

**TECHNICAL PAPER A-3**  
**DEVELOPMENT OF PROJECTED AGRICULTURAL DEMANDS**  
**FOR DOWNSTREAM IRRIGATION OPERATIONS**  
**January 2026**

LCRA supplies water for agricultural irrigation to four canal operations in the lower Colorado River basin as shown on Exhibit 1. For this revision to the LCRA Water Management Plan (WMP), future agricultural demands were primarily set based on recent per acre use (“duty”) for rice irrigation from the Lower Colorado River’s on-farm metering program that began in 2011. (Note, the use of the term “duty” in this technical paper is in a general sense as a shorthand for “per acre use” and does not imply a specific limit on water use.) On-farm duty measurements were used to develop weather-varied demands based on relationships of on-farm duty to an observed weather dataset that spans the period of record of the Water Availability Model (WAM). This approach allows for the development of a weather-varied demand dataset that reflects current farming practice and covers the entire period of record of the LCRA WMP WAM model (1940-2023). The demand volumes were calculated by multiplying the on-farm duty by a set acreage. The acreage was set to the highest first season (March-July) acreage for each agricultural operation from 2011-2023 as presented in Table 1. The demands for irrigation operations also include non-rice demands and canal losses where applicable. More detail is provided below.

**Table 1. Modeled Rice Acreage**  
**(Highest Historical First Season Acreage 2011-2023)**

<b>Irrigation Operation</b>	<b>First Season Acreage</b>
Garwood	20,785
Gulf Coast	18,316
Lakeside	27,554
Pierce Ranch	6,792

**Weather-Varied On-Farm Duty and On-Farm Demand Volume**

As in prior WMPs, correlations between agricultural rice demands and weather conditions were evaluated separately for each irrigation operation. For this WMP update, during years of operation, net evaporation (TWDB Quadrangle 811; gross evaporation minus precipitation) was found to be well correlated with recent on-farm duty from 2011-2023 for the first season (March-July). Regression equations were developed based on these correlations and subsequently used to produce weather-varied on-farm duties for each irrigation operation for each first season for the period 1940-2023<sup>1</sup>. These values are reflective of expected on-farm duty under current farming practice given the historic weather over the WAM period of simulation (1940-2023). The first season rice demand volumes for each operation were

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<sup>1</sup> Pierce Ranch on-farm duty was calculated based on the average of Garwood and Lakeside on-farm duty because on-farm duty measurements are not available for Pierce Ranch.

calculated by multiplying the operation's on-farm duty (1940-2023) for first season by the acreages in Table 1.

When water is available for a second agricultural season, the amount of acreage cultivated and water use volumes in a given operation during second irrigation season is related to the first season acreage and water use. For purposes of developing demands for this WMP update, for each operation, second season on-farm total water volumes (August through October) were found to be well correlated with first season on-farm use volumes. As a result, the second season demands were developed based on these correlations rather than the on-farm duty approach used for first season. The second season operation-wide on-farm use volume for Garwood, Lakeside, and Gulf Coast were calculated using a regression model with the respective first season operation-wide on-farm use volume as an input. Second season water use for Pierce Ranch was set to the lesser of 51.5% of its first season operation-wide at-river demand volume or to the remaining amount of the 30,000 acre-feet of annual contract limit. See below for further discussion of demands at the river.

### **Demand at the River**

At-river demand was calculated to account for estimated canal losses of 20% for Lakeside, Garwood and Pierce Ranch, and 30% for Gulf Coast that occur in transit between the river pumps and the farms. (For contracting purposes, the canal losses are determined based on LCRA's drought contingency plan for interruptible agricultural customers and the estimated canal losses are updated periodically to reflect recent measured losses.) The at-river demand is calculated as the operation-wide on-farm volume divided by the respective canal delivery percentage (80% for Lakeside, Garwood and Pierce Ranch, and 70% for Gulf Coast). Garwood irrigation demand at the river was capped at 100,000 acre-feet for the year. As noted above, second season at-river demand for Pierce Ranch was calculated directly from first season at-river demand and set to the lesser of 51.5% of first season operation-wide at-river demand volume or to the remaining amount of the 30,000 acre-feet of annual contract limit.

### **Non-Rice Water Demands**

The operations also use water for non-rice crops such as row crops, hay, turf grass, etc., as well as for wildlife management. Lakeside non-rice demand was set to 2,227 acre-feet over the WAM period of simulation (1940-2023), and Gulf Coast non-rice demand was set to 12,404 acre-feet over the same period. Non-rice demand was set based on the highest non-rice use for each operation from 2011-2022, and was distributed between the first and second seasons using the same fixed percentages used in the 2020 WMP (65% and 35% respectively). These percentages were calculated in the previous WMP update and recent data indicated that a change was not warranted. These demands were applied at the river.

