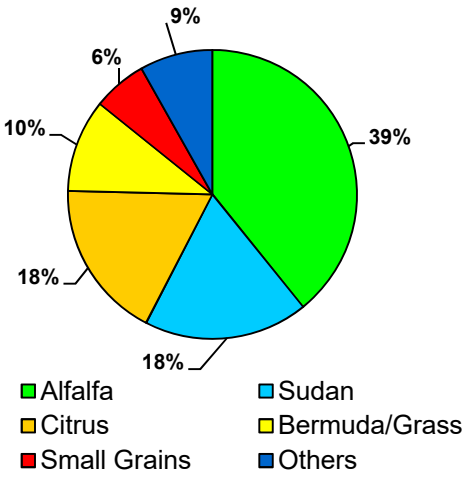
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Unit B Irrigation and Drainage District - AZ

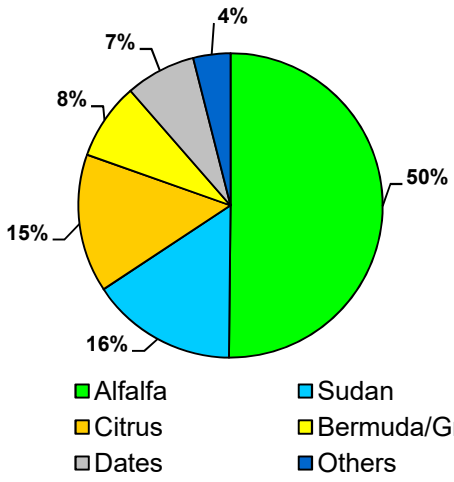
2013

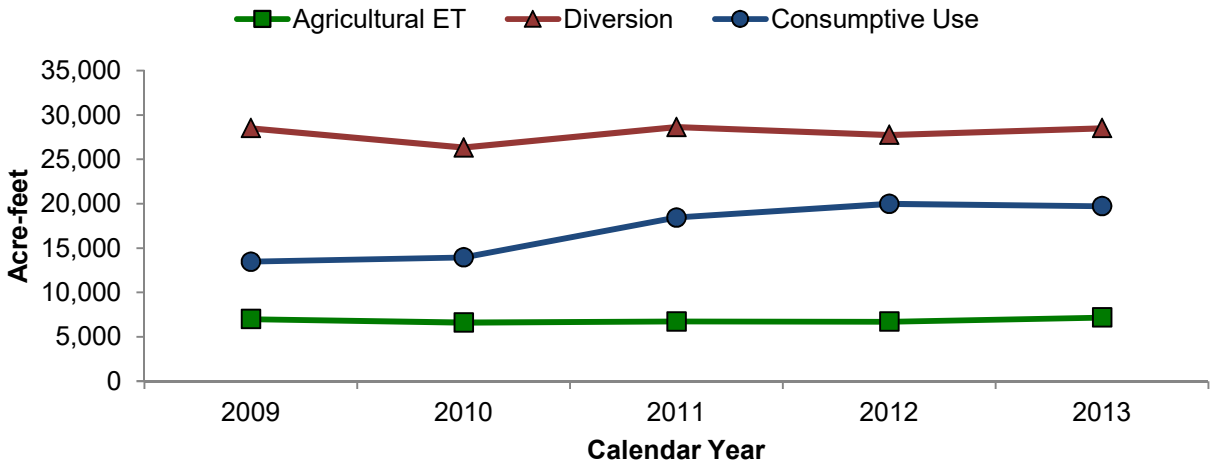
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	1,880
Gross Cropped Acres:	1,752
Net Cropped Acres:	1,622
Fallowed/Idle Acres:	258
Agricultural Evapotranspiration (acre-feet):	7,165
Riparian	
Riparian Vegetation Acres:	0
Riparian Evapotranspiration (acre-feet):	0
Open Water	
Open Water Acres:	20
Open Water Evaporation (acre-feet):	118

Major Crop Types



Annual Agricultural ET





Unit B Irrigation and Drainage District - AZ

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	687	39	3,594	50
Bermuda/Grass	182	10	585	8
Citrus	312	18	1,054	15
Cotton	8	<1	27	<1
Crucifers	11	1	6	<1
Dates	93	5	537	7
Deciduous Orchards	3	<1	14	<1
Lettuce	10	1	4	<1
Melons	2	<1	3	<1
Miscellaneous herbs	1	<1	4	<1
Nursery/Greenhouse	15	1	33	<1
Small Grains	106	6	192	3
Sudan	322	18	1,114	16
Total*	**1,752**	**100%**	**7,165**	**100%**

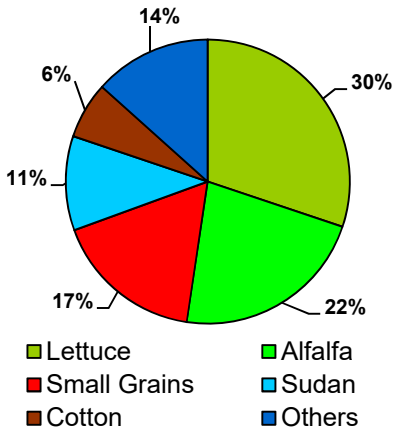
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Wellton-Mohawk Irrigation and Drainage District - AZ

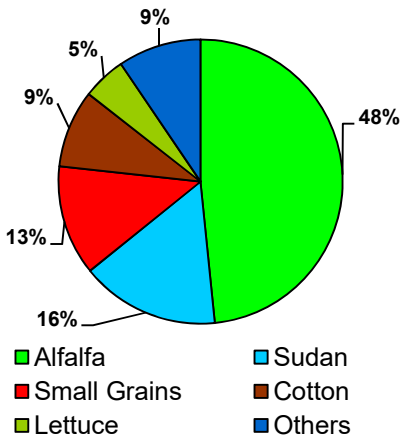
2013

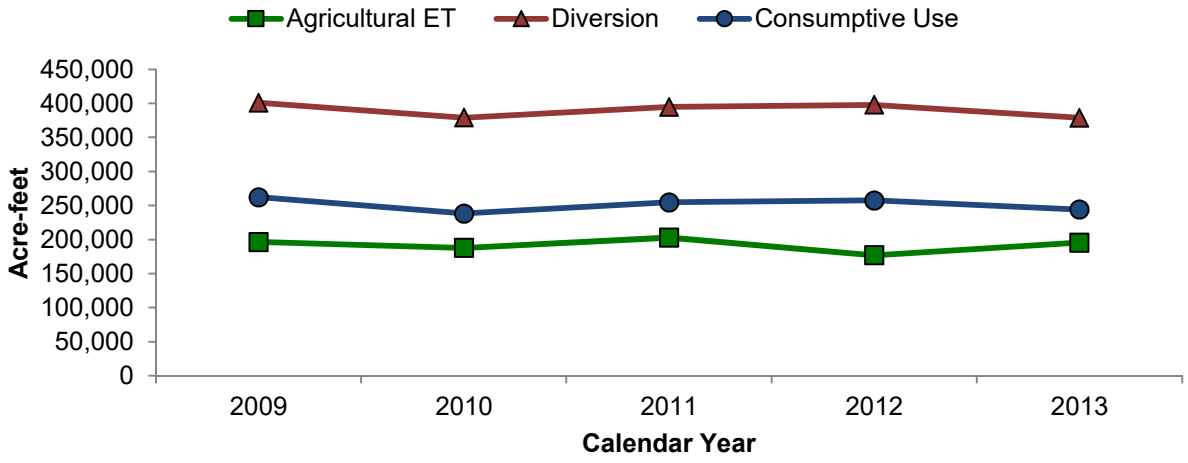
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	58,656
Gross Cropped Acres:	87,401
Net Cropped Acres:	56,537
Fallowed/Idle Acres:	2,119
Agricultural Evapotranspiration (acre-feet):	195,351
Riparian	
Riparian Vegetation Acres:	0
Riparian Evapotranspiration (acre-feet):	0
Open Water	
Open Water Acres:	129
Open Water Evaporation (acre-feet):	692

Major Crop Types



Annual Agricultural ET





Wellton-Mohawk Irrigation and Drainage District - AZ

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	19,433	22	94,552	48
Bermuda/Grass	2,770	3	8,383	4
Citrus	374	<1	1,124	1
Cotton	5,639	6	17,320	9
Crucifers	3,667	4	1,628	1
Dates	10	<1	53	<1
Deciduous Orchards	53	<1	225	<1
Field Grain	596	1	1,366	1
Legume/Solanum Veg.	277	<1	459	<1
Lettuce	26,343	30	9,630	5
Melons	2,677	3	3,377	2
Oil Crops	90	<1	258	<1
Perennial Vegetables	38	<1	158	<1
Root Vegetables	84	<1	72	<1
Small Grains	14,914	17	24,434	13
Small Vegetables	962	1	1,419	1
Sudan	9,381	11	30,834	16
Sugar Beets	94	<1	58	<1
Total*	**87,401**	**100%**	**195,351**	**100%**

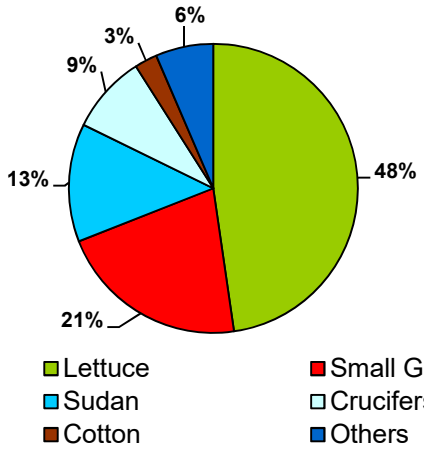
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Yuma County Water Users' Association - AZ

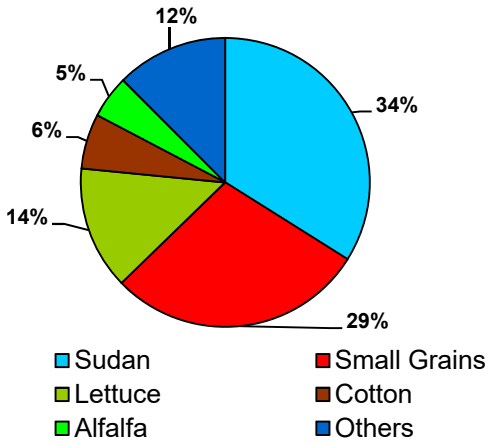
2013

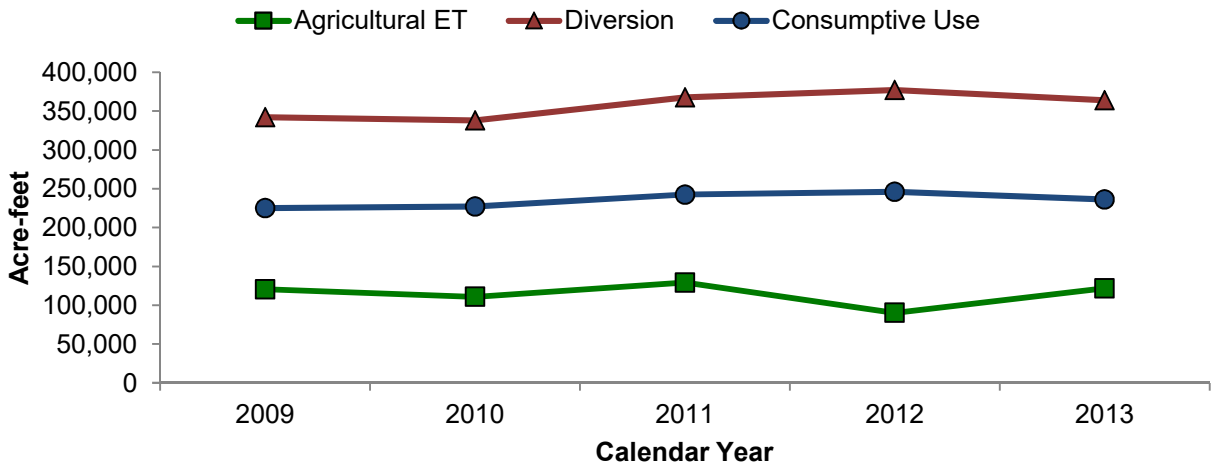
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	41,205
Gross Cropped Acres:	90,313
Net Cropped Acres:	40,613
Fallowed/Idle Acres:	592
Agricultural Evapotranspiration (acre-feet):	121,606
Riparian	
Riparian Vegetation Acres:	2
Riparian Evapotranspiration (acre-feet):	1
Open Water	
Open Water Acres:	321
Open Water Evaporation (acre-feet):	1,864

Major Crop Types



Annual Agricultural ET





Yuma County Water Users' Association - AZ

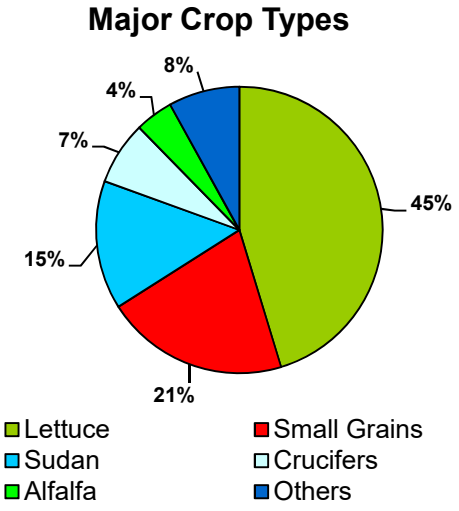
2013

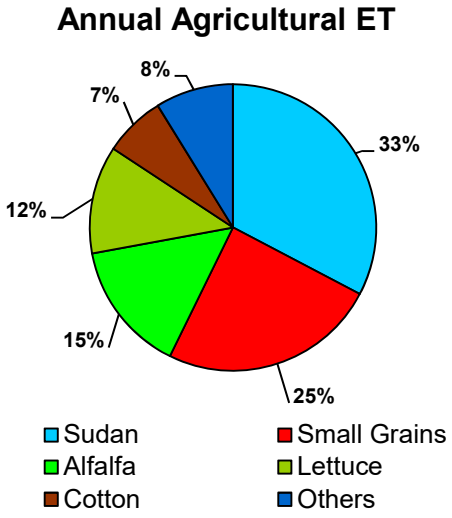
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	1,092	1	5,828	5
Bermuda/Grass	391	<1	1,378	1
Citrus	247	<1	874	1
Cotton	2,293	3	7,493	6
Crucifers	7,905	9	3,807	3
Dates	322	<1	1,866	2
Deciduous Orchards	89	<1	408	<1
Field Grain	8	<1	21	<1
Legume/Solanum Veg.	518	1	1,010	1
Lettuce	43,091	48	16,767	14
Melons	1,821	2	3,124	3
Miscellaneous herbs	307	<1	932	1
Nursery/Greenhouse	277	<1	604	<1
Oil Crops	3	<1	9	<1
Perennial Vegetables	14	<1	65	<1
Root Vegetables	128	<1	130	<1
Small Grains	19,259	21	35,048	29
Small Vegetables	573	1	896	1
Sudan	11,937	13	41,266	34
Sugar Beets	36	<1	78	<1
Total*	**90,313**	**100%**	**121,606**	**100%**

