Summit/MVIC Feasibility Study

# Summit Reservoir & Irrigation Co.
# Montezuma Valley Irrigation Co.

## *Feasibility Study*

***October 2010***

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## PURPOSE OF STUDY

This study contemplated the potential for combining the operations of the two private irrigation companies, Summit Reservoir and Irrigation Company (Summit) and the Montezuma Valley Irrigation Company (MVIC). This phase of the project will analyze and outline the benefits and drawbacks associated with a potential merger of the companies based on a perspective of water rights and water planning. The results and findings will provide a platform for shareholders in both companies to evaluate if the concept of merger warrants additional study and effort or whether the concept should be abandoned.

From our understanding, the concept of merging the two companies does not necessarily mean dissolution of one company. Rather, the concept may simply involve coordination between the two companies on operations, use of facilities and structures, and maximizing use of the available water. It is envisioned that Summit could potentially benefit from assistance from MVIC particularly with regard to use of available construction equipment for regular on-going maintenance or repairs. Long-term, cooperation between the companies may evolve into coordination, development, and use of existing and future facilities for delivery and storage of water.

In developing our evaluation, we held discussions with various individuals to gain their insights into the specific company operations, water right administration, and basin needs. Contacts included:

- Summit Board members: Norman Butler (President), John McHenry, Steve Wallace, David Sanford (Secretary), Steve Boyd (Ditch Rider)
- MVIC: Randy Carver (President), Jim Siscoe (General Manager)
- State Engineer's Office: Rege Leach, Denise Miller, Marty Robbins
- Dolores Water Conservancy District: Mike Preston (General Manager), Ken Curtis, Don Schwindt
- Mr. John Porter
- Steve Harris, Harris Engineering

We reviewed numerous documents in completing this study which included water right decrees, records, summaries, and reports that were available from various sources or were provided to us. These sources included information available from the State Engineer's Office, documents provided by the Summit Reservoir and Irrigation Company, reports from Harris Engineering, and information provided by the Montezuma Valley Irrigation Company. We also researched available data concerning the related operations, particularly with regard to diversions for irrigation and storage, and where needed, we conducted preliminary engineering investigations with regard to potential water use, demands, and operations.

The concept of coordination between Summit and MVIC will also need to consider potential impacts upon other area water users and in particular, the effect upon the Dolores Project. In completing this evaluation, consideration will be given to understanding not only the Summit and MVIC operations, but also the Dolores Project.

The general locations of the Summit and MVIC systems are shown on **Figure 1**. It should be noted that the location of the respective companies as represented in the figure is only for illustrative purposes. The boundaries reflected in the figure generally represent areas in which the respective company facilities may be located or traverse, or areas in which the State Engineer's Office records reflect irrigation served by the respective system.

Various assumptions and approaches were applied in our evaluation in order to generally describe potential operational results. Additionally, we did not attempt to validate existing data other than to confirm the information with the respective managers. Therefore, the findings presented in this study should only be considered general in nature which may need to be verified through further investigations or more specific analysis.

## SUMMIT RESERVOIR AND IRRIGATION COMPANY

### *General Description*

The Summit Reservoir and Irrigation Company (Summit) system is generally located south of the Lost Creek Canyon basin, north and east of Cortez, Colorado. The general location of the Summit system is reflected in **Figure 2**.

The system is currently made up of a total of 150 shareholders in the system. The Restated Bylaws indicate that no certificate shall be split into less than one share after January 23, 1993 and further that no share can be subdivided in half. However, if a shareholder currently holds a certificate for one-half share it can be sold and will be transferred.

Historically, irrigation under the Summit system was based on a total of 4,000 acres of irrigation and 400 shares, or 10 acres per share. Using the State Engineer's data files, we determined that the current amount of irrigation currently in place corresponds to approximately 3,215 acres. Assuming that approximately 3,200 acres are currently irrigated with a total of 400 shares, this equates to an average of eight acres per share on average. This reduction in acreage would reflect a 20% reduction in acreage within the system. The variance in acreage could be reflective of a water system being very susceptible to water availability, capacity restriction, conversion to hobby farming, or other system limitations. It is also interesting to note that in 2005, the State Engineer's Office (SEO) records reflect irrigation of approximately 2,800 acres. Previous SEO records also reflect that approximately 80% of the lands were flood irrigated and the remaining 20% were sprinkler irrigated. Approximately 70% of the irrigated lands are currently under sprinkler irrigation. This significant switch in irrigation practices is an indicator of a water short system.