### **WAM Model Demand Volumes**

The annual weather-varied demands at the river for first and second season for each of the four irrigation operations used in the WAM modeling are shown in Figures 1 through 5. For reference purposes, the median and maximum river demands are shown both annually (Table 2), as well as for first and second seasons (Table 3). The demand totals include non-rice demands.

**Table 2. Weather-Varied Annual Demands at the River for Downstream Agricultural Operations (in acre-feet)**

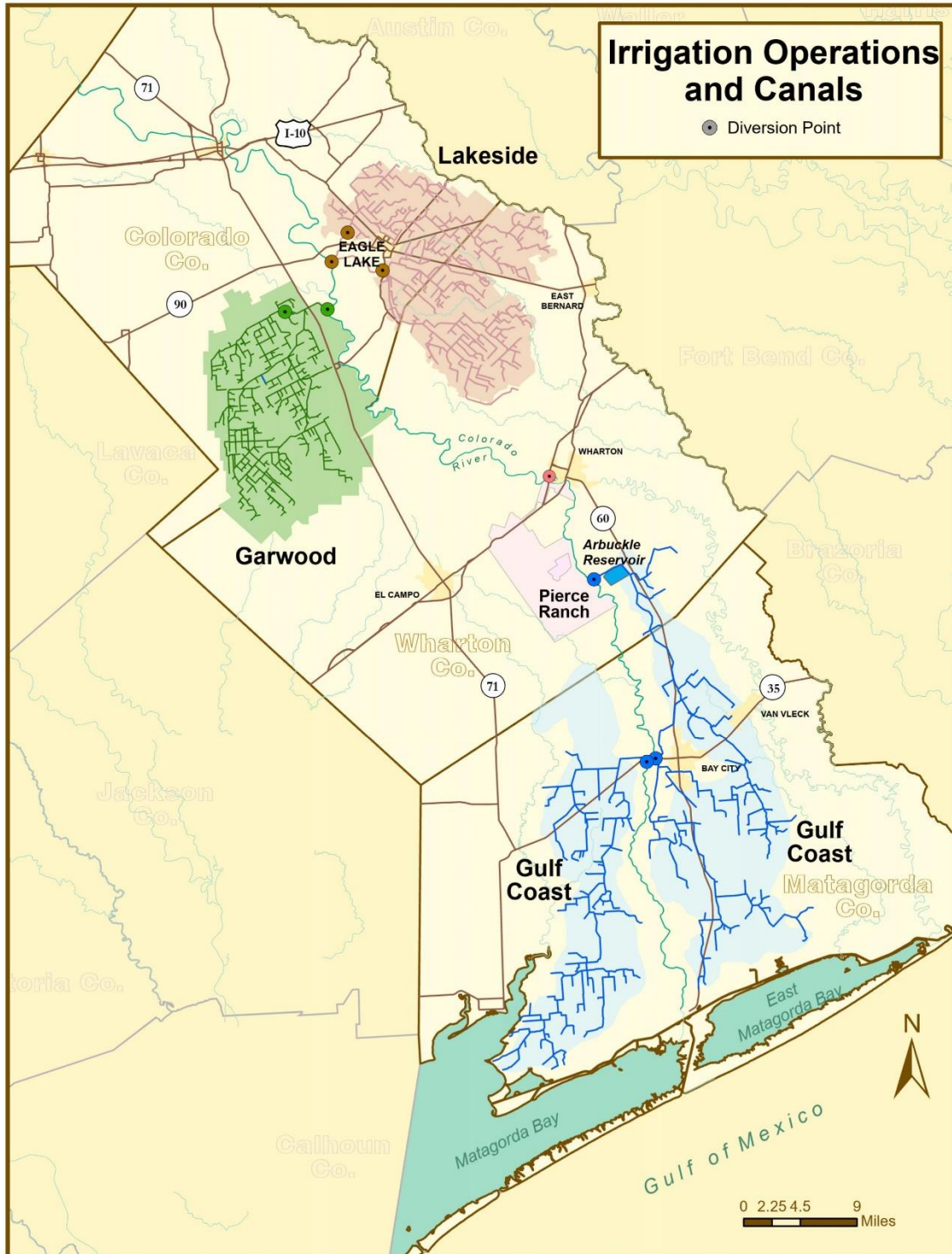
<b>Irrigation Operation</b>	<b>Median</b>	<b>Maximum</b>
Garwood	83,900	100,000
Gulf Coast	111,300	151,000
Lakeside	87,500	140,200
Pierce Ranch	25,200	30,000