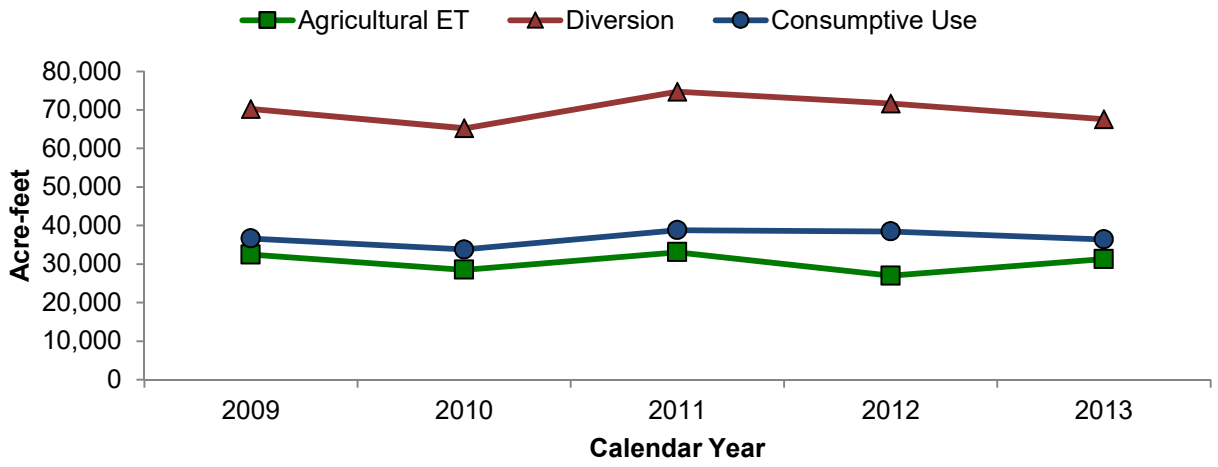
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Yuma Irrigation District - AZ
2013

River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	10,045
Gross Cropped Acres:	20,404
Net Cropped Acres:	9,910
Fallowed/Idle Acres:	135
Agricultural Evapotranspiration (acre-feet):	31,321
Riparian	
Riparian Vegetation Acres:	224
Riparian Evapotranspiration (acre-feet):	654
Open Water	
Open Water Acres:	61
Open Water Evaporation (acre-feet):	352







Yuma Irrigation District - AZ

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	876	4	4,644	15
Bermuda/Grass	77	<1	247	1
Citrus	1	<1	3	<1
Cotton	662	3	2,164	7
Crucifers	1,459	7	674	2
Dates	66	<1	378	1
Legume/Solanum Veg.	104	1	257	1
Lettuce	9,240	45	3,820	12
Melons	397	2	680	2
Nursery/Greenhouse	28	<1	62	<1
Root Vegetables	43	<1	44	<1
Small Grains	4,228	21	7,695	25
Small Vegetables	260	1	414	1
Sudan	2,962	15	10,240	33
Total*	**20,404**	**100%**	**31,321**	**100%**

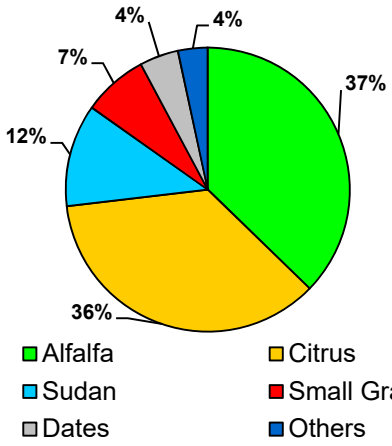
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Yuma Mesa Irrigation and Drainage District - AZ

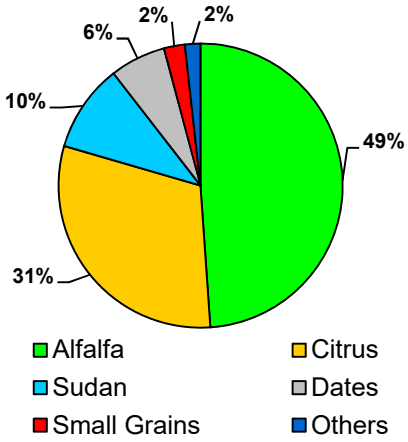
2013

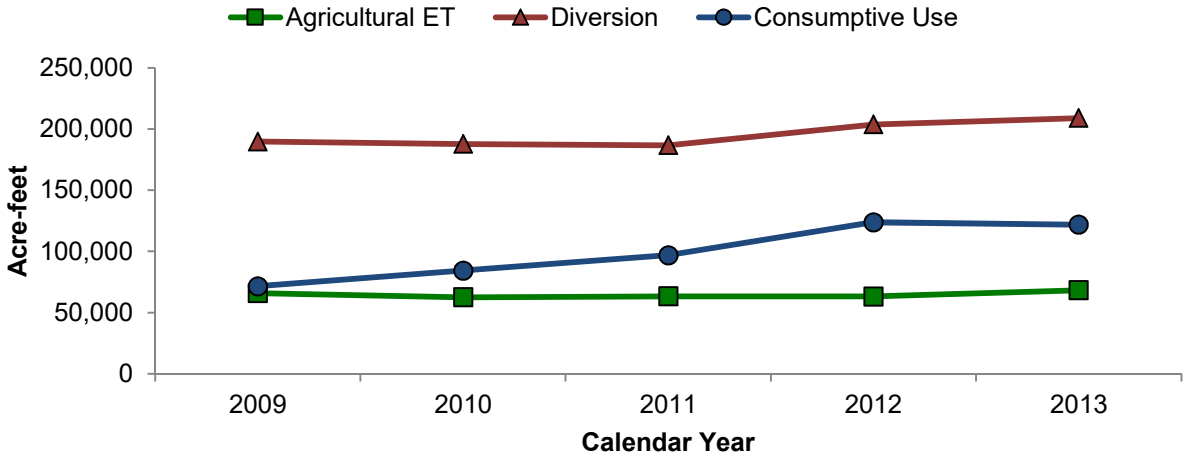
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	17,333
Gross Cropped Acres:	16,934
Net Cropped Acres:	16,273
Fallowed/Idle Acres:	1,060
Agricultural Evapotranspiration (acre-feet):	68,252
Riparian	
Riparian Vegetation Acres:	0
Riparian Evapotranspiration (acre-feet):	0
Open Water	
Open Water Acres:	177
Open Water Evaporation (acre-feet):	1,027

Major Crop Types



Annual Agricultural ET





Yuma Mesa Irrigation and Drainage District - AZ

2013

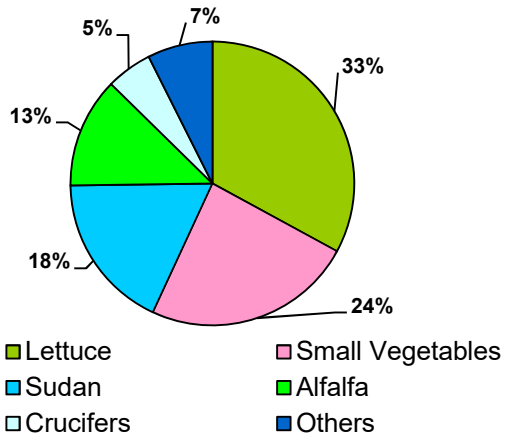
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	6,307	37	33,386	49
Bermuda/Grass	188	1	558	1
Citrus	6,080	36	20,872	31
Cotton	9	<1	29	<1
Crucifers	4	<1	1	<1
Dates	751	4	4,339	6
Deciduous Orchards	87	1	403	1
Lettuce	206	1	56	<1
Melons	4	<1	8	<1
Nursery/Greenhouse	72	<1	158	<1
Small Grains	1,251	7	1,617	2
Sudan	1,974	12	6,824	10
Total*	**16,934**	**100%**	**68,252**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

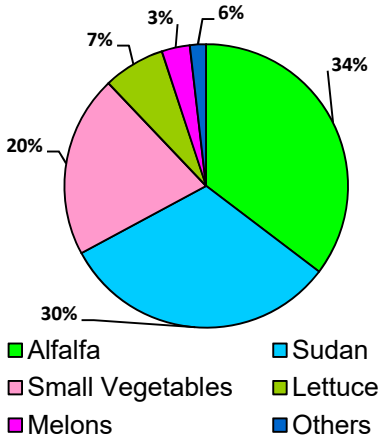
Arizona State Trust Lands, CA
2013

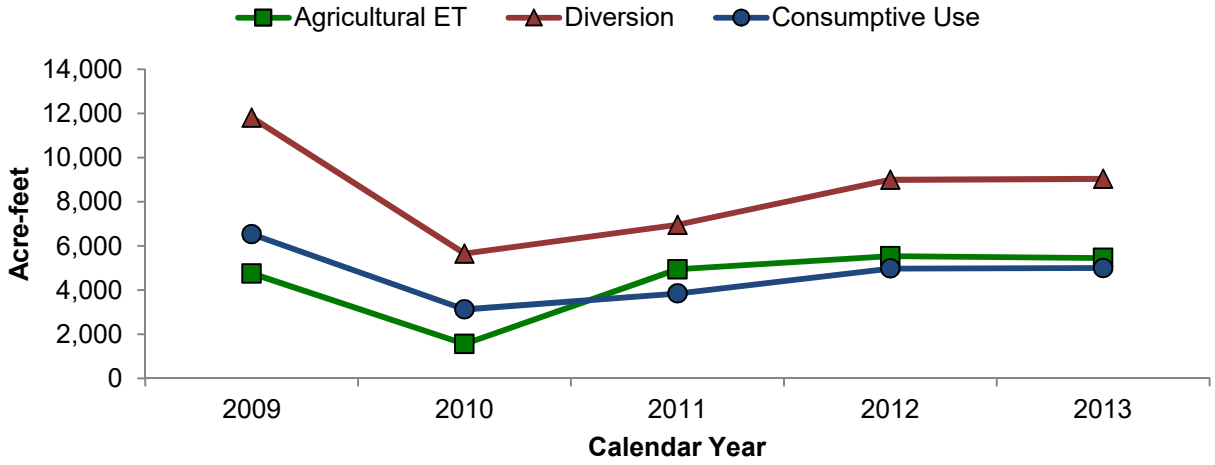
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	1,970
Gross Cropped Acres:	2,686
Net Cropped Acres:	1,858
Fallowed/Idle Acres:	112
Agricultural Evapotranspiration (acre-feet):	5,453
Riparian	
Riparian Vegetation Acres:	511
Riparian Evapotranspiration (acre-feet):	1,678
Open Water	
Open Water Acres:	17
Open Water Evaporation (acre-feet):	100

Major Crop Types



Annual Agricultural ET





Arizona State Trust Lands, CA

2013

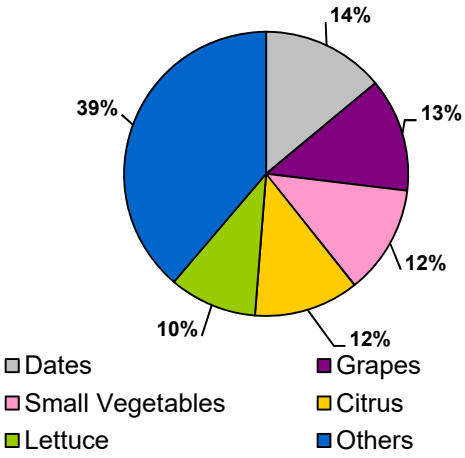
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	338	13	1,846	34
Bermuda/Grass	14	1	46	1
Citrus	27	1	98	2
Crucifers	141	5	68	1
Legume/Solanum Veg.	30	1	73	1
Lettuce	885	33	367	7
Melons	91	3	167	3
Root Vegetables	32	1	32	1
Small Grains	6	<1	11	<1
Small Vegetables	644	24	1,084	20
Sudan	481	18	1,662	30
Total*	**2,686**	**100%**	**5,453**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

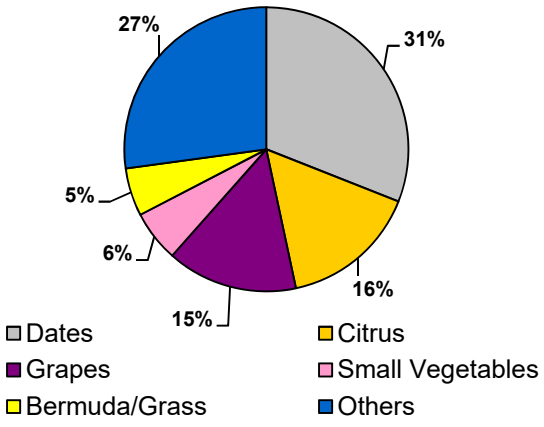
Coachella Valley Water District - CA
2013