Over twenty miles of open ditch carry water from Lost Canyon to the three Company reservoirs. The Summit (Lost Canyon) Ditch and Turkey Creek Ditch carry water from Lost Canyon Creek basin to Joe Moore and Summit Reservoirs; the Puett Supply Ditch then conveys water from Summit Reservoir to Puett Reservoir. Turkey Creek Ditch is approximately 16 miles in length, Summit Ditch is approximately four miles in length and the Puett Supply ditch is approximately 3,000 feet in length. Below Summit Reservoir, the Main Ditch is a combination piped and open ditch that is seven miles long; below Puett Reservoir, the Camp and South Main Ditches are both private ditches.

The existing capacity of the piped systems has not been investigated particularly with respect to potentially carrying or delivering additional water. Should system improvements be considered, it is not currently known whether the existing improvements would pose any limitations on future deliveries in the event deliveries are increased.

***Water Rights***

Summit (Lost Canyon) Ditch is a transbasin diversion that delivers water from Lost Canyon Creek, which is tributary to the Dolores River, to the drainage of the San Juan River (McElmo Creek); the same is true for the Turkey Creek Ditch. The water stored in Joe Moore, Summit and Puett Reservoirs are primarily from transbasin diversions.

| Name | Source | Amount (cfs) | Amount (ac-ft) | Adjudication Date | Appropriation Date |
|---|---|---|---|---|---|
| Turkey Creek Ditch | Lost Canyon/Turkey Creeks | 30 | | Feb. 1, 1892 | Jul. 16, 1886 |
| | | 60 | | Mar. 22, 1963 | Mar. 21, 1905 |
| | **total** | 90 | *total excludes 40 cfs abandoned in 84CW178* | | |
| | | | | | |
| Summit Ditch (aka, Lost Canyon Ditch) | Lost Canyon Creek | 135 | | Mar. 22, 1963 | Jun. 14, 1913 |
| | | | | | |
| Joe Moore Reservoir (aka, Big Pine Reservoir) | Lost Canyon/Turkey Creeks | | 304 | Dec. 18, 1933 | May 16, 1907 |
| | | | | *154.97 ac-ft transferred to Summit Reservoir* | |
| | | | | | |
| Summit Reservoir | Lost Canyon/Turkey Creeks | | 3013 | Dec. 18, 1933 | Mar. 1, 1905 |
| | | | 1274 | Mar. 22, 1963 | Dec. 1, 1938 |
| | | | 155 | Dec. 18, 1933 | May 16, 1907 |
| | **total** | | 4442 | *1666 ac-ft transferred to Puett Reservoir; 154.97 transferred from Joe Moore Reservoir.* | |
| | | | | | |
| Puett Reservoir | Lost Canyon/Turkey Creeks | | 654 | Dec. 18, 1933 | Nov. 28, 1904 |
| | | | 1666 | Dec. 18, 1933 | Mar. 1, 1905 |
| | **total** | | 2320 | *1666 ac-ft transferred from Summit Reservoir* | |

In total, 225 cfs has been decreed for diversion through the Turkey Creek and Summit Ditches. To the extent water is available at the respective diversion points, it is diverted to storage then subsequently delivered for irrigation uses.

It should be noted that Summit's water rights in Lost Canyon and Turkey Creek are junior to the water rights of MVIC but senior to the Dolores Project, as discussed later in the report. For MVIC to call out Summit's rights, flows on the Dolores River would need to decrease to the point such that MVIC's direct flow right of 795 cfs is not being satisfied (summary table of MVIC's water rights presented later in report). Additionally, in comparing the storage decrees for the respective company reservoirs, MVIC's Narraguinnep Reservoir right would also be senior to Summit's storage rights. In the event Summit's rights are called out during extended drought conditions, it is likely that Summit would not have the ability to meet all demands particularly if storage is limited. Typically, storage is depleted during the irrigation season as the system does not have sufficient carryover capacity to extend through a drought cycle. Thus, improvement or development of additional storage would enhance Summit's overall system deliveries.