**Table 3. Weather-Varied Seasonal Demands at the River for Downstream Agricultural Operations (in acre-feet)**

<b>Irrigation Operation</b>	<b>First Season</b>		<b>Second Season</b>	
	<b>Median</b>	<b>Maximum</b>	<b>Median</b>	<b>Maximum</b>
Garwood	58,300	73,000	25,600	27,000
Gulf Coast	76,800	101,700	34,600	49,300
Lakeside	65,500	111,600	22,000	28,600
Pierce Ranch	17,400	25,500	7,600	9,100

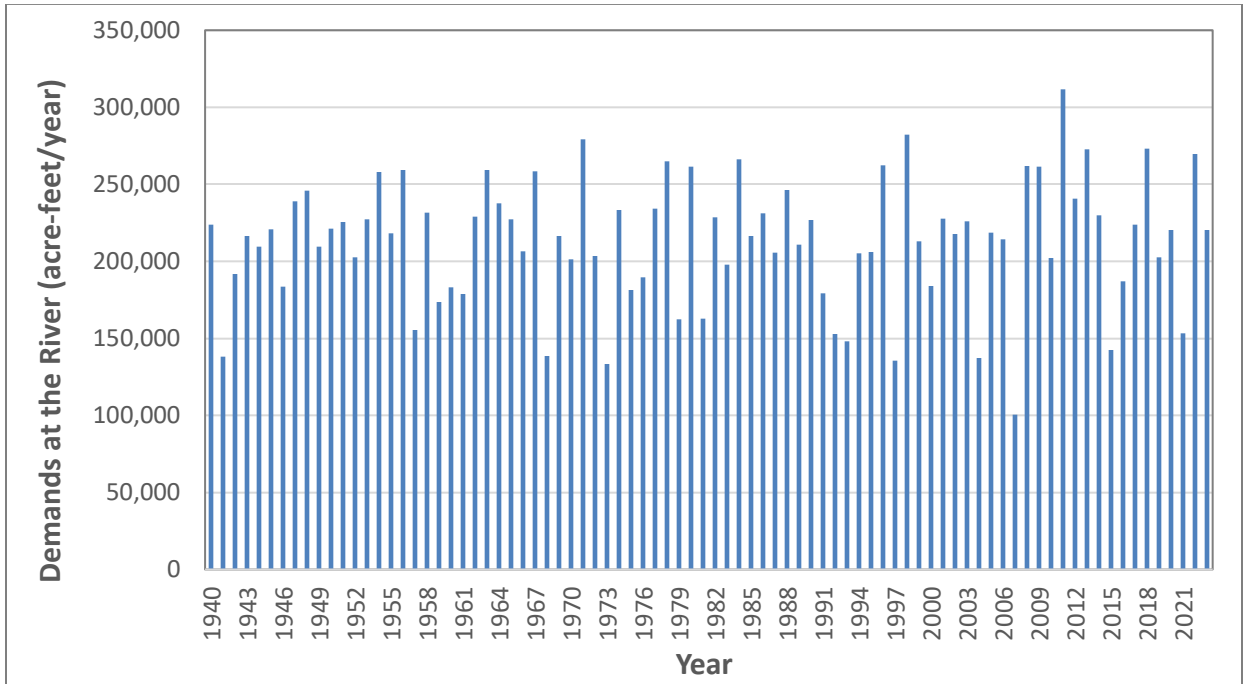
The weather-varied agricultural demands are inputs for the WMP WAM simulations, representing non-curtailed demands for each year of the simulation. The weather-varied demands do not reflect reduced planting that may occur under limited supply conditions. Any reduced plantings due to curtailments are simulated within the WAM modeling logic based on reductions in available supply.