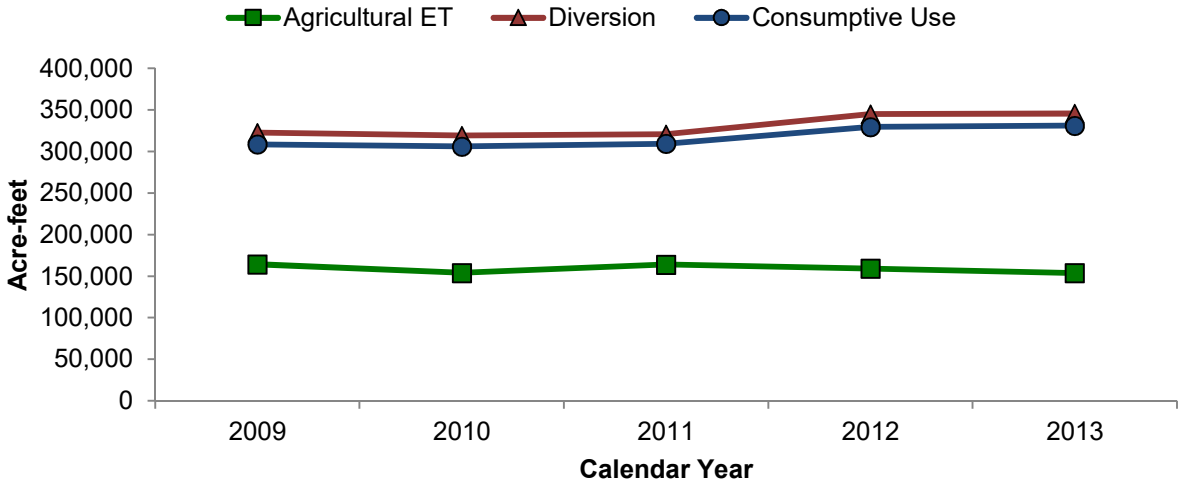
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	58,154
Gross Cropped Acres:	61,518
Net Cropped Acres:	51,276
Fallowed/Idle Acres:	6,878
Agricultural Evapotranspiration (acre-feet):	153,725
Riparian	
Riparian Vegetation Acres:	0
Riparian Evapotranspiration (acre-feet):	0
Open Water	
Open Water Acres:	926
Open Water Evaporation (acre-feet):	5,588

Major Crop Types



Annual Agricultural ET





Coachella Valley Water District - CA

2013

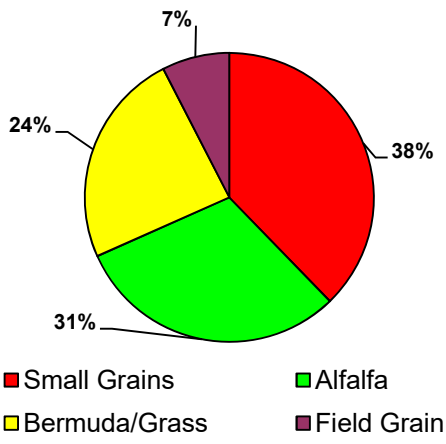
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	532	1	2,723	2
Aloe	1	<1	3	<1
Bermuda/Grass	2,026	3	8,389	5
Citrus	7,350	12	24,082	16
Crucifers	5,398	9	3,921	3
Dates	8,593	14	47,636	31
Deciduous Orchards	548	1	2,385	2
Field Grain	2,878	5	8,153	5
Grapes	7,957	13	22,899	15
Legume/Solanum Veg.	5,978	10	4,999	3
Lettuce	6,140	10	4,895	3
Melons	2,227	4	3,840	2
Miscellaneous herbs	601	1	1,348	1
Moist Soil Unit	87	<1	425	<1
Nursery/Greenhouse	1,643	3	3,437	2
Oil Crops	16	<1	38	<1
Perennial Vegetables	558	1	2,449	2
Small Grains	104	<1	221	<1
Small Vegetables	7,632	12	8,960	6
Sudan	187	<1	541	<1
Tomatoes	1,061	2	2,382	2
Total*	**61,518**	**100%**	**153,725**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

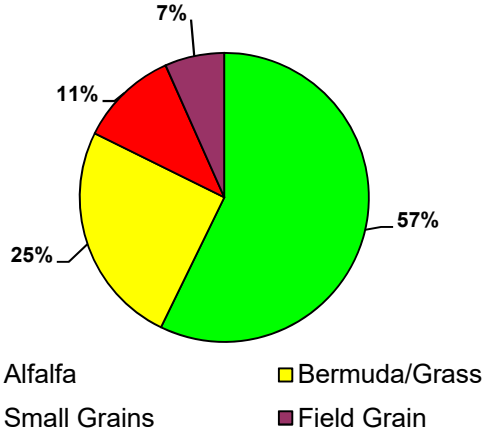
Fort Mojave Indian Reservation - CA
2013

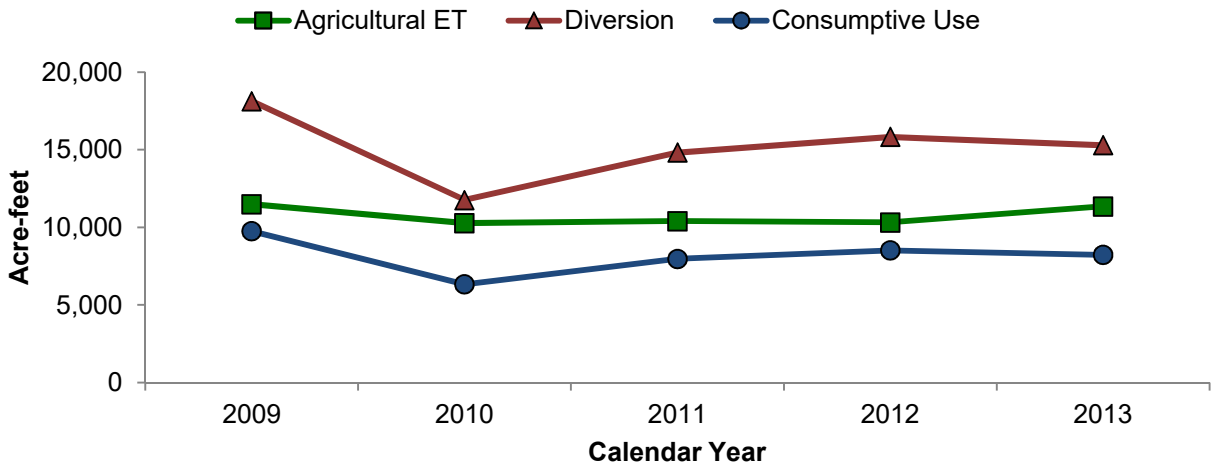
River Reach:	Davis Dam to Parker Dam
Agriculture	
Irrigable Acres:	3,239
Gross Cropped Acres:	3,954
Net Cropped Acres:	3,087
Fallowed/Idle Acres:	152
Agricultural Evapotranspiration (acre-feet):	11,360
Riparian	
Riparian Vegetation Acres:	919
Riparian Evapotranspiration (acre-feet):	2,668
Open Water	
Open Water Acres:	0
Open Water Evaporation (acre-feet):	0

Major Crop Types



Annual Agricultural ET





Fort Mojave Indian Reservation - CA

2013

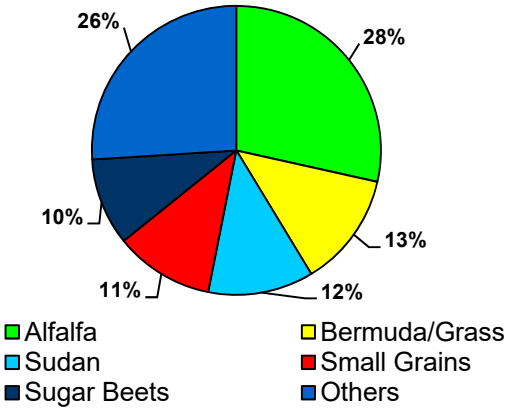
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	1,210	31	6,499	57
Bermuda/Grass	953	24	2,851	25
Field Grain	299	8	756	7
Small Grains	1,493	38	1,253	11
Total*	**3,954**	**100%**	**11,360**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

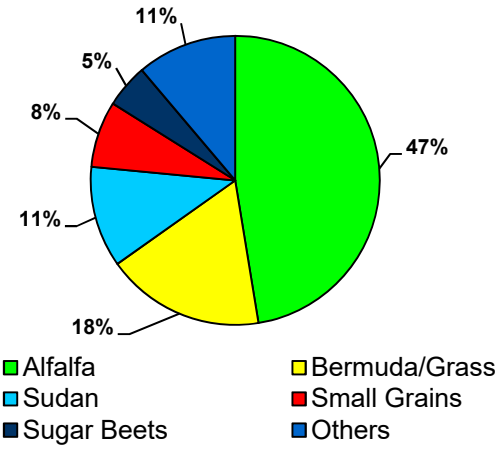
Imperial Irrigation District - CA
2013

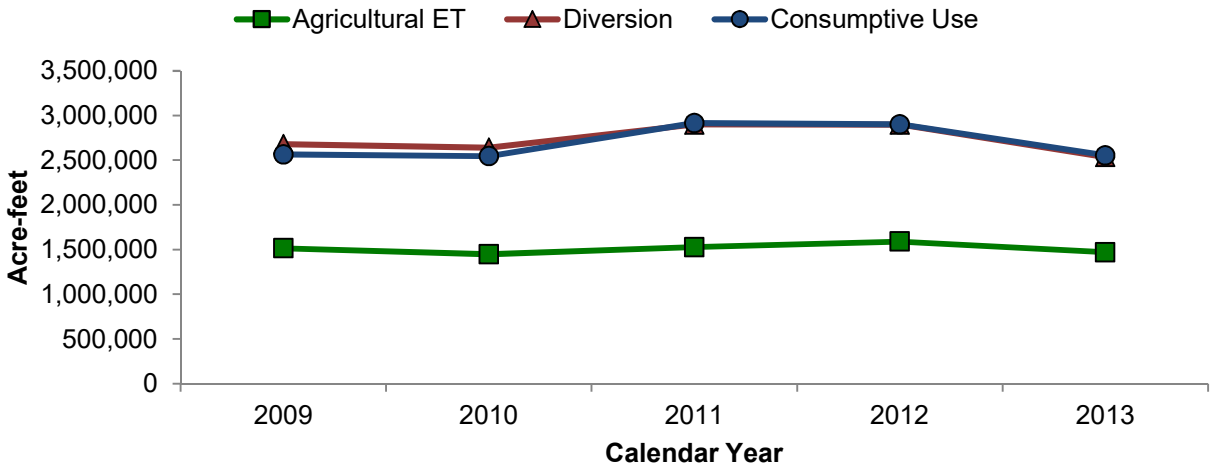
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	430,581
Gross Cropped Acres:	485,992
Net Cropped Acres:	386,765
Fallowed/Idle Acres:	43,816
Agricultural Evapotranspiration (acre-feet):	1,468,642
Riparian	
Riparian Vegetation Acres:	0
Riparian Evapotranspiration (acre-feet):	0
Open Water	
Open Water Acres:	2,136
Open Water Evaporation (acre-feet):	12,761

Major Crop Types



Annual Agricultural ET





Imperial Irrigation District - CA

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	138,449	28	696,342	47
Aloe	23	<1	49	<1
Bermuda/Grass	62,284	13	261,195	18
Cane/Bamboo	65	<1	355	<1
Citrus	6,472	1	20,088	1
Crucifers	30,209	6	21,513	1
Dates	996	<1	5,584	<1
Deciduous Orchards	455	<1	1,981	<1
Field Grain	7,224	1	20,462	1
Legume/Solanum Veg.	2,173	<1	2,285	<1
Lettuce	37,606	8	28,088	2
Marsh Maintained	303	<1	1,679	<1
Melons	4,674	1	8,204	1
Miscellaneous herbs	31	<1	70	<1
Moist Soil Unit	1,207	<1	5,901	<1
Nursery/Greenhouse	502	<1	1,052	<1
Oil Crops	264	<1	626	<1
Perennial Vegetables	114	<1	500	<1
Small Grains	54,009	11	109,014	7
Small Vegetables	32,872	7	43,330	3
Sudan	57,427	12	166,140	11
Sugar Beets	47,454	10	71,574	5
Tomatoes	99	<1	223	<1
Wildlife Forage Maintained	1,079	<1	2,388	<1
Total*	**485,992**	**100%**	**1,468,642**	**100%**

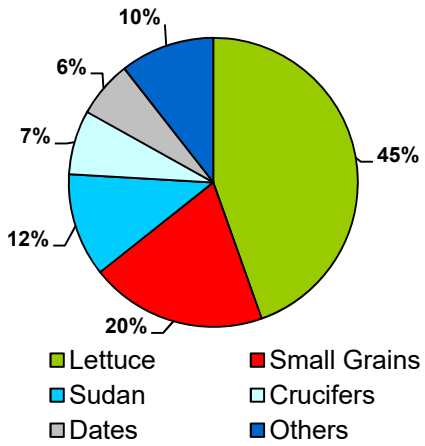
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Yuma Project Reservation Division, Bard Unit - CA

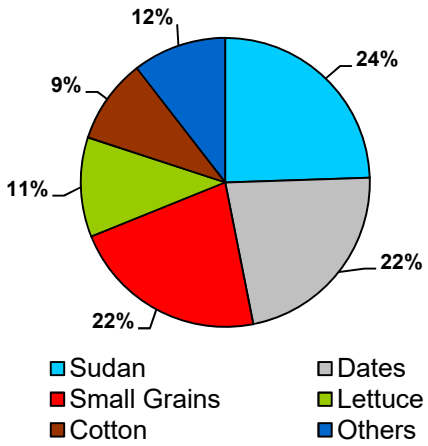
2013

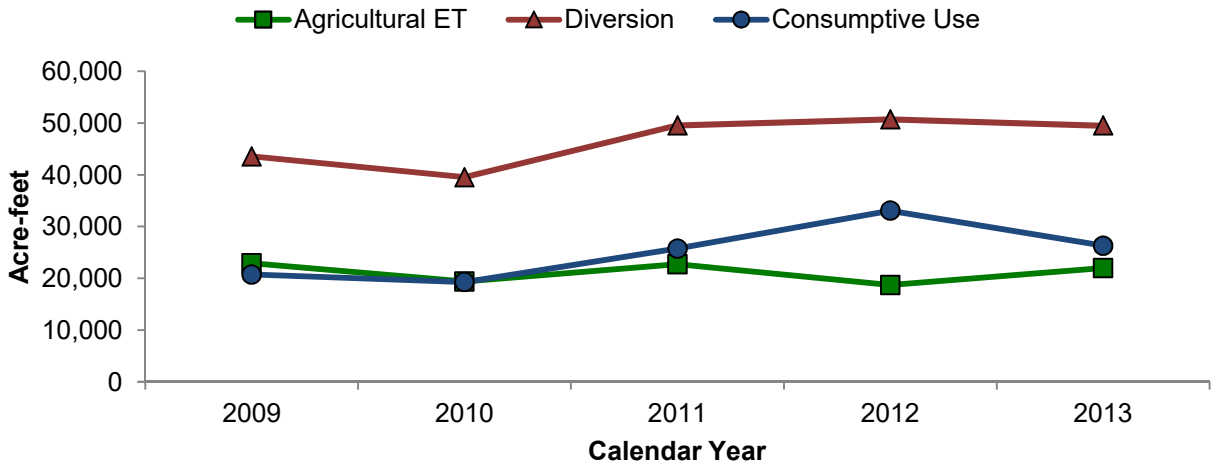
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	6,386
Gross Cropped Acres:	13,440
Net Cropped Acres:	6,385
Fallowed/Idle Acres:	1
Agricultural Evapotranspiration (acre-feet):	21,971
Riparian	
Riparian Vegetation Acres:	250
Riparian Evapotranspiration (acre-feet):	807
Open Water	
Open Water Acres:	29
Open Water Evaporation (acre-feet):	167