***Company Operations***

The Summit system is currently not operated as a demand system. Water is diverted during the spring runoff period which typically ends mid-May. Once the storage reservoirs are filled, ditch water is then delivered or water is released from storage and delivered to the shareholders. For delivery at a full head, 12 shares are delivered per cfs. Water runs may extend over a period of 100 days, but typically deliveries go for about 60 to 70 days. Normal year deliveries begin around the second week of May and continue through mid-August. Previous studies indicated that the system only provides for 45% of the irrigation needs.

As reflected in the table above, the total decreed rate of diversion for the Turkey Creek and Summit Ditches is 225 cfs. In review of SEO records, peak total daily diversion for the Summit Ditch reached about 177 cfs in 1981. However over the period of 1951 through 2009, the records reflect an average diversion rate of about 27 cfs over the season. Similarly for the Turkey Creek Ditch, total peak daily diversions reached 50 cfs in 2005 and over the 1951 through 2009 period, diversions averaged about 9 cfs. Considering strictly the total average diversion rate of 36 cfs (27 cfs for Summit Ditch and 9 cfs for Turkey Creek Ditch) indicates that at times, 189 cfs is not being utilized or may not be available. On the other hand, considering the total peak maximum diversion rate of 227 cfs (177 cfs for Summit Ditch and 50 cfs for Turkey Creek Ditch), indicates that peak diversion rates could approximate the total decreed rate.

During normal or above normal years such as reported in 1977 and 1978, total deliveries may exceed 10,000 acre-feet. Over the period of 1951 through 2009, the average annual diversions from the two ditches total 5,280 acre-feet. If the capacity of the ditches were enlarged, potential constrictions removed, or the ditches were improved to reduce ditch losses, the existing reservoirs could potentially be filled earlier and more irrigation needs could possibly be met with the direct flow rights. However, it appears that the ditch capacities may be sufficient to capture flows when available. Therefore, having the ability to capture peak flows when available and place into storage for subsequent use would likely be more beneficial. Once Summit and Puett Reservoirs are filled, water is either delivered to users within the system or diversions cease until demands increase. Currently, the storage holding time in Summit Reservoir is limited and therefore, having additional storage capacity is needed.

It has been reported that Summit Ditch has the biggest source of loss from the diversion point to where the ditch crosses into the McElmo Creek drainage. Summit Ditch is measured at the flume just north of Highway 184 near Summit Reservoir. Travel time from the diversion point to the flume is about four hours, which make adjustments to deliveries difficult. From the crest of the divide between Lost Canyon Creek and headwaters of McElmo Creek to the measuring flume for the Summit Ditch, the distance is about one mile. To ensure deliveries, it takes about five to six extra shares to make full delivery to the end of ditch.

Approximately 40 miles of private lateral ditches and pipelines are owned by individual stockholders or pipeline associations. All the laterals are piped for at least part of their length. Since a significant portion of the system has been converted to piped systems, the overall system efficiency has been improved. In recent years, several pipeline groups and associations have been formed within the company and operate the laterals from the main delivery ditches. Users within the association pool their water to facilitate deliveries, which is typically done by

shareholders that would otherwise own less than the minimum share allowance. Ditch and lateral improvements have enhanced the overall water delivery system minimizing system losses.

The Summit system is basically made up of four delivery zones as follows and reflected in **Figure 2**:

- From Turkey Creek Ditch above Joe Moore Reservoir, water is delivered directly to head gates on the ditch. Currently, 11.5 shares are delivered from the ditch above Joe Moore Reservoir. From its diversion point on Lost Canyon Creek, the ditch is an open channel to Joe Moore Reservoir. This area accounts for approximately 3% of the total system shares. The total irrigated acreage above Joe Moore Reservoir is approximately 71 acres, or approximately six acres per share.

- Below Joe Moore Reservoir, 26 shares are delivered to head gates off of the Turkey Creek Ditch. Below Joe Moore Reservoir, the ditch is an open channel. This area accounts for approximately 6% of the total system shares. The total irrigated acreage below Joe Moore Reservoir and above Summit Reservoir is approximately 262 acres, or approximately 10 acres per share.

- From Summit Reservoir, 271 shares are delivered through the Main, Exon, Withers, and Extension Ditches. All of these ditches have been piped. This area accounts for approximately 68% of the total system shares and approximately 2,197 acres, or approximately eight acres per share.

- Below Puett Reservoir, 91.5 shares are served through the South Main and Camp Ditches. Both of these ditches have been piped. This area accounts for approximately 23% of the total system shares and approximately 685 acres, or approximately seven acres per share.