# Exhibit 1. Irrigation Operations and Diversion Points

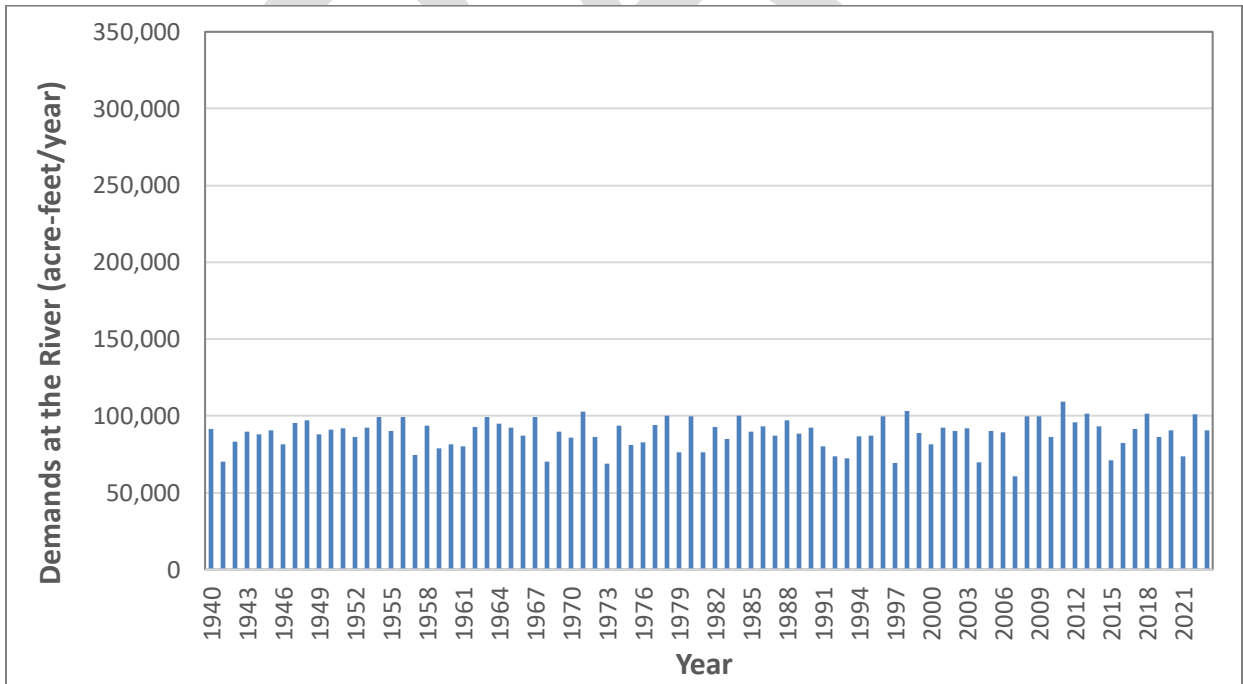


Map Document: (V:\WaterCol\Project\Irrigation\irrigation\_districts\all\_dist\_poster\_8x11.mxd) 09/23/2025 -- 10:19:54 AM

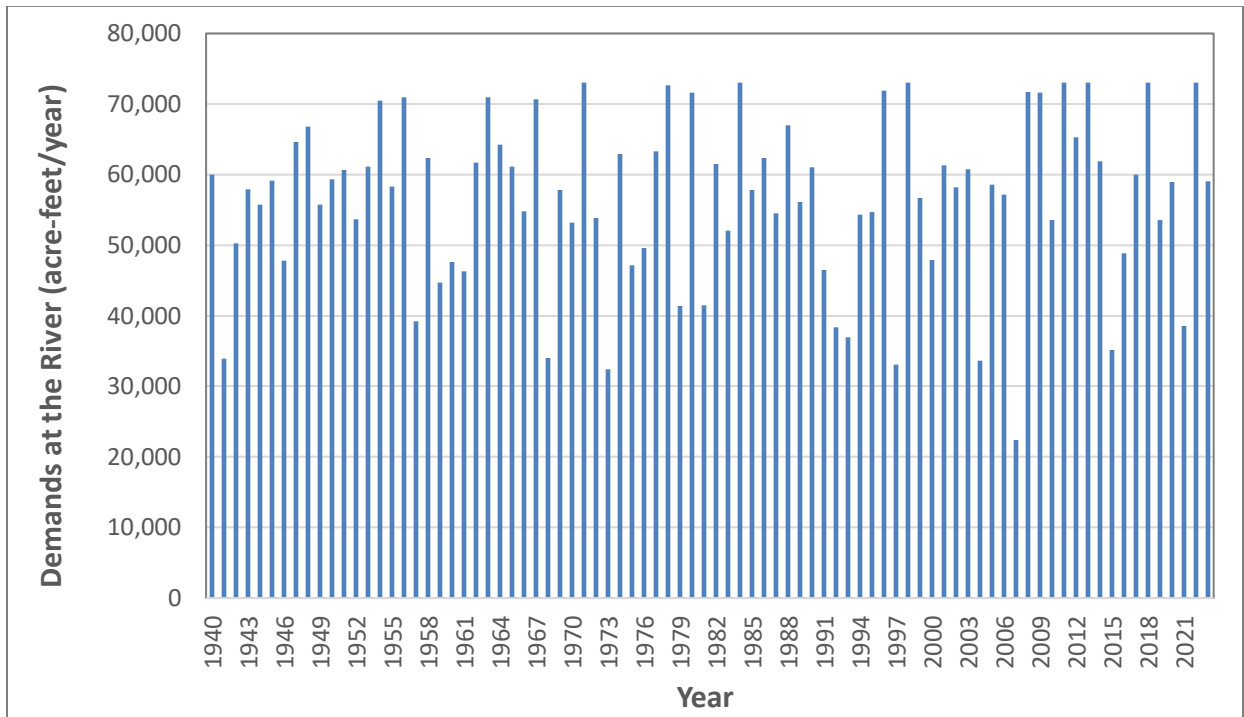
**Figure 1. Weather-Varied Total Agricultural Demands – First Season**