Major Crop Types



Annual Agricultural ET





Yuma Project Reservation Division, Bard Unit - CA

2013

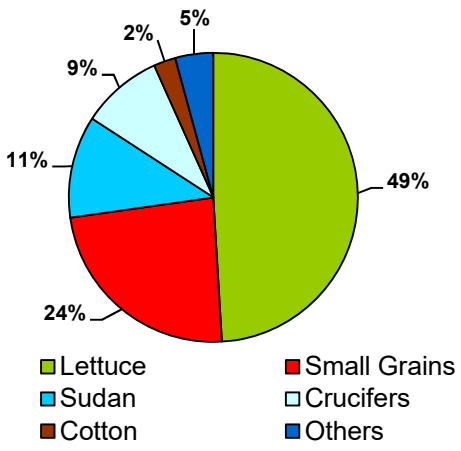
Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	122	1	590	3
Bermuda/Grass	6	<1	21	<1
Citrus	115	1	418	2
Cotton	637	5	2,082	9
Crucifers	968	7	349	2
Dates	852	6	4,928	22
Deciduous Orchards	7	<1	30	<1
Lettuce	5,990	45	2,450	11
Melons	298	2	563	3
Miscellaneous herbs	6	<1	19	<1
Moist Soil Unit	8	<1	8	<1
Root Vegetables	98	1	100	<1
Small Grains	2,656	20	4,834	22
Small Vegetables	122	1	204	1
Sudan	1,555	12	5,376	24
Total*	**13,440**	**100%**	**21,971**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

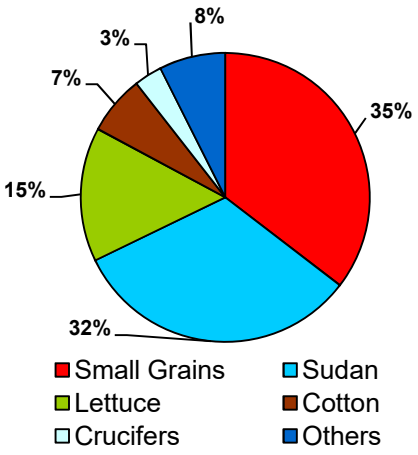
Yuma Project Reservation Division
Indian Unit - CA
2013

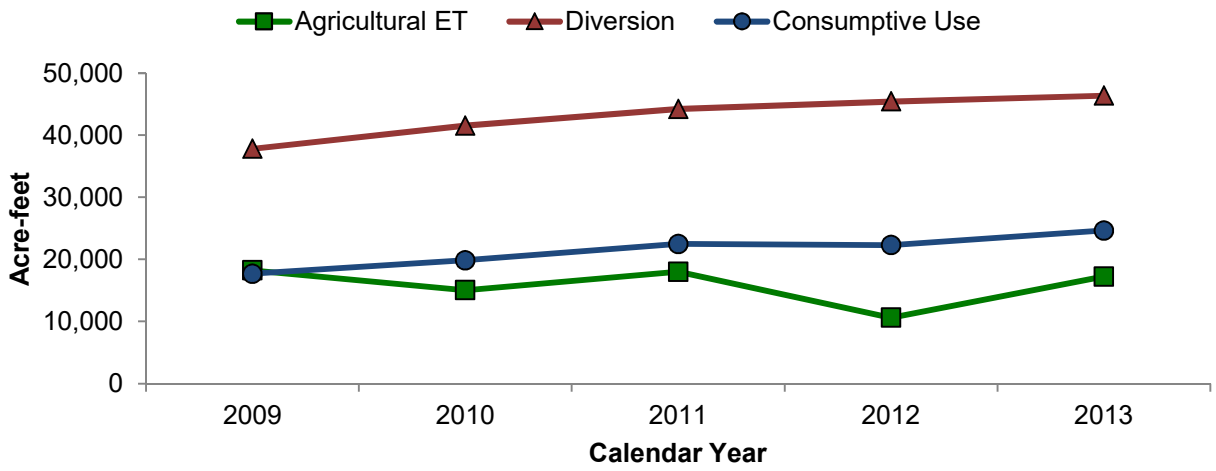
River Reach:	Imperial Dam to Mexico
Agriculture	
Irrigable Acres:	6,143
Gross Cropped Acres:	14,136
Net Cropped Acres:	5,962
Fallowed/Idle Acres:	181
Agricultural Evapotranspiration (acre-feet):	17,213
Riparian	
Riparian Vegetation Acres:	239
Riparian Evapotranspiration (acre-feet):	657
Open Water	
Open Water Acres:	20
Open Water Evaporation (acre-feet):	119

Major Crop Types



Annual Agricultural ET





Yuma Project Reservation Division
Indian Unit - CA
2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	49	<1	224	1
Bermuda/Grass	107	1	344	2
Cotton	349	2	1,140	7
Crucifers	1,289	9	539	3
Dates	9	<1	54	<1
Legume/Solanum Veg.	32	<1	22	<1
Lettuce	6,937	49	2,588	15
Melons	178	1	264	2
Miscellaneous herbs	36	<1	109	1
Root Vegetables	44	<1	45	<1
Small Grains	3,349	24	6,094	35
Small Vegetables	144	1	211	1
Sudan	1,613	11	5,578	32
Total*	**14,136**	**100%**	**17,213**	**100%**

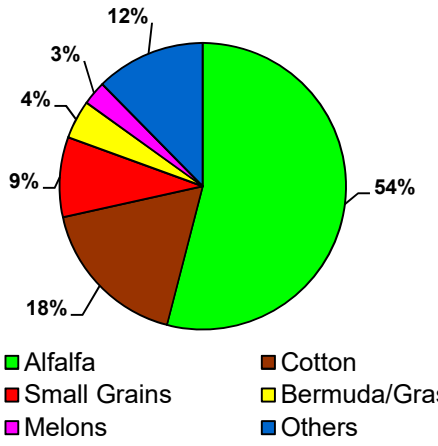
*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

Palo Verde Irrigation District - CA

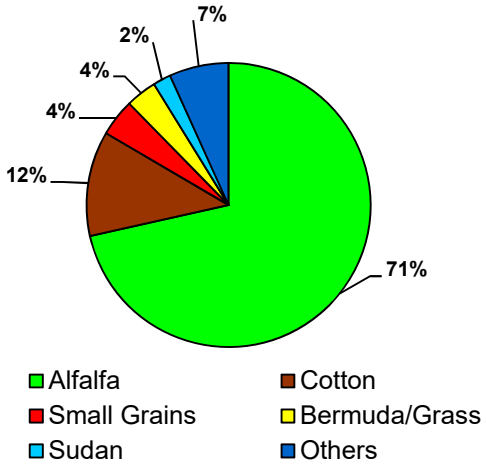
2013

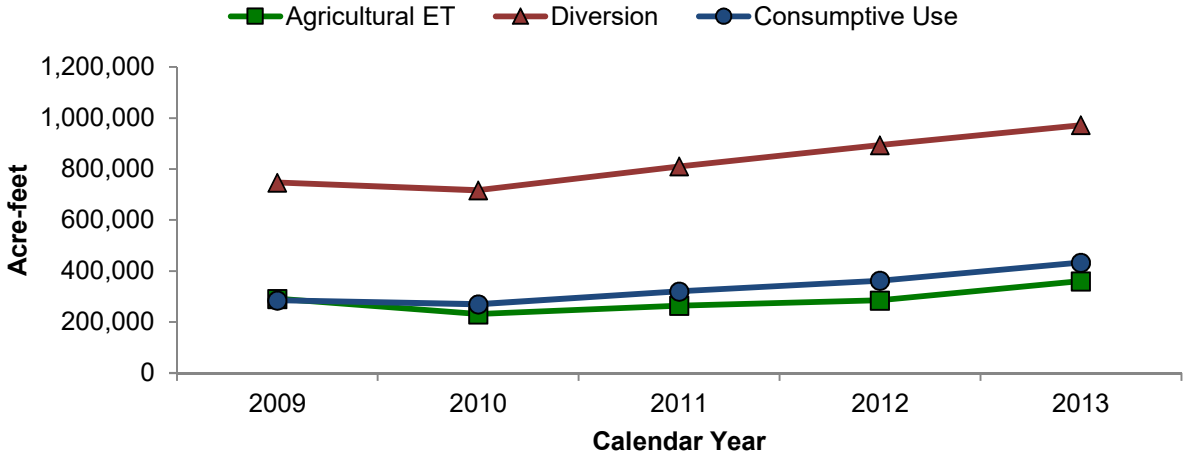
River Reach:	Parker Dam to Imperial Dam
Agriculture	
Irrigable Acres:	89,337
Gross Cropped Acres:	88,880
Net Cropped Acres:	83,167
Fallowed/Idle Acres:	6,170
Agricultural Evapotranspiration (acre-feet):	360,237
Riparian	
Riparian Vegetation Acres:	2,921
Riparian Evapotranspiration (acre-feet):	8,389
Open Water	
Open Water Acres:	241
Open Water Evaporation (acre-feet):	1,252

Major Crop Types



Annual Agricultural ET





Palo Verde Irrigation District - CA

2013

Crop Type	Acres	Acres % Total	Annual ET (acre-feet)	Annual ET % Total
Alfalfa	48,020	54	257,546	71
Bermuda/Grass	3,879	4	12,735	4
Citrus	1,870	2	6,477	2
Cotton	15,545	17	43,037	12
Crucifers	2,225	3	1,255	<1
Dates	253	<1	1,459	<1
Deciduous Orchards	460	1	2,128	1
Field Grain	1,944	2	5,000	1
Grapes	37	<1	69	<1
Legume/Solanum Veg.	385	<1	197	<1
Lettuce	1,276	1	729	<1
Melons	2,395	3	5,000	1
Moist Soil Unit	41	<1	205	<1
Nursery/Greenhouse	9	<1	19	<1
Restoration Area	471	1	1,818	1
Small Grains	8,036	9	15,247	4
Sudan	2,035	2	7,317	2
Total*	**88,880**	**100%**	**360,237**	**100%**

*Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.

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Other Water Users Not Reported on Individual Fact Sheets
2013

		Agricultural Acreage				Agriculture			Riparian Vegetation		Open Water	
Water User	River Reach	Irrigable Acres	Gross Cropped Acres	Net Cropped Acres	Fallowed/Idle Acres	Crop Type	Acres	Annual ET (acre-feet)	Acres	Annual ET (acre-feet)	Acres	Annual Evaporation (acre-feet)
Note: Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.												
Arizona												
Beattie Farms Southwest	Imperial Dam To Mexico	214	219	193	21	Alfalfa	115	611				
						Small Grains	10	18				
						Small Vegetables	47	69				
						Sudan	47	163				
						Total	**219**	**861**	**87**	**237**	**0**	**0**
Bill Williams National Wildlife Refuge	Davis Dam To Parker Dam	0	0	0	0							
						Total	**0**	**0**	**2,140**	**7,588**	**45**	**219**
Bill Williams National Wildlife Refuge (NCR)	Bill Williams River, NCR	0	0	0	0							
						Total	**0**	**0**	**457**	**1,612**	**10**	**49**
BLM	Imperial Dam To Mexico	55	55	55	0	Bermuda/Grass	40	130				
						Restoration Area	15	75				
						Total	**55**	**205**	**23**	**131**	**0**	**0**
BLM (Monty Lee)	Imperial Dam To Mexico	50	99	50	0	Lettuce	50	8				
						Small Grains	50	90				
						Total	**99**	**98**	**0**	**0**	**0**	**0**
BLM (Pratt)	Imperial Dam To Mexico	61	66	61	0	Alfalfa	12	11				
						Restoration Area	6	29				
						Small Grains	48	87				
						Total	**66**	**128**	**0**	**0**	**0**	**0**
Cha Cha, LLC	Imperial Dam To Mexico	536	485	536	0	Citrus	456	1,222				
						Dates	29	131				
						Total	**485**	**1,352**	**10**	**26**	**2**	**10**
City of Yuma (Yuma East Wetlands)	Imperial Dam to Mexico	0	0	0	0							
						Total	**0**	**0**	**97**	**392**	**17**	**97**
Cocopah Indian Tribe, Fee Lands	Imperial Dam To Mexico	108	287	108	0	Cotton	53	172				
						Lettuce	80	28				
						Small Grains	55	101				
						Small Vegetables	99	146				
						Total	**287**	**447**	**18**	**52**	**0**	**0**
Cocopah Indian Tribe - West Reservation (NCR)	Imperial Dam to Mexico	703	480	562	141	Alfalfa	296	1,670				
						Lettuce	36	11				
						Melons	148	281				
						Total	**480**	**1,962**	**1,684**	**4,718**	**0**	**0**
Curtis, Armon	Imperial Dam To Mexico	43	85	43	0	Lettuce	43	7				
						Small Grains	43	78				
						Total	**85**	**84**	**5**	**18**	**0**	**0**
Fort Yuma Indian Reservation	Imperial Dam To Mexico	75	40	44	31	Alfalfa	40	213				
						Total	**40**	**213**	**1,357**	**4,378**	**24**	**142**
Fort Yuma Indian Reservation, Ranch 5	Imperial Dam To Mexico	181	89	89	92	Sudan	89	307				
						Total	**89**	**307**	**1**	**2**	**0**	**0**
Fort Yuma Indian Reservation, Yuma East Wetlands	Imperial Dam To Mexico	0	0	0	0							
						Total	**0**	**0**	**189**	**624**	**<1**	**2**
Griffin, R.	Imperial Dam To Mexico	13	39	13	0	Lettuce	26	12				
						Small Grains	13	23				
						Total	**39**	**36**	**0**	**0**	**0**	**0**
Griffin Ranches	Imperial Dam To Mexico	38	104	38	0	Lettuce	40	19				
						Miscellaneous herbs	9	26				
						Small Grains	20	36				
						Small Vegetables	18	26				
						Sudan	18	61				
						Total	**104**	**169**	**<1**	**1**	**0**	**0**
GSC Farm, LLC	Parker Dam To Imperial Dam	389	411	376	13	Alfalfa	35	28				
						Cotton	376	1,041				
						Total	**411**	**1,070**	**0**	**0**	**0**	**0**