As previously indicated, the average irrigated acres per share for the system is about eight acres per share based upon our calculation of the total irrigated acreage. The above information reflects differences throughout the Summit system with respect to the duty of shares. Obviously, the deliveries above Joe Moore Reservoir do not receive any benefit of storage.

***Summit (Lost Canyon) Ditch***

As previously indicated, the Summit Ditch is approximately four miles long and the company experiences maintenance problems in several problem areas. As shown in the following photograph, the ditch is on a very steep north facing slope and rocks and debris regularly fall in to the ditch from above.

***Summit (Lost Canyon) Ditch – steep up-gradient side slope***

The diversion structure is in good repair but the gabions above it may need to be rebuilt. According to Company personnel, once the gate is opened in the spring it is nearly impossible to close due to the accumulation of debris under the gate. When a problem occurs downstream, the water cannot be turned off. The typical approach has been to breach the ditch of the blockage which in itself causes additional problems and loss of water. What is needed is a return or spill structure just downstream of the head gate that could be operated and avoid breaching of the ditch. Trashrack configurations should be evaluated as well to minimize debris collection.

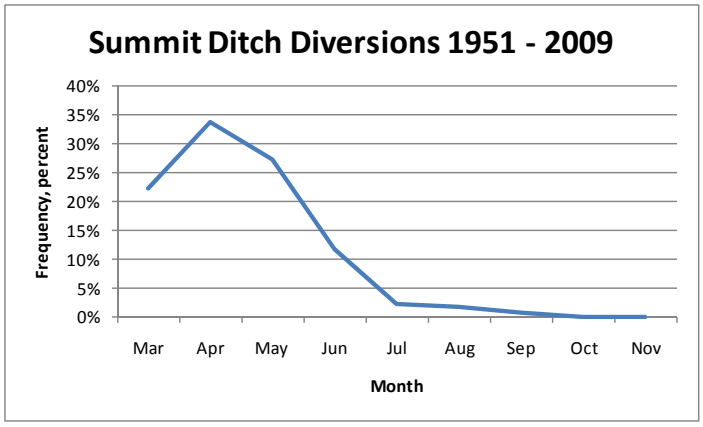
***Summit (Lost Creek) Ditch – diversion structure***

Portions of the ditch have been piped and an old wooden siphon has been replaced. The piping has reduced seepage or loss in the ditch but it still seeps badly. The seep from the ditch causes unstable banks along the ditch that periodically slough and the concern is that the ditch could be lost if a major bank failure occurred. Considering the location of the Summit Ditch and associated maintenance issues, a new diversion structure capable of limiting debris and replacing the entire ditch with a piped system would eliminate the on-going maintenance issues and historical ditch losses.

New technologies are available that can also maximize the diversions without requiring constant attendance to the headgate. Diurnal fluctuations in streamflows can create lost opportunity. Hydraulic gates are available that can be set to remotely monitor diversion rates and will rise and fall with increasing and decreasing stream flow levels. This keeps a constant diversion into the headgate and maximizes beneficial use.

The point of diversion for the Summit Ditch originates on Forest Service land and the ditch easement predates the Forest Service. Maintenance of the ditch can continue as it has in the past.

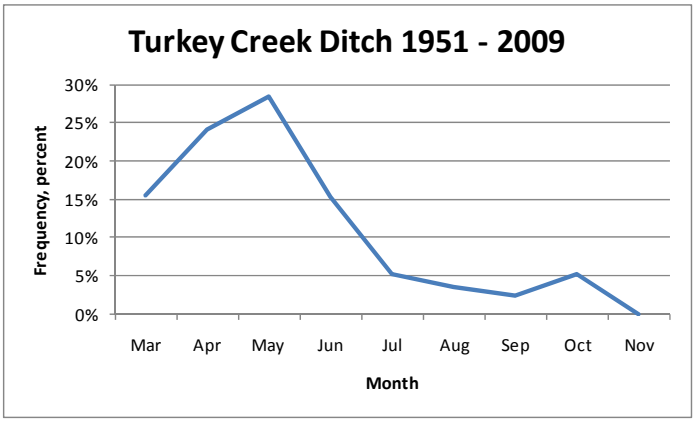
As previously stated, available diversion records from the State Engineer's Office for the Summit Ditch reflect a maximum daily diversion rate of 177 cfs which was reported in 1981. Over the period of record (1951 – 2009), over 2,900 days of diversion were reported and the average daily diversion rate reflected from these records is approximately 27 cfs. Higher diversion rates are reflected during the early part of the season (March through May) typically when the runoff is occurring. As depicted in the following chart, the bulk of the diversions occurs during the months of March through June and reflects approximately 95% of the total annual diversions. Again, having the ability to capture peak flows early in the year would be beneficial.