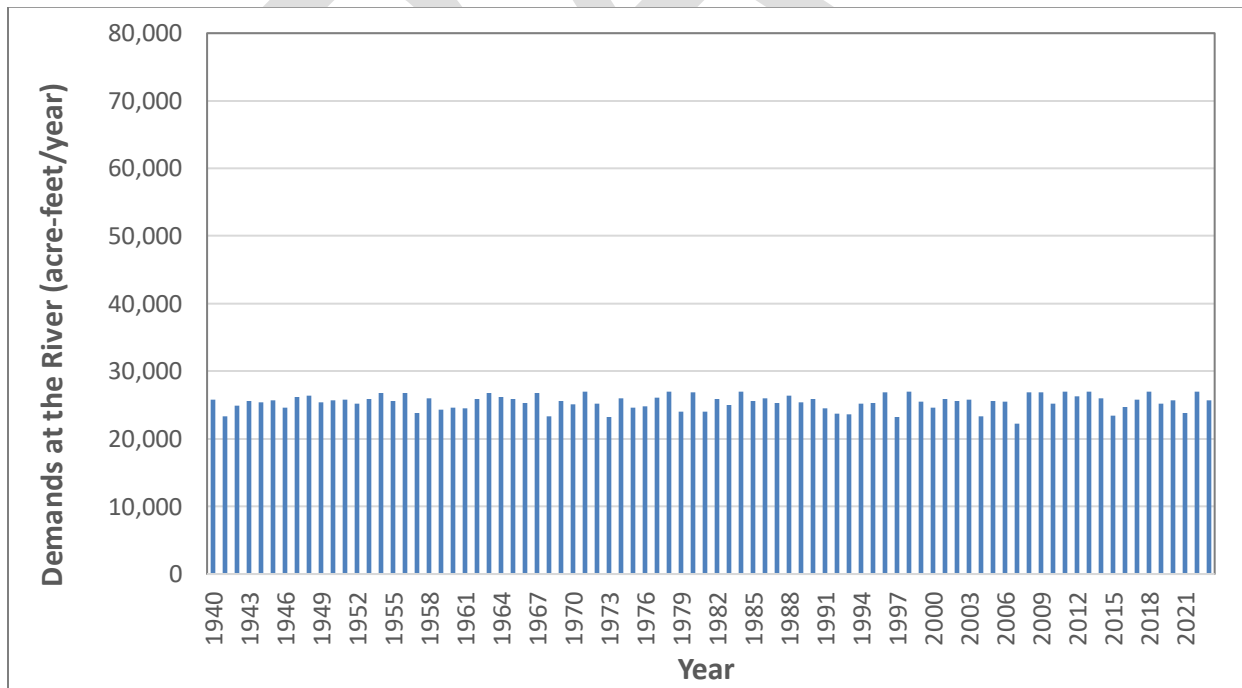
**Figure 2. Weather-Varied Total Agricultural Demands – Second Season**



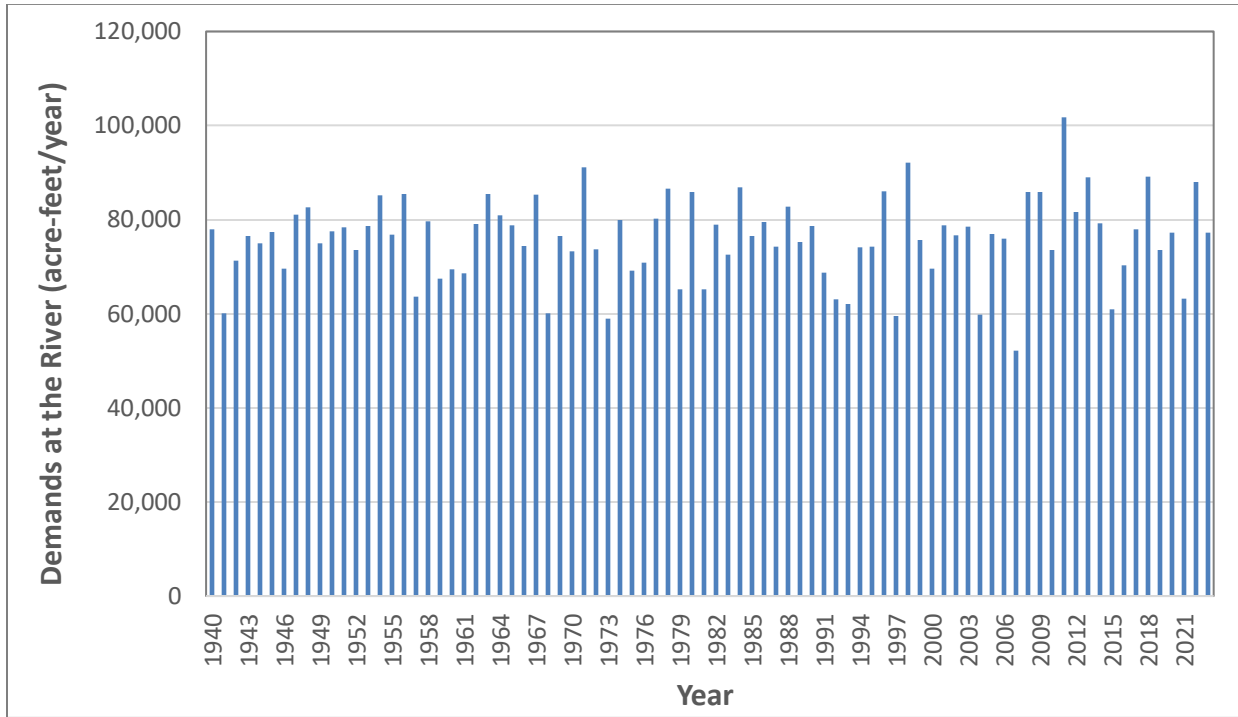
**Figure 3. Weather-Varied Garwood Demands – First Season**