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Other Water Users Not Reported on Individual Fact Sheets
2013

		Agricultural Acreage				Agriculture			Riparian Vegetation		Open Water	
Water User	River Reach	Irrigable Acres	Gross Cropped Acres	Net Cropped Acres	Fallowed/Idle Acres	Crop Type	Acres	Annual ET (acre-feet)	Acres	Annual ET (acre-feet)	Acres	Annual Evaporation (acre-feet)
Note: Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.												
Arizona (continued)												
Havasu National Wildlife Refuge	Davis Dam To Parker Dam	0	0	0	0	**Total**	**0**	**0**	**10,933**	**43,403**	**3,172**	**15,431**
Hillander C (NCR)	Imperial Dam To Mexico NCR	2,334	562	709	1,625	Alfalfa	562	3,168				
						Total	**562**	**3,168**	**0**	**0**	**0**	**0**
Imperial National Wildlife Refuge	Parker Dam To Imperial Dam	70	70	70	0	Bermuda/Grass	70	225				
						Total	**70**	**225**	**4,814**	**21,026**	**623**	**3,244**
JRJ Partners, LLC	Imperial Dam To Mexico	200	266	200	0	Alfalfa	16	28				
						Dates	111	641				
						Small Grains	70	127				
						Small Vegetables	70	102				
						Total	**266**	**897**	**4**	**11**	**0**	**0**
Lake Havasu State Park	Davis Dam To Parker Dam	0	0	0	0	**Total**	**0**	**0**	**405**	**1,315**	**49**	**238**
Lake Mead National Recreation Area (Davis Dam to Parker Dam)	Davis Dam To Parker Dam	0	0	0	0	**Total**	**0**	**0**	**27**	**102**	**1**	**5**
Lake Mead National Recreation Area (Hoover Dam to Davis Dam)	Hoover dam to Davis Dam	0	0	0	0	**Total**	**0**	**0**	**666**	**2,083**	**7**	**33**
Mittry Lake Management Area	Imperial Dam To Mexico	0	0	0	0	**Total**	**0**	**0**	**3,235**	**14,698**	**454**	**2,632**
North Baja Pipeline, LLC	Parker Dam To Imperial Dam	46	46	46	0	Cotton	46	128				
						Total	**46**	**128**	**1**	**2**	**0**	**0**
Ogram Boys Enterprises Inc.	Imperial Dam To Mexico	169	275	169	0	Alfalfa	50	266				
						Lettuce	107	36				
						Small Grains	118	215				
						Total	**275**	**517**	**2**	**11**	**0**	**0**
Ogram, George	Imperial Dam To Mexico	73	73	73	0	Alfalfa	73	390				
						Total	**73**	**390**	**0**	**0**	**0**	**0**
Pasquinelli, Gary and Barbara	Imperial Dam To Mexico	76	93	76	0	Crucifers	36	21				
						Lettuce	8	1				
						Small Grains	9	16				
						Small Vegetables	41	71				
						Total	**93**	**109**	**0**	**0**	**0**	**0**
Peach, John	Imperial Dam To Mexico	74	74	74	0	Cotton	74	243				
						Total	**74**	**243**	**0**	**0**	**0**	**0**
Phillips, Milton	Imperial Dam To Mexico	19	56	19	0	Lettuce	19	3				
						Small Vegetables	19	27				
						Sudan	19	65				
						Total	**56**	**95**	**0**	**0**	**0**	**0**
Power	Imperial Dam To Mexico	43	99	43	0	Cotton	33	108				
						Lettuce	66	32				
						Total	**99**	**139**	**0**	**0**	**0**	**0**
Power, Victor	Imperial Dam To Mexico	8	53	8	0	Cotton	10	32				
						Lettuce	27	11				
						Small Vegetables	8	11				
						Sudan	8	27				
						Total	**53**	**81**	**1**	**2**	**0**	**0**
Rayner Ranches	Parker Dam To Imperial Dam	679	679	679	0	Alfalfa	236	1,281				
						Cotton	443	1,226				
						Total	**679**	**2,507**	**2**	**2**	**0**	**0**
State of Arizona (Davis Dam to Parker Dam)	Davis Dam To Parker Dam	0	0	0	0	**Total**	**0**	**0**	**895**	**2,148**	**72**	**348**

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Other Water Users Not Reported on Individual Fact Sheets
2013

		Agricultural Acreage				Agriculture			Riparian Vegetation		Open Water	
Water User	River Reach	Irrigable Acres	Gross Cropped Acres	Net Cropped Acres	Fallowed/Idle Acres	Crop Type	Acres	Annual ET (acre-feet)	Acres	Annual ET (acre-feet)	Acres	Annual Evaporation (acre-feet)
Note: Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.												
Arizona (continued)												
State of Arizona (Imperial Dam to Mexico)	Imperial Dam To Mexico	839	914	667	172	Alfalfa	50	268				
						Bermuda/Grass	18	57				
						Citrus	2	6				
						Crucifers	13	8				
						Dates	231	1,326				
						Lettuce	229	104				
						Small Grains	112	205				
						Sudan	260	897				
						Total	**914**	**2,871**	**2,370**	**8,170**	**87**	**507**
State of Arizona (Parker Dam to Imperial Dam)	Parker Dam To Imperial Dam	131	159	131	0	Alfalfa	50	203				
						Sudan	109	391				
						Total	**159**	**594**	**6,226**	**21,808**	**720**	**3,748**
State of Arizona, Alamo Dam to Bill Williams River NWR (NCR)	Bill Williams River, NCR	410	615	410	0	Alfalfa	81	351				
						Cotton	165	438				
						Small Grains	369	730				
						Total	**615**	**1,520**	**6,349**	**15,545**	**110**	**537**
State of Arizona, Down Gradient of YMIDD	Imperial Dam To Mexico	7,591	7,444	6,713	878	Alfalfa	2,641	14,412				
						Bermuda/Grass	3	9				
						Citrus	541	1,971				
						Cotton	125	409				
						Dates	2,007	11,600				
						Deciduous Orchards	38	175				
						Field Grain	122	295				
						Small Grains	983	1,362				
						Sudan	984	3,400				
						Total	**7,444**	**33,633**	**0**	**0**	**0**	**0**
State of Arizona, Gila River Valley (NCR)	Gila River Valley, NCR	2,866	573	574	2,292	Dates	339	1,791				
						Jojoba Beans	234	1,080				
						Total	**573**	**2,871**	**0**	**0**	**7**	**39**
State of Arizona, Limitrophe	Imperial Dam To Mexico	793	965	726	67	Alfalfa	123	659				
						Bermuda/Grass	270	867				
						Crucifers	50	22				
						Dates	31	177				
						Lettuce	189	87				
						Melons	62	118				
						Small Grains	117	213				
						sudan	124	427				
						Total	**965**	**2,569**	**1,447**	**4,037**	**0**	**0**
University of Arizona	Imperial Dam To Mexico	84	81	70	14	Alfalfa	6	15				
						Citrus	44	147				
						Dates	2	9				
						Deciduous Orchards	5	23				
						Nursery/Greenhouse	1	3				
						Small Grains	15	27				
						Sudan	8	28				
						Total	**81**	**251**	**0**	**0**	**0**	**0**
Yuma Proving Ground	Imperial Dam to Mexico	0	0	0	0							
						Total	**0**	**0**	**84**	**259**	**0**	**0**
California												
Chemehuevi Indian Reservation	Davis Dam To Parker Dam	58	0	0	58							
						Total	**0**	**0**	**560**	**2,189**	**6**	**31**
Cibola National Wildlife Refuge	Davis Dam To Parker Dam	0	0	0	0							
						Total	**0**	**0**	**3,945**	**13,225**	**118**	**613**

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Other Water Users Not Reported on Individual Fact Sheets
2013

		Agricultural Acreage				Agriculture			Riparian Vegetation		Open Water	
Water User	River Reach	Irrigable Acres	Gross Cropped Acres	Net Cropped Acres	Fallowed/Idle Acres	Crop Type	Acres	Annual ET (acre-feet)	Acres	Annual ET (acre-feet)	Acres	Annual Evaporation (acre-feet)
Note: Due to displaying values to the nearest whole number, totals may differ from the sum of the individual values.												
California (continued)												
Colorado River Indian Reservation	Parker Dam To Imperial Dam	949	661	671	278	Alfalfa	660	3,601				
						Bermuda/Grass	1	2				
						Total	**661**	**3,603**	**11,107**	**33,049**	**133**	**691**
Fort Yuma Indian Reservation	Imperial Dam To Mexico	134	241	104	30	Lettuce	165	66				
						Melons	42	80				
						Small Grains	33	59				
						Sudan	2	6				
						Total	**241**	**210**	**3,518**	**10,682**	**57**	**328**
Fort Yuma Indian Reservation, Ranch 1	Imperial Dam To Mexico	90	160	90	0	Alfalfa	35	62				
						Crucifers	10	5				
						Lettuce	67	20				
						Sudan	48	167				
						Total	**160**	**253**	**0**	**0**	**0**	**0**
Fort Yuma Indian Reservation, Ranch 2, Parcel 3	Imperial Dam To Mexico	55	109	55	0	Lettuce	55	29				
						Sudan	55	189				
						Total	**109**	**218**	**0**	**0**	**0**	**0**
Fort Yuma Indian Reservation, Ranch 3	Imperial Dam To Mexico	80	2	2	78	Dates	2	9				
						Total	**2**	**9**	**5**	**14**	**0**	**0**
Fort Yuma Indian Reservation, Ranch 4	Imperial Dam To Mexico	329	418	285	44	Cotton	65	214				
						Lettuce	279	139				
						Small Grains	31	57				
						Small Vegetables	42	71				
						Total	**418**	**480**	**0**	**0**	**0**	**0**
Fort Yuma Indian Reservation, Ranch 5	Imperial Dam To Mexico	311	247	186	125	Lettuce	60	48				
						Sudan	186	643				
						Total	**247**	**692**	**0**	**0**	**0**	**0**
Fort Yuma Indian Reservation, Ranch 7	Imperial Dam To Mexico	120	124	72	48	Cotton	52	169				
						Crucifers	52	33				
						Lettuce	21	8				
						Total	**124**	**209**	**0**	**0**	**0**	**0**
Fort Yuma Indian Reservation, Ranch 15	Imperial Dam To Mexico	127	13	13	114	Lettuce	13	11				
						Total	**13**	**11**	**2**	**10**	**0**	**0**
Fort Yuma Indian Reservation, Ranch 17	Imperial Dam To Mexico	58	19	19	39	Sudan	19	66				
						Total	**19**	**66**	**0**	**0**	**0**	**0**
Havasu National Wildlife Refuge	Davis Dam To Parker Dam	0	0	0	0							
						Total	**0**	**0**	**755**	**3,716**	**87**	**425**
Imperial National Wildlife Refuge	Parker Dam To Imperial Dam	0	0	0	0							
						Total	**0**	**0**	**2,536**	**10,400**	**208**	**1,081**
Lake Enterprises of California, LLC	Parker Dam To Imperial Dam	0	0	0	0							
						Total	**0**	**0**	**131**	**656**	**3**	**13**
State of California (Davis Dam to Parker Dam)	Davis Dam To Parker Dam	362	0	0	362							
						Total	**0**	**0**	**3,268**	**9,355**	**84**	**410**
State of California (Parker Dam to Imperial Dam)	Parker Dam To Imperial Dam	1,341	365	366	975	Citrus	153	472				
						Dates	212	1,228				
						Total	**365**	**1,701**	**4,535**	**18,833**	**1,003**	**5,224**
State of California (Imperial Dam to Mexico)	Imperial Dam to Mexico	0	0	0	0							
						Total	**0**	**0**	**2,396**	**8,317**	**64**	**369**
Nevada												
Fort Mojave Indian Reservation	Davis Dam To Parker Dam	412	412	412	0	Alfalfa	412	2,223				
						Total	**412**	**2,223**	**2,256**	**5,294**	**11**	**54**
Lake Mead National Recreation Area (Hoover Dam to Davis Dam)	Hoover Dam to Davis Dam	0	0	0	0							
						Total	**0**	**0**	**690**	**2,049**	**2**	**11**
State of Nevada (Davis Dam to Parker Dam)	Davis Dam To Parker Dam	0	0	0	0							
						Total	**0**	**0**	**3,287**	**9,311**	**59**	**287**

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Appendix 2: Monthly Reference Values for Reference ET, Precipitation, and Crop/Riparian Vegetation ET Rates

This appendix contains area-specific data used by Reclamation to calculate the ET and evaporation estimates provided in this report. Each table displays monthly reference ET and precipitation values, monthly ET rates for crop and riparian groups, and monthly evaporation rates for open water areas.