***Turkey Creek Ditch***

The point of diversion for the Turkey Creek Ditch also originates on Forest Service land and the ditch easement predates the Forest Service. Most of the ditch is within the Forest Service boundary and maintenance of the ditch has been sporadic primarily due to the fact that the level of work is substantial. It is anticipated that a joint effort with the Forest Service may be necessary for the ditch to receive adequate maintenance.

As previously stated, State Engineer's Office diversion records indicate a maximum daily diversion rate of 50 cfs which was reported in 2005. Over the period of record (1951 – 2009), over 3,300 days of diversion were reported and the average daily diversion rate reflected from these records is approximately 9 cfs. Higher diversion rates are reflected during the early part of the season (March through May) typically when the snowmelt runoff is occurring. As depicted in the following chart, the bulk of the diversions occurs during the months of March through June and reflects over 80% of the total annual diversions.




***Diversion records***

The State Engineer's Office diversion records available for both ditches were reviewed over the period of 1951 through 2009 and are summarized in Appendix A, Tables A-1, A-2, and A-3; a summary of the total diversions through Summit and Turkey Creek Ditches is provided in the tables below.

TURKEY CREEK DITCH
Summary of Total Diversions

*all values in acre-feet*

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| average | 38 | 0 | 41 | 517 | 676 | 196 | 52 | 25 | 7 | 13 | 0 | 0 | 1566 |
| max | 1524 | 0 | 411 | 1345 | 2053 | 1628 | 432 | 206 | 119 | 280 | 0 | 0 | 5440 |
| min | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 117 |

SUMMIT DITCH
Summary of Total Diversions

*all values in acre-feet*

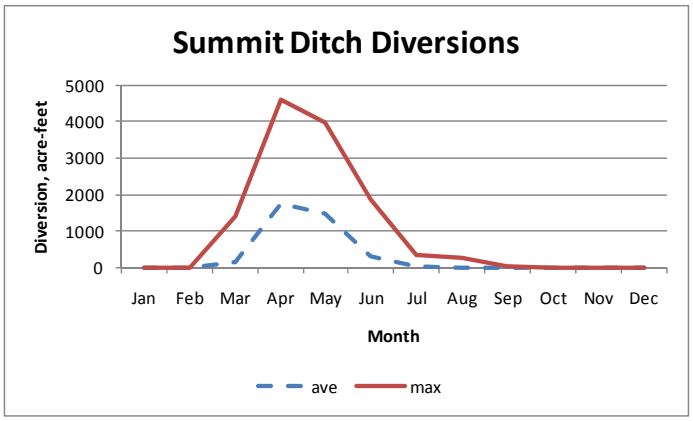
| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| average | 0 | 0 | 130 | 1766 | 1486 | 302 | 20 | 9 | 1 | 0 | 0 | 0 | 3715 |
| max | 0 | 0 | 1406 | 4593 | 3982 | 1853 | 327 | 267 | 29 | 0 | 0 | 0 | 10389 |
| min | 0 | 0 | 0 | 335 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 610 |

From the above tables, a total of 5,280 acre-feet on average is diverted per year by the two ditches. For the 400 shares, deliveries equate to approximately 13 acre-feet per share on average and range from a minimum of just under 2 acre-feet per share to a maximum of 27 acre-feet per share.