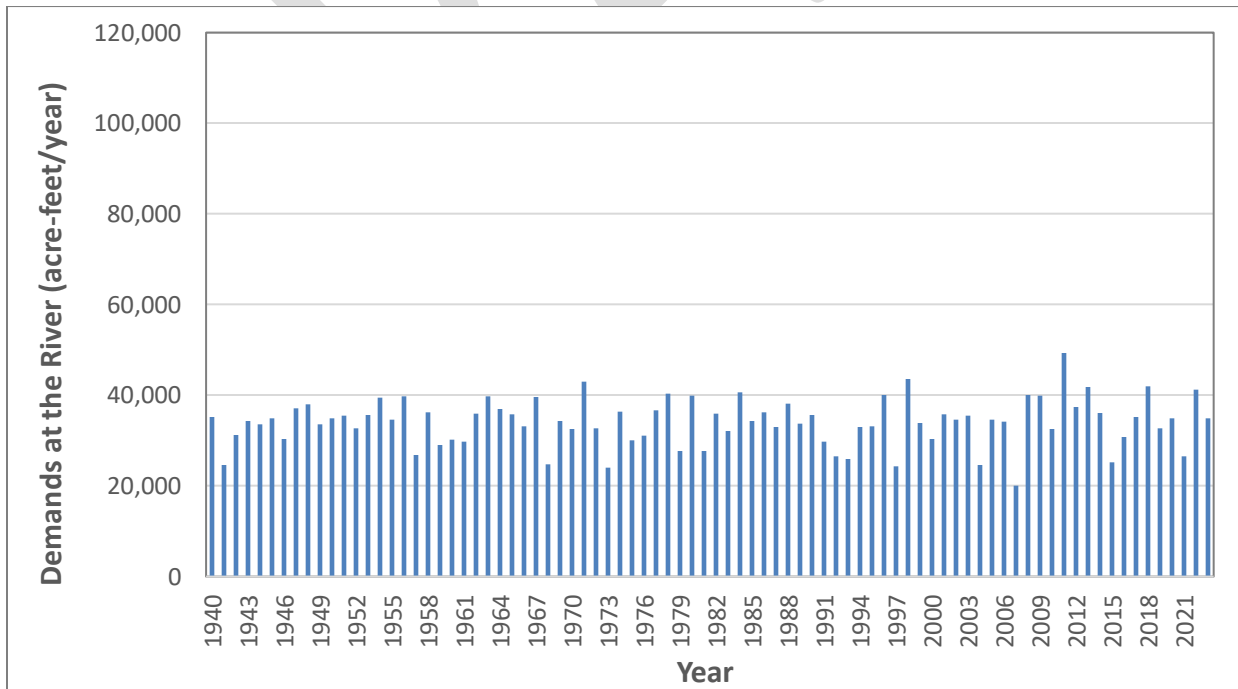
**Figure 4. Weather-Varied Garwood Demands – Second Season**