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Mohave Area ET Rate Table
(Inches)
2013

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Reference ET	3.20	3.57	5.37	7.45	9.01	9.16	8.48	7.88	6.06	5.18	3.10	3.26	71.72
Precipitation	0.42	0.25	0.33	0.00	0.00	0.00	0.17	1.60	0.80	0.05	0.64	0.00	4.26

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Alfalfa	2.33	3.61	4.29	6.94	8.26	8	7.58	7.72	6.39	3.91	2.52	3.54	65.08
Bermuda	0	0	0	3.14	7.35	7.8	7.22	6.6	4.92	0.32	0	0	37.33
Bermuda Overseeded with Rye in Winter	2.85	3.04	4.11	3.14	7.35	7.8	7.22	6.6	4.92	2.4	2.7	2.91	55.03
Citrus - Declining	1.56	1.67	2.41	3.2	3.7	3.65	3.38	3.14	2.47	2.26	1.44	1.62	30.51
Citrus - Mature	2.23	2.38	3.44	4.57	5.28	5.22	4.83	4.49	3.53	3.22	2.06	2.32	43.59
Citrus - Young	1.34	1.43	2.07	2.74	3.17	3.13	2.9	2.69	2.12	1.93	1.24	1.39	26.15
Cotton	0	0	0	1.07	2.28	5.2	7.79	8.81	5.91	0.87	0	0	31.94
Crucifers Fall Early	0	0	0	0	0	0	0	0	0	2.34	1.77	3.06	7.17
Crucifers Fall Late	0	0	0	0	0	0	0	0	0	0.16	1.4	2.05	3.61
Crucifers Spring Early	3.21	3.46	0.59	0	0	0	0	0	0	0	0	0	7.25
Crucifers Spring Late	3.06	3.58	5.14	0	0	0	0	0	0	0	0	0	11.77
Dates	2.8	3.24	5.31	7.49	9.01	9.06	8.29	7.62	5.79	4.9	2.9	3.01	69.43
Deciduous Orchards	1.44	1.62	3.04	5.47	7.73	7.93	7.34	6.82	5.25	4.49	2.61	1.99	55.74
Fall Melons	0	0	0	0	0	0	0	1.11	3.68	5.06	3.09	1.65	14.59
Farm Pond	2.85	3.07	4.67	7.08	8.38	7.79	6.87	5.99	4.42	4.04	2.73	2.64	60.52
Field Grain	0	0	1.84	6.76	10.8	9.64	1.38	0	0	0	0	0	30.42
Grapes	0	0.25	1.56	4.82	7.6	7.78	6.86	5.07	1.54	0	0	0	35.47
Irrigated Restoration - Cottonwood/Willow	1.06	1.18	2.56	5.61	8.88	9.32	8.62	8.01	6.16	4.74	1.75	0.75	58.65
Irrigated Restoration - Mixed Veg Low	0.66	0.76	1.72	3.45	5.01	5.13	4.75	4.33	2.74	1.79	0.74	0.67	31.76
Irrigated Restoration - Mixed Veg Medium	0.96	1.08	2	3.46	4.78	4.89	4.5	3.77	2.42	1.7	0.93	0.98	31.48
Legume/Solanum Vegetables Fall	0	0	0	0	0	0	0	0	0	1.62	2.18	3.28	7.08
Legume/Solanum Vegetables Spring	3.37	3.7	1.93	0	0	0	0	0	0	0	0	0	9
Lettuce Fall Early	0	0	0	0	0	0	0	0	0	3.14	2.68	0	5.82
Lettuce Spring Late	2.9	3.58	2.08	0	0	0	0	0	0	0	0	0	8.56
Miscellaneous herbs	0	1.38	4.07	8.79	11.15	10.2	1.75	0	0	0	0	0	37.33
Moist Soil Unit	3.2	3.57	5.25	7.32	5.21	2.94	9.04	8.91	4.01	5.18	3.1	3.26	60.99
Not Maintained	2.83	3.07	4.67	7.08	8.38	7.79	6.87	5.99	4.42	4.04	2.73	2.64	60.5
Nursery/Greenhouse	1.34	1.43	2.07	2.74	3.17	3.13	2.9	2.69	2.12	1.93	1.24	1.39	26.15
Oil Crops	0	1.38	4.07	8.79	11.15	10.2	1.75	0	0	0	0	0	37.33
Perennial Vegetables	1.4	1.56	2.48	5.49	8.38	8.55	7.91	7.34	4.95	3.34	1.4	1.42	54.22
Root Vegetables	0	0	0	0	0	0	0	0	2.12	3.81	3.25	3.07	12.26
Small Grains Fall	0	0	0	0	0	0	0	0	0	0	0.25	1.25	1.5
Small Grains Spring	2.68	4.03	6.06	8.14	3.05	0	0	0	0	0	0	0	23.96
Small Vegetables Fall	0	0	0	0	0	0	0	0	1.14	2.05	2.3	3.24	8.73
Small Vegetables Spring	3.19	3.56	4.5	0	0	0	0	0	0	0	0	0	11.25
Spring Melons	0	0.38	3.54	7.36	9	5.29	0	0	0	0	0	0	25.57
Sudan	0	0	2.75	7.61	10.27	10.44	9.37	1.5	0	0	0	0	41.95
Sugar Beets (Summer)	3.43	3.83	5.76	7.7	6.7	0.22	0	0	0	0	0	0	27.63
Sugar Beets Fall	0	0	0	0	0	0	0	0	0.75	1.85	1.93	3.21	7.74
Tomatoes	0	2.2	4.6	8.74	10.11	3.9	0	0	0	0	0	0	29.56
Wildlife Forage Maintained	3.1	4.23	6.36	7.74	3.77	0.33	0	0	0	0	0.06	1.51	27.1

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Open Water	2.85	3.07	4.67	7.08	8.38	7.79	6.87	5.99	4.42	4.04	2.73	2.64	60.52

Riparian Types	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
USGS barren	0.64	0.63	0.75	1.01	1.23	1.25	1.15	1.07	0.82	0.74	0.55	0.65	10.50
Cottonwood/Willow	1.06	1.18	2.56	5.61	8.88	9.32	8.62	8.01	6.16	4.74	1.75	0.75	58.65
Marsh	0.83	0.93	4.19	8.86	10.71	10.89	10.08	9.37	7.15	3.15	0.77	0.82	67.76
Mixed Veg Low	0.66	0.76	1.72	3.45	5.01	5.13	4.75	4.33	2.74	1.79	0.74	0.67	31.76
Mixed Veg Medium	0.96	1.08	2.00	3.46	4.78	4.89	4.50	3.77	2.42	1.70	0.93	0.98	31.48
Salt Cedar Dense	0.72	0.8	1.54	3.78	6.44	6.93	6.42	5.97	4.57	3.1	1.11	0.73	42.1

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Parker Area ET Rate Table
(Inches)
2013

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Reference ET	2.71	3.32	5.68	7.59	8.89	9.58	8.90	8.12	6.44	5.02	2.92	2.66	71.83
Precipitation	0.64	0.04	0.02	0.00	0.00	0.00	1.18	0.38	0.39	0.01	0.72	0.01	3.39

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Alfalfa	1.98	3.37	4.45	7.09	8.23	8.41	7.98	7.9	6.8	3.82	2.31	2.89	65.22
Bermuda	0	0	0	3.19	7.27	8.15	7.57	6.8	5.23	0.34	0	0	38.56
Bermuda Overseeded with Rye in Winter	2.42	2.83	4.33	3.19	7.27	8.15	7.57	6.8	5.23	2.35	2.55	2.38	55.07
Citrus - Declining	1.32	1.55	2.55	3.26	3.65	3.82	3.55	3.24	2.63	2.19	1.36	1.32	30.43
Citrus - Mature	1.88	2.22	3.64	4.66	5.21	5.46	5.07	4.63	3.75	3.13	1.94	1.89	43.48
Citrus - Young	1.13	1.33	2.18	2.79	3.13	3.28	3.04	2.78	2.25	1.88	1.16	1.13	26.09
Cotton	0	0	0	1.09	2.26	5.51	8.18	9.08	6.28	0.81	0	0	33.22
Crucifers Fall Early	0	0	0	0	0	0	0	0	0	2.26	1.66	2.49	6.42
Crucifers Fall Late	0	0	0	0	0	0	0	0	0	0.14	1.32	1.67	3.13
Crucifers Spring Early	2.72	3.21	0.54	0	0	0	0	0	0	0	0	0	6.47
Crucifers Spring Late	2.6	3.33	5.43	0	0	0	0	0	0	0	0	0	11.35
Dates	2.37	3.02	5.62	7.64	8.89	9.47	8.71	7.85	6.16	4.75	2.73	2.46	69.65
Deciduous Orchards	1.22	1.51	3.23	5.57	7.63	8.3	7.71	7.03	5.58	4.35	2.47	1.63	56.22
Fall Melons	0	0	0	0	0	0	0	1.2	3.92	4.9	2.91	1.32	14.24
Farm Pond	2.41	2.86	4.94	7.21	8.27	8.14	7.21	6.17	4.7	3.92	2.57	2.15	60.55
Field Grain	0	0	1.95	6.87	10.66	9.98	1.39	0	0	0	0	0	30.86
Grapes	0	0.23	1.67	4.9	7.5	8.13	7.2	5.22	1.63	0	0	0	36.49
Irrigated Restoration - Cottonwood/Willow	0.9	1.1	2.72	5.71	8.78	9.74	9.05	8.26	6.55	4.59	1.66	0.62	59.68
Irrigated Restoration - Mixed Veg Low	0.56	0.71	1.83	3.51	4.95	5.36	4.98	4.47	2.91	1.74	0.7	0.55	32.26
Irrigated Restoration - Mixed Veg Medium	0.81	1.01	2.12	3.53	4.72	5.12	4.73	3.88	2.57	1.65	0.88	0.8	31.81
Legume/Solanum Vegetables Fall	0	0	0	0	0	0	0	0	0	1.54	2.04	2.67	6.25
Legume/Solanum Vegetables Spring	2.85	3.44	1.91	0	0	0	0	0	0	0	0	0	8.2
Lettuce Fall Early	0	0	0	0	0	0	0	0	0	3.05	2.6	0	5.65
Lettuce Spring Late	2.47	3.33	2.07	0	0	0	0	0	0	0	0	0	7.87
Miscellaneous herbs	0	1.29	4.33	8.95	11	10.57	1.82	0	0	0	0	0	37.95
Moist Soil Unit	2.71	3.32	5.56	7.47	5.03	3.17	9.52	9.17	4.25	5.02	2.92	2.66	60.79
Nursery/Greenhouse	1.13	1.33	2.18	2.79	3.13	3.28	3.04	2.78	2.25	1.88	1.16	1.13	26.09
Oil Crops	0	1.29	4.33	8.95	11	10.57	1.82	0	0	0	0	0	37.95
Perennial Vegetables	1.18	1.45	2.63	5.59	8.27	8.94	8.3	7.56	5.26	3.23	1.34	1.16	54.92
Root Vegetables	0	0	0	0	0	0	0	0	2.26	3.69	3.06	2.49	11.51
Salt Cedar Dense	0.61	0.74	1.63	3.85	6.38	7.25	6.74	6.15	4.85	3.01	1.05	0.6	42.85
Small Grains Fall	0	0	0	0	0	0	0	0	0	0	0.2	1.02	1.22
Small Grains Spring	2.31	3.74	6.41	8.3	2.9	0	0	0	0	0	0	0	23.66
Small Vegetables Fall	0	0	0	0	0	0	0	0	1.22	1.99	2.16	2.65	8.02
Small Vegetables Spring	2.7	3.31	4.74	0	0	0	0	0	0	0	0	0	10.74
Spring Melons	0	0.35	3.76	7.51	8.88	5.29	0	0	0	0	0	0	25.78
Sudan	0	0	2.92	7.74	10.13	10.92	9.84	1.6	0	0	0	0	43.15
Sugar Beets (Summer)	2.91	3.56	6.09	7.85	6.58	0.15	0	0	0	0	0	0	27.13
Sugar Beets Fall	0	0	0	0	0	0	0	0	0.8	1.8	1.81	2.61	7.03
Tomatoes	0	2.05	4.89	8.91	9.97	3.84	0	0	0	0	0	0	29.66
Wildlife Forage Maintained	2.67	3.93	6.73	7.9	3.65	0.31	0	0	0	0	0.05	1.23	26.48

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Open Water	1.84	2.39	4.71	7.06	8.09	8.91	8.19	7.47	5.99	4.87	2.86	2.05	64.43

Riparian Types	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Barren	0.54	0.59	0.8	1.03	1.21	1.3	1.21	1.1	0.88	0.72	0.52	0.53	10.43
Cottonwood/Willow	0.9	1.1	2.72	5.71	8.78	9.74	9.05	8.26	6.55	4.59	1.66	0.62	59.68
Marsh	0.7	0.86	4.49	9.02	10.57	11.39	10.58	9.65	7.6	3.05	0.73	0.67	69.32
Mixed Veg Low	0.56	0.71	1.83	3.51	4.95	5.36	4.98	4.47	2.91	1.74	0.7	0.55	32.26
Mixed Veg Medium	0.81	1.01	2.12	3.53	4.72	5.12	4.73	3.88	2.57	1.65	0.88	0.8	31.81
Salt Cedar Dense	0.61	0.74	1.63	3.85	6.38	7.25	6.74	6.15	4.85	3.01	1.05	0.6	42.85

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Wellton-Mohawk Area ET Rate Table
(Inches)
2013

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Reference ET	2.33	3	3	6.73	8.14	8.99	8.71	7.83	6.5	4.52	2.64	2.02	64.41
Precipitation	0.19	0.23	0.06	0	0	0	1.11	0.19	0.63	0.02	1.41	0.75	4.59

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Alfalfa	1.77	3.04	4.22	5.38	6.75	7.94	7.82	6.99	5.35	4.78	2.26	2.14	58.44
Bermuda	0	0	0	2.83	6.62	7.61	7.37	6.53	5.29	0.32	0	0	36.57
Bermuda Overseeded with Rye in Winter	2.07	2.56	3.87	2.83	6.62	7.61	7.37	6.53	5.29	2.13	2.3	1.8	50.97
Citrus - Declining	1.13	1.4	2.24	2.89	3.34	3.59	3.48	3.12	2.65	1.97	1.23	1	28.05
Citrus - Mature	1.62	2	3.2	4.13	4.77	5.12	4.96	4.46	3.79	2.82	1.75	1.43	40.07
Citrus - Young	0.97	1.2	1.92	2.48	2.86	3.07	2.98	2.68	2.27	1.69	1.05	0.86	24.04
Cotton	0	0	0.8	1.76	3.17	6.09	8.41	8.79	6.33	1.52	0	0	36.87
Crucifers Fall Early	0	0	0	0	0	0	0	0	0.27	1.59	1.42	1.89	5.17
Crucifers Fall Late	0	0	0	0	0	0	0	0	0	0	0.93	1.07	2
Crucifers Spring Early	0	0.79	0	0	0	0	0	0	0	0	0	0	3.11
Crucifers Spring Late	0	3	2.19	0	0	0	0	0	0	0	0	0	7.29
Dates	1.91	2.59	4.81	6.62	7.99	8.78	8.46	7.57	6.25	4.33	2.51	1.91	63.75
Deciduous Orchards	0.89	1.16	2.57	4.72	6.85	7.64	7.4	6.66	5.53	3.84	2.2	1.25	50.71
Fall Melons	0	0	0	0	0	0	0	0	3.21	3.95	2.63	1.82	11.61
Farm Pond	2.07	2.58	4.35	6.39	7.57	7.64	7.06	5.95	4.75	3.53	2.32	1.64	55.84
Field Grain	0	0.57	2.9	7.54	9.67	6.93	0	0	0	0	0	0	27.61
Grapes	0	0.21	1.46	4.34	6.87	7.63	7.04	5.02	1.72	0	0	0	34.3
Irrigated Restoration - Cottonwood/Willow	0.77	0.99	2.39	5.06	8.04	9.14	8.86	7.96	6.61	4.12	1.5	0.47	55.93
Irrigated Restoration - Mixed Veg Low	0.48	0.64	1.61	3.11	4.53	5.03	4.88	4.3	2.95	1.56	0.63	0.41	30.14
Irrigated Restoration - Mixed Veg Medium	0.7	0.91	1.86	3.13	4.32	4.8	4.63	3.74	2.61	1.48	0.79	0.61	29.57
Jojoba Beans	2.56	3.15	3.04	0.18	3.88	7.46	9.57	8.61	7.15	4.97	2.9	2.22	55.7
Legume/Solanum Veg.	0	0	0	1.85	5.08	8.76	9.05	3.48	0	0	0	0	28.23
Legume/Solanum Vegetables Fall	0	0	0	0	0	0	0	0	0	1.17	1.6	1.99	4.77
Legume/Solanum Vegetables Spring	2.45	3.11	1.67	0	0	0	0	0	0	0	0	0	7.22
Lettuce Fall Early	0	0	0	0	0	0	0	0	1.77	3.31	2.49	0	7.57
Lettuce Fall Late	0	0	0	0	0	0	0	0	0	0	0	1.39	1.39
Lettuce Spring Early	2.23	1.67	0	0	0	0	0	0	0	0	0	0	3.9
Lettuce Spring Late	0.91	2.63	4.91	0.17	0	0	0	0	0	0	0	0	8.62
Miscellaneous herbs	0	1.1	3.73	7.87	10	9.92	1.75	0	0	0	0	0	34.35
Moist Soil Unit	2.33	3	4.9	6.63	4.63	2.92	9.32	8.84	4.38	4.52	2.64	2.02	56.13
Nursery/Greenhouse	0.97	1.2	1.92	2.48	2.86	3.07	2.98	2.68	2.27	1.69	1.05	0.86	24.04
Oil Crops	0	1.1	3.73	7.87	10	9.92	1.75	0	0	0	0	0	34.35
Perennial Vegetables	0.95	1.22	2.17	4.83	7.49	8.29	8.03	7.21	5.29	2.92	1.25	0.82	50.49
Root Vegetables	0	0	0	0	0	0	0	0	2.41	3.39	2.77	1.9	10.46
Small Grains Fall	0	0	0	0	0	0	0	0	0	0	0	0.68	0.68
Small Grains Spring	2.11	3.35	5.58	6.4	2.36	0	0	0	0	0	0	0	19.8
Small Vegetables Fall	0	0	0	0	0	0	0	0	0	1.27	1.58	1.72	4.57
Small Vegetables Spring	2.32	2.99	4.93	5.54	0	0	0	0	0	0	0	0	15.79
Small Vegetables Spring Late	1.77	2.33	4.62	5.96	3.65	0.9	0	0	0	0	0	0	19.23
Spring Melons	0	2.2	4.45	6.79	7.67	0	0	0	0	0	0	0	21.1
Sudan	0	0	0	2.85	8	10.17	9.85	8.58	0	0	0	0	39.44
Sugar Beets (Summer)	2.47	3.19	5.31	6.9	5.96	0.16	0	0	0	0	0	0	23.99
Sugar Beets Fall	0	0	0	0	0	0	0	0	0.77	1.65	1.64	1.96	6.02
Tomatoes	0	1.85	4.29	7.88	9.11	3.79	0	0	0	0	0	0	26.93
Wildlife Forage Maintained	2.27	3.55	5.92	7	3.35	0.31	0	0	0	0	0.04	0.93	23.38

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Open Water	1.98	2.88	5.15	7.00	8.38	9.26	9.06	8.14	6.63	4.47	2.30	1.52	66.77

Riparian Types	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
USGS barren	0.47	0.53	0.7	0.92	1.11	1.22	1.18	1.06	0.88	0.65	0.47	0.4	9.59
Cottonwood/Willow	0.77	0.99	2.39	5.06	8.04	9.14	8.86	7.96	6.61	4.12	1.5	0.47	55.93
marsh	0.61	0.78	3.93	8	9.68	10.69	10.36	9.31	7.67	2.71	0.66	0.51	64.9
Mixed Veg Low	0.48	0.64	1.61	3.11	4.53	5.03	4.88	4.3	2.95	1.56	0.63	0.41	30.14
Mixed Veg Medium	0.7	0.91	1.86	3.13	4.32	4.8	4.63	3.74	2.61	1.48	0.79	0.61	29.57
Salt Cedar Dense	0.52	0.67	1.43	3.41	5.84	6.81	6.59	5.93	4.9	2.7	0.95	0.45	40.2

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Yuma Area ET Rate Table
(Inches)
2013

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Reference ET	2.95	3.44	5.46	7.36	8.41	9.17	9.38	8.36	6.97	5.23	3.12	2.84	72.69
Precipitation	0.85	0.02	0.08	0	0	0	0.94	1.12	1.06	0	1.39	0.09	5.55

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Alfalfa	2.18	3.48	4.67	5.95	6.99	8.19	8.58	7.43	5.74	5.52	2.66	3.02	64.42
Bermuda	0	0	0	3.09	6.83	7.76	7.93	6.98	5.67	0.35	0	0	38.6
Bermuda Overseeded with Rye in Winter	2.62	2.94	4.2	3.09	6.83	7.76	7.93	6.98	5.67	2.42	2.72	2.53	55.69
Citrus - Declining	1.44	1.61	2.45	3.16	3.45	3.66	3.74	3.34	2.84	2.28	1.45	1.41	30.83
Citrus - Mature	2.05	2.3	3.5	4.52	4.93	5.23	5.35	4.77	4.06	3.26	2.07	2.02	44.04
Citrus - Young	1.23	1.38	2.1	2.71	2.96	3.14	3.21	2.86	2.44	1.95	1.24	1.21	26.42
Cotton	0	0	0.85	1.92	3.27	6.21	9	9.38	6.78	1.81	0	0	39.22
Crucifers Fall Early	0	0	0	0	0	0	0	0	0.29	1.84	1.7	2.67	6.5
Crucifers Fall Late	0	0	0	0	0	0	0	0	0	0	1.1	1.54	2.64
Crucifers Spring Early	2.94	0.9	0	0	0	0	0	0	0	0	0	0	3.84
Crucifers Spring Late	2.67	3.44	2.43	0	0	0	0	0	0	0	0	0	8.53
Dates	2.42	2.97	5.25	7.24	8.26	8.96	9.12	8.08	6.71	5.01	2.97	2.69	69.67
Deciduous Orchards	1.13	1.33	2.81	5.16	7.07	7.79	7.97	7.11	5.92	4.45	2.59	1.74	55.07
Fall Melons	0	0	0	0	0	0	0	0	3.44	4.55	3.11	2.53	13.63
Farm Pond	2.63	2.96	4.75	6.99	7.82	7.79	7.6	6.35	5.09	4.08	2.75	2.3	61.11
Field Grain	0	0.64	3.16	8.23	9.99	7.07	0	0	0	0	0	0	29.09
Grapes	0	0.24	1.59	4.74	7.1	7.79	7.6	5.35	1.83	0	0	0	36.23
Irrigated Restoration - Cottonwood/Willow	0.98	1.14	2.6	5.53	8.3	9.33	9.54	8.5	7.09	4.79	1.76	0.66	60.2
Irrigated Restoration - Mixed Veg Low	0.6	0.73	1.76	3.4	4.68	5.14	5.25	4.59	3.16	1.81	0.75	0.58	32.45
Irrigated Restoration - Mixed Veg Medium	0.89	1.04	2.04	3.42	4.46	4.9	4.98	3.99	2.79	1.72	0.94	0.85	32.01
Legume/Solanum Veg.	0	0	0	1.98	5.24	8.93	9.75	3.65	0	0	0	0	29.55
Legume/Solanum Vegetables Fall	0	0	0	0	0	0	0	0	0	1.31	1.91	2.81	6.02
Legume/Solanum Vegetables Spring	3.1	3.56	1.93	0	0	0	0	0	0	0	0	0	8.59
Lettuce Fall Early	0	0	0	0	0	0	0	0	1.91	3.8	2.92	0	8.63
Lettuce Fall Late	0	0	0	0	0	0	0	0	0	0	0	1.98	1.98
Lettuce Spring Early	2.83	1.91	0	0	0	0	0	0	0	0	0	0	4.74
Lettuce Spring Late	1.17	3.02	5.36	0.21	0	0	0	0	0	0	0	0	9.77
Miscellaneous herbs	0	1.26	4.06	8.59	10.33	10.1	2.13	0	0	0	0	0	36.47
Moist Soil Unit	2.95	3.44	5.34	7.25	4.84	3	9.99	9.43	4.68	5.23	3.12	2.84	62.1
Nursery/Greenhouse	1.23	1.38	2.1	2.71	2.96	3.14	3.21	2.86	2.44	1.95	1.24	1.21	26.42
Oil Crops	0	1.26	4.06	8.59	10.33	10.1	2.13	0	0	0	0	0	36.47
Perennial Vegetables	1.2	1.4	2.38	5.27	7.73	8.45	8.65	7.7	5.67	3.39	1.46	1.16	54.48
Root Vegetables	0	0	0	0	0	0	0	0	2.58	3.89	3.27	2.63	12.38
Small Grains Fall	0	0	0	0	0	0	0	0	0	0	0	0.97	0.97
Small Grains Spring	2.67	3.84	6.09	7.01	2.47	0	0	0	0	0	0	0	22.08
Small Vegetables Fall	0	0	0	0	0	0	0	0	0	1.42	1.87	2.43	5.72
Small Vegetables Spring	2.94	3.43	5.38	6.06	0	0	0	0	0	0	0	0	17.82
Small Vegetables Spring Late	2.22	2.67	5.05	6.53	3.79	0.92	0	0	0	0	0	0	21.18
Spring Melons	0	2.52	4.85	7.43	7.92	0	0	0	0	0	0	0	22.72
Sudan	0	0	0	3.12	8.24	10.37	10.61	9.15	0	0	0	0	41.49
Sugar Beets (Summer)	3.13	3.65	5.8	7.54	6.17	0.16	0	0	0	0	0	0	26.46
Sugar Beets Fall	0	0	0	0	0	0	0	0	0.85	1.9	1.95	2.77	7.47
Tomatoes	0	2.12	4.68	8.62	9.41	3.93	0	0	0	0	0	0	28.75
Wildlife Forage Maintained	2.87	4.08	6.47	7.67	3.49	0.33	0	0	0	0	0.05	1.32	26.27

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Open Water	2.51	3.3	5.62	7.65	8.66	9.45	9.76	8.69	7.11	5.18	2.71	2.13	72.78

Riparian Types	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Barren	0.59	0.61	0.77	1	1.14	1.25	1.28	1.14	0.95	0.75	0.55	0.57	10.59
Cottonwood/Willow	0.98	1.14	2.6	5.53	8.3	9.33	9.54	8.5	7.09	4.79	1.76	0.66	60.2
Marsh	0.77	0.89	4.28	8.75	10	10.9	11.15	9.94	8.22	3.19	0.78	0.71	69.59
Mixed Veg Low	0.6	0.73	1.76	3.4	4.68	5.14	5.25	4.59	3.16	1.81	0.75	0.58	32.45
Mixed Veg Medium	0.89	1.04	2.04	3.42	4.46	4.9	4.98	3.99	2.79	1.72	0.94	0.85	32.01
Salt Cedar Dense	0.66	0.77	1.56	3.72	6.02	6.94	7.1	6.33	5.25	3.13	1.11	0.64	43.24

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IID and Coachella Area ET Rate Table
(Inches)
2013

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Reference ET	2.64	3.61	6.01	7.64	8.32	8.87	7.91	7.50	6.67	5.16	2.85	2.41	69.59
Precipitation	0.53	0.08	0.08	0.05	0.05	0.12	0.07	1.02	0.28	0.01	0.51	0.02	2.82