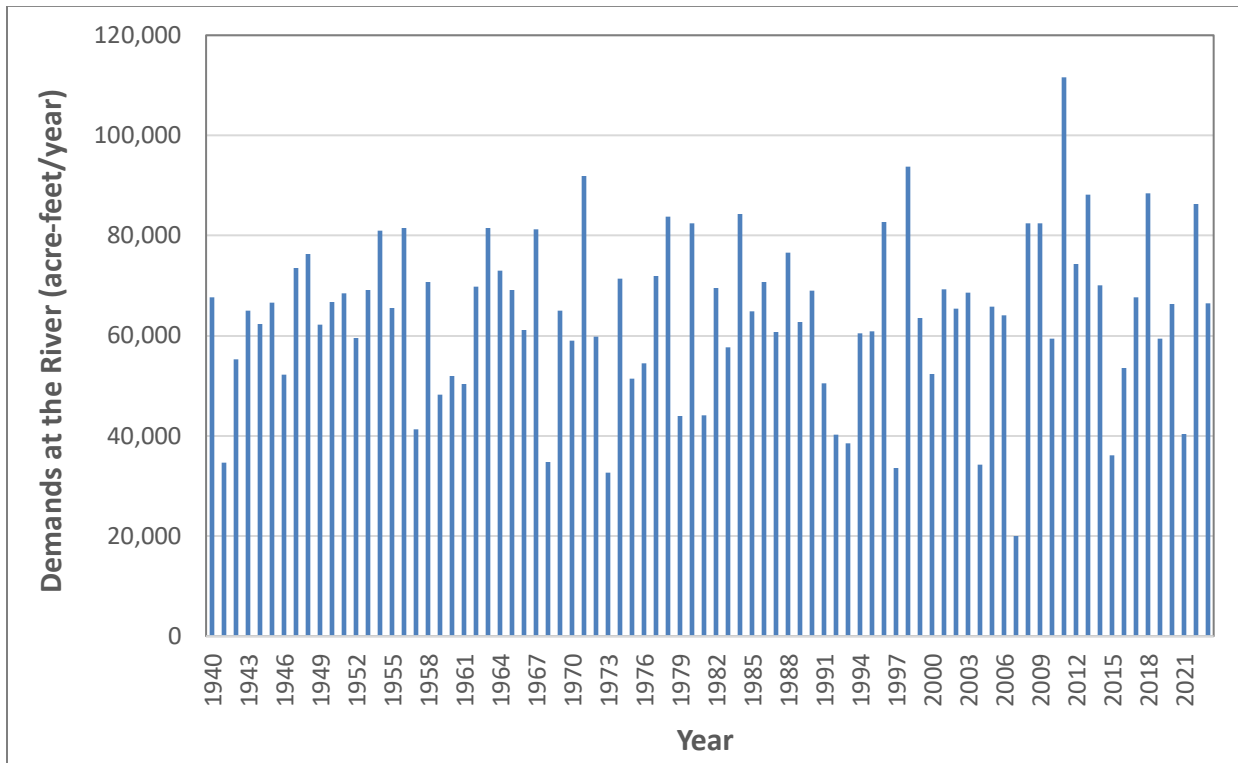
**Figure 5. Weather-Varied Gulf Coast Demands – First Season**



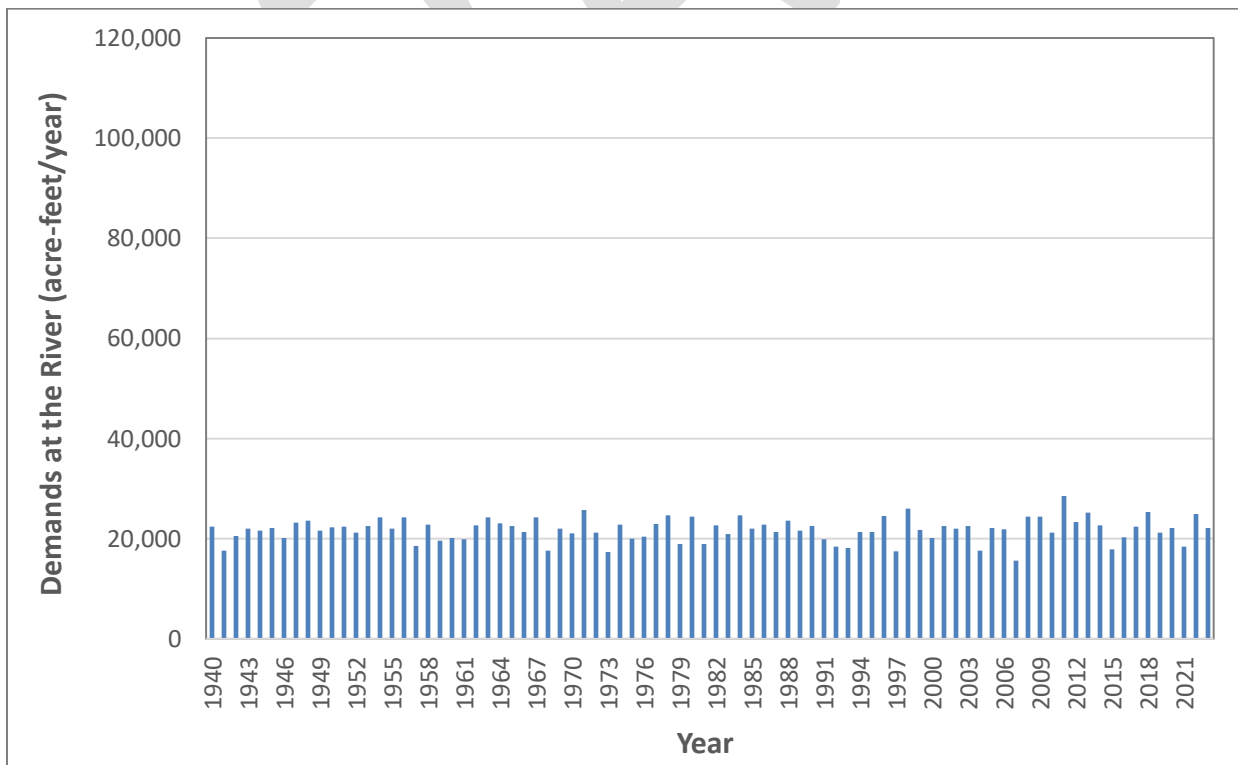
**Figure 6. Weather-Varied Gulf Coast Demands – Second Season**