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Alfalfa	2.15	4.2	4.7	6.06	6.61	7.1	6.53	6.38	5.25	5.98	2.48	2.8	60.26
Aloe	1.1	1.45	2.31	2.81	2.92	3.03	2.71	2.57	2.33	1.93	1.14	1.03	25.32
Bermuda	0	0.09	5.29	7.33	7.99	8.52	7.59	7.2	5.9	0.66	0	0	50.58
Bermuda Overseeded with Rye in Winter	2.31	3.47	5.77	7.33	7.99	8.52	7.59	7.2	5.9	0.66	0	0.12	56.87
Cane/Bamboo	0.69	0.94	4.76	9.08	9.89	10.55	9.4	8.92	7.87	3.11	0.71	0.6	66.52
Citrus - Declining	1.29	1.69	2.7	3.28	3.41	3.54	3.16	2.99	2.72	2.25	1.33	1.2	29.55
Citrus - Mature	1.84	2.41	3.85	4.69	4.87	5.06	4.51	4.27	3.89	3.21	1.89	1.71	42.21
Citrus - Young	1.1	1.45	2.31	2.81	2.92	3.03	2.71	2.57	2.33	1.93	1.14	1.03	25.32
Cotton	0	0.08	1.71	2.11	4.08	7.23	8.92	7.55	3.66	0.57	0	0	35.9
Cottonwood/Willow	0.87	1.19	2.88	5.74	8.23	9.02	8.04	7.63	6.78	4.72	1.61	0.56	57.29
Crucifers Fall Early	0	0	0	0	0	0	0	3.21	2.85	5.06	3.42	2.32	16.86
Crucifers Fall Late	0	0	0	0	0	0	0	0	2.61	1.8	2.51	2.89	9.81
Crucifers Spring Early	0.77	0.03	0	0	0	0	0	0	0	0	0	0	0.8
Crucifers Spring Late	2.74	1.35	0.17	0	0	0	0	0	0	0	0	0	4.26
Dates	2.17	3.11	5.79	7.52	8.17	8.66	7.69	7.25	6.42	4.94	2.71	2.28	66.71
Deciduous Orchards	1.01	1.4	3.1	5.36	7	7.54	6.72	6.38	5.67	4.39	2.37	1.48	52.41
Fall Melons	0	0	0	0	0	0	0.55	3.82	3.93	5.39	2.95	1.66	18.29
Farm Pond	2.82	3.86	6.43	8.17	8.9	9.49	8.46	8.03	7.14	5.52	3.05	2.58	74.46
Field Grain	0	0.93	2.87	7.58	9.95	9.31	3.1	0.3	0	0	0	0	34.04
Grapes	0	0.24	1.77	4.92	7.02	7.53	6.39	4.85	1.7	0	0	0	34.43
Irrigated Restoration - Cottonwood/Willow	0.87	1.19	2.88	5.74	8.23	9.02	8.04	7.63	6.78	4.72	1.61	0.56	57.29
Irrigated Restoration - Mixed Veg Low	0.54	0.77	1.94	3.53	4.63	4.97	4.43	4.13	3.01	1.78	0.68	0.49	30.91
Irrigated Restoration - Mixed Veg Medium	0.79	1.1	2.25	3.55	4.42	4.74	4.2	3.59	2.66	1.7	0.86	0.72	30.56
Jojoba Beans	2.9	3.8	3.56	0.21	3.94	7.36	8.69	8.25	7.34	5.68	3.14	2.65	57.51
Legume/Solanum Veg.	0	0	2.46	4.95	9.78	8.4	3.38	0.14	0	0	0	0	29.11
Legume/Solanum Vegetables Fall	0	0	0	0	0	0	0	0	0	1.18	1.32	2.41	4.9
Legume/Solanum Vegetables Spring	2.89	3.53	5.71	2.14	0	0	0	0	0	0	0	0	14.26
Lettuce Fall Early	0	0	0	0	0	0	0	0	0	3.82	3.04	2.57	9.44
Lettuce Fall Late	0	0	0	0	0	0	0	0	0	0.25	2.4	2.57	5.23
Lettuce Spring Early	2.82	1.24	0.02	0	0	0	0	0	0	0	0	0	4.07
Lettuce Spring Late	2.82	3.86	6.03	0.89	0	0	0	0	0	0	0	0	13.59
Miscellaneous herbs	0.17	1.74	4.2	9.02	7.72	3.83	0.3	0	0	0	0	0	26.98
Moist Soil Unit	2.64	3.61	5.89	7.54	4.63	2.88	8.45	8.49	4.38	5.16	2.85	2.41	58.93
Nursery/Greenhouse	1.1	1.45	2.31	2.81	2.92	3.03	2.71	2.57	2.33	1.93	1.14	1.03	25.32
Oil Crops	0.17	1.74	4.2	9.02	7.72	3.83	1.85	0	0	0	0	0	28.53
Perennial Vegetables	0.53	0.01	1.74	3.82	7.68	8.43	7.51	7.12	6.34	4.9	2.71	2.01	52.8
Root Vegetables	0.54	0.01	0	0	0	0	0	0	0.77	1.87	2.55	2.54	8.27
Salt Cedar Dense	0.59	0.81	1.73	3.87	5.98	6.71	5.99	5.68	5.02	3.08	1.02	0.54	41.02
Small Grains Fall	0	0	0	0	0	0	0	0	0	0	0.05	1.11	1.16
Small Grains Spring	2.57	4.28	7.12	7.96	3.37	0.31	0	0	0	0	0	0	25.59
Small Vegetables Fall	0	0	0	0	0	0	0	0	0.12	1.9	1.81	2.36	6.18
Small Vegetables Spring	2.8	3.67	5.46	5.88	0.88	0	0	0	0	0	0	0	18.69
Small Vegetables Spring Late	2.01	2.8	5.56	6.77	3.69	0.88	0	0	0	0	0	0	21.73
Spring Melons	0.11	1.71	6.09	7.64	5.4	0.94	0	0	0	0	0	0	21.9
Sudan	0	0	0.29	3.22	8.39	10.57	8.03	4.02	0.22	0	0	0	34.72
Sugar Beets (Summer)	3.01	4.11	6.52	7.41	5.41	2.36	0.26	0	0	0	0	0	29.09
Sugar Beets Fall	0	0	0	0	0	0	0	0	0.2	1.95	1.61	2.37	6.12
Tomatoes	0.17	1.74	4.2	9.02	7.72	3.83	0.3	0	0	0	0	0	26.98
Wildlife Forage Maintained	2.57	4.28	7.12	7.96	3.37	0.31	0	0	0	0	0.05	1.11	26.76

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Open Water	2.82	3.86	6.43	8.17	8.90	9.49	8.46	8.03	7.14	5.52	3.05	2.58	74.46
All American Canal*	2.24	3.47	6.19	7.95	8.57	9.14	8.23	7.8	6.8	5.11	2.48	1.81	69.78

*Imperial to Morelos Kc data and Yuma area weather data used for these calculations

Riparian Types	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Barren	0.53	0.64	0.84	1.04	1.13	1.21	1.08	1.02	0.91	0.74	0.51	0.48	10.11
Marsh	0.69	0.94	4.76	9.08	9.89	10.55	9.4	8.92	7.87	3.11	0.71	0.6	66.52
Mixed Veg Low	0.54	0.77	1.94	3.53	4.63	4.97	4.43	4.13	3.01	1.78	0.68	0.49	30.91
Mixed Veg Medium	0.79	1.1	2.25	3.55	4.42	4.74	4.2	3.59	2.66	1.7	0.86	0.72	30.56

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Appendix 3: Maps of the Program Area

This appendix contains the following maps:

1. Map 1. Program area, reach boundaries.
2. Map 2. Program area, Hoover Dam to Davis Dam.
3. Map 3. Program area, Davis Dam to Parker Dam.
4. Map 4. Program area, Parker Dam to Imperial Dam.
5. Map 5. Program area, Imperial Dam to Mexico.

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PROGRAM AREA ALONG THE COLORADO RIVER

Reach Boundaries

- Dams
- Reach Boundaries
- Riparian
- Agriculture

HOOVER DAM

NEVADA

Hoover Dam to Davis Dam

DAVIS DAM

ARIZONA

Davis Dam to Parker Dam

CALIFORNIA

Bill Williams River (NCR)

PARKER DAM

PALO VERDE DIVERSION DAM

Parker Dam to Imperial Dam

* NCR (Non-Colorado River). The origin of water used for agricultural irrigation and by riparian vegetation and open water areas is considered to be from sources other than the Colorado River.

Salton

IMPERIAL DIVERSION DAM

Gila River Valley

MEXICO

Imperial Dam to Mexico

Imperial Dam to Mexico (NCR)

Gila River Valley (NCR)

N

0 5 10 20 30 40 Miles

RECLAMATION
Managing Water in the West

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PROGRAM AREA ALONG THE COLORADO RIVER
Hoover Dam to Davis Dam

0 3 6 9 12 Miles

HOOVER DAM

DAVIS DAM

Dams

Reach Boundary

State Boundaries

1) Lake Mead National Recreation Area, NV (Hoover Dam to Davis Dam)

2) Lake Mead National Recreation Area, AZ (Hoover Dam to Davis Dam)

1

2

NEVADA

ARIZONA

Lake Mead

Lake Mohave

Boulder City

Nelson

Searchlight

Searchlight Airport

White Hills

Dolan Springs

Golden Valley

Chloride

Cal-Nev-Ari

Laughlin/Bullhead International Airport

A3-2

N

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PROGRAM AREA ALONG THE COLORADO RIVER
Davis Dam to Parker Dam

0 3 6 9 12 Miles

Dams

Reach Boundary

State Boundaries

1) Lake Mead National Recreation Area, NV (Davis Dam to Parker Dam)

2) Lake Mead National Recreation Area, AZ (Davis Dam to Parker Dam)

3) State of Nevada (Davis Dam to Parker Dam)

4) State of Arizona (Davis Dam to Parker Dam)

5) Ft Mohave Indian Reservation, NV

6) Ft Mohave Indian Reservation, AZ

7) Mohave Valley Irrigation and Drainage District, AZ

8) State of California (Davis Dam to Parker Dam)

9) Ft Mohave Indian Reservation, CA

10) Havasu National Wildlife Refuge, AZ

11) Havasu National Wildlife Refuge, CA

12) Chemehuevi Indian Reservation, CA

13) Lake Havasu State Park, AZ

14) Bill Williams River National Wildlife Refuge, AZ

NEVADA

ARIZONA

CALIFORNIA

PARKER DAM

N

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PROGRAM AREA ALONG THE COLORADO RIVER
Parker Dam to Imperial Dam

0 6 12 18 24 Miles

PARKER DAM

PALO VERDE DIVERSION DAM

IMPERIAL DIVERSION DAM

Bill Williams River (NCR)

CALIFORNIA

ARIZONA

Dams

Reach Boundaries

State Boundaries

1) State of California (Parker Dam to Imperial Dam)

2) State of Arizona (Parker Dam to Imperial Dam)

3) Colorado River Indian Reservation, CA

4) Colorado River Indian Reservation, AZ

5) Palo Verde Irrigation District, CA

6) Rayner Ranches, AZ

7) North Baja Pipeline, LLC (TransCanada)

8) Arizona State Land Department, AZ (Parker Dam to Imperial Dam)

9) Cibola Valley Irrigation and Drainage District, AZ

10) Arizona Game and Fish Commission

11) Hopi Tribe

12) GSC

13) Cibola National Wildlife Refuge, CA

14) Cibola National Wildlife Refuge, AZ

15) Imperial National Wildlife Refuge, CA

16) Imperial National Wildlife Refuge, AZ

17) Lake Enterprises of California, LLC, CA

18) Yuma Proving Ground, AZ

19) Bill Williams River National Wildlife Refuge, AZ (NCR)

20) State of Arizona, Alamo Dam to Bill Williams River NWR (NCR)

N

* NCR (Non-Colorado River) - The origin of water used for agricultural irrigation and by riparian vegetation and open water areas is considered to be from sources other than the Colorado River.

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PROGRAM AREA ALONG THE COLORADO RIVER
Imperial Dam to Mexico

0 3 6 9 12 Miles

IMPERIAL DIVERSION DAM

Imperial Dam to Mexico

CALIFORNIA

ARIZONA

Gila River Valley (NCR)

Gila River Valley

Gila River Valley

Northerly International Boundary

Southerly International Boundary

MEXICO

* NCR (Non-Colorado River) - The origin of water used for agricultural irrigation and by riparian vegetation and open water areas is considered to be from sources other than the Colorado River.

- Dams
- 1) State of California (Imperial Dam to Mexico)
- 2) State of Arizona (Imperial Dam to Mexico)
- 3) Mittry Lake Management Area, AZ
- 4) Ft Yuma Indian Reservation, AZ
- 5) BLM (Pratt), AZ
- 6) BLM
- 7) Ft Yuma Indian Reservation, CA
- 8) North Gila Valley Irrigation District, AZ
- 9) Yuma Project Reservation Division, Bard Unit, CA
- 10) Ft Yuma Indian Reservation, CA Ranch 1
- 11) Ft Yuma Indian Reservation, CA Ranch 2, Parcel 3
- 12) Ft Yuma Indian Reservation, CA Ranch 3
- 13) Ft Yuma Indian Reservation, CA Ranch 15
- 14) Ft Yuma Indian Reservation, CA Ranch 4
- 15) Ft Yuma Indian Reservation, CA Ranch 7
- 16) AZ State Trust Lands, CA
- 17) Yuma Project Reservation Division, Indian Unit, CA
- 18) Arizona State Land Department, AZ (Imperial Dam To Mexico)
- 19) Cha Cha, LLC, AZ
- 20) Beattie Farms Southwest, AZ
- 21) JRJ Partners, LLC, AZ
- 22) Ft Yuma Indian Reservation, CA, Ranch 5
- 23) Ft Yuma Indian Reservation, AZ Ranch 5
- 24) Gila Monster Farms, AZ
- 25) Yuma Irrigation District, AZ
- 26) Ogram, George, AZ
- 27) Ogram Boys Enterprises Inc., AZ
- 28) John Peach
- 29) City of Yuma, AZ (Yuma East Wetlands)
- 30) Ft Yuma Indian Reservation, AZ, Yuma East Wetlands
- 31) BLM (Monty Lee)
- 32) Curtis, Armon, AZ
- 33) Ft Yuma Indian Reservation, CA Ranch 17
- 34) North Cocopah Indian Reservation, AZ Fee
- 35) Power
- 36) R. Griffin
- 37) Milton Phillips
- 38) Griffin Ranches
- 39) Victor Power
- 40) North Cocopah Indian Reservation, AZ
- 41) Pasquinelli, Gary and Barbara, AZ
- 42) Yuma County Water Users Association, AZ
- 43) State of Arizona, Limitrophe
- 44) West Cocopah Indian Reservation, AZ
- 45) Ft Yuma Indian Reservation, AZ & Homesteads
- 46) Yuma Mesa Irrigation and Drainage District, AZ
- 47) University of Arizona, AZ
- 48) Unit B Irrigation and Drainage District, AZ
- 49) Desert Lawn Memorial Park, AZ
- 50) East Cocopah Indian Reservation, AZ
- 51) State of Arizona, Down Gradient of YMIDD
- 52) Hillander C, AZ (NCR)
- 53) State of Arizona, Gila River Valley (NCR)
- 54) Wellton-Mohawk Irrigation and Drainage District, AZ
- 55) West Cocopah Indian Reservation, AZ (NCR)
- Reach Boundaries
- State Boundaries

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