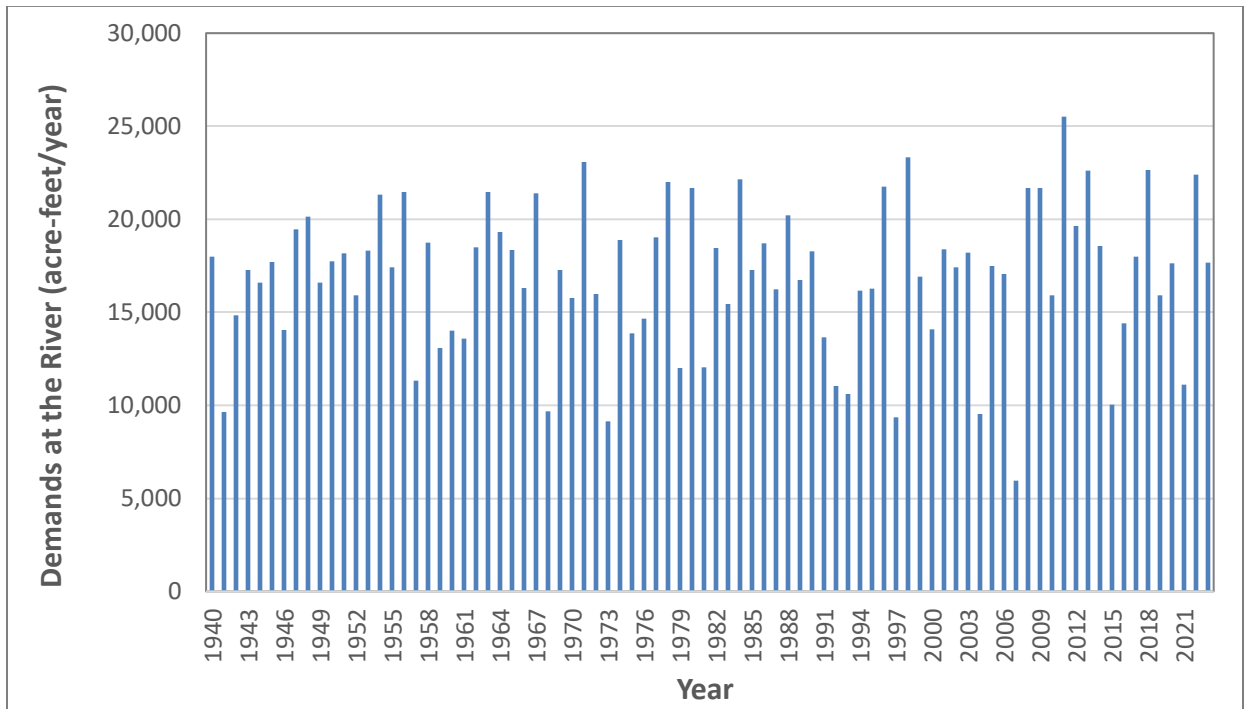
**Figure 7. Weather-Varied Lakeside Demands – First Season**



**Figure 8. Weather-Varied Lakeside Demands – Second Season**



**Figure 9. Weather-Varied Pierce Ranch Demands – First Season**



**Figure 10. Weather-Varied Pierce Ranch Demands – Second Season**