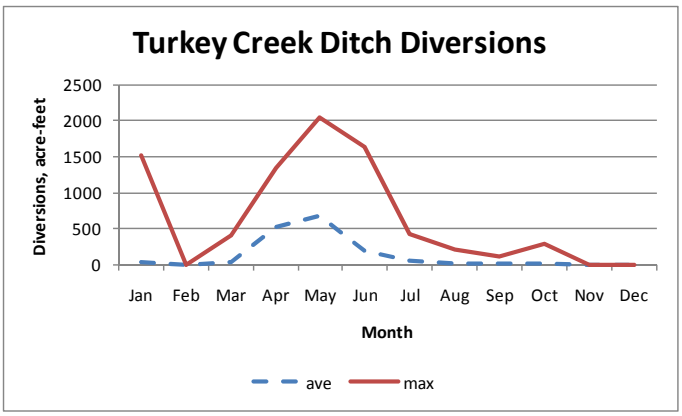
Although water may be diverted during the irrigation season, the majority of the water diverted is typically available during the months of March through June. During this time, water that is

diverted is first delivered to storage for subsequent release to users below Summit Reservoir. The shareholders located above Summit Reservoir can only divert water directly from the Turkey Creek Ditch when it is available.

For the Summit Ditch, diversions have occurred over the months of March through September. However, approximately 95% of the total diversions on average have occurred over the months of March through June. The ditch has on average run 73 days; with the maximum run of 175 days in 1997. During 1997, the total water diverted through the Summit Ditch was 3,014 acre-feet and again, was substantially less than the maximum diversion of 10,389 acre-feet reported over the period of records. The following chart presents a summary of the average monthly and maximum monthly diversions reported for the Summit Ditch. The summary reflects that at times, a significant amount of water is available for diversion particularly during the months of May and June.




Similarly for the Turkey Creek Ditch, diversions have occurred over the months of March through October. However, approximately 83% of the total diversions have occurred over the months of March through June on average. The ditch has run 94 days on average, extending to a maximum of 214 days during the years of 1974, 1982, and 1986. During these years, the total water diverted through the Turkey Creek Ditch was 1,074 acre-feet, 1,545 acre-feet, and 4,501 acre-feet, respectively. It should be noted from the table above that although this ditch ran for a longer season, the total diversions during these three years were considerably less than the maximum diversion of 5,440 acre-feet reported in 1952. A diversion of 1,524 acre-feet was reported through the Turkey Creek Ditch in January of 1986; however, diversions typically do not occur during the November through February period. The following chart presents a summary of the average monthly and maximum monthly diversions reported for the Turkey Creek Ditch. Again, it is apparent that a significant amount of water may be available in May and June.




Understanding that water is typically available for diversion only during a short period of time during the year, storage becomes an integral part of the overall system to meet demands later in the season. Therefore, maximizing diversions and storage as well as increasing the overall system efficiency will enhance Summit's system. For both the Summit and Turkey Creek Ditches, there appears to be times when substantial amounts of water could be diverted for later use. However, the diversion records seem to indicate that the ditches are at or near capacity at times. In lieu of increasing ditch capacity, it may be more beneficial to capture peak flows and place into storage for later use or to serve as carryover for drought protection.

***System Loss***

The Summit and Turkey Creek Ditches experience loss along their course in the form of seepage, evaporative, or phreatophyte consumption from the point of diversion to the storage reservoirs. The total combined length of the open ditches is over 20 miles. Applying a conservative loss estimate of 25% to the average annual diversions summarized above (5,280 acre-feet), a total loss of approximately 1,760 acre-feet may be realized on an annual basis which may be reflected in the actual water diverted at the head gates (i.e., an additional 1,760 acre-feet may have been diverted at the head gates in order to realize an actual delivery of 5,280 acre-feet measured at the flumes).

With the conversion over to piped systems, system loss below Summit Reservoir has been considerably reduced and has enhanced overall deliveries. Prior to this conversion, additional losses were experienced that again limited irrigation deliveries to shareholders.

A major contributor of system loss has been associated with Summit Reservoir. Previous reservoir inspections have indicated excessive seepage particularly at high water levels and based on this observance, a storage restriction has been in place on Summit Reservoir by the State Engineer's Office. Additional loss from the company reservoirs includes evaporative loss which on an annual basis, may be in the range of four acre-feet per acre of surface area. However, considering that the reservoirs are typically filled in April and May and are depleted by September, the total evaporative loss during this period is about three acre-feet per acre. In total, the combined surface area associated with Joe Moore, Summit, and Puett Reservoirs is approximately 602 acres. For purposes only to estimate evaporative loss, an average surface area of 250 acres over the season applied to three acre-feet per acre results in a potential evaporative loss of 750 acre-feet.

Although general in nature, the above estimates for system loss including ditch seepage and transit loss, and reservoir evaporative loss provides a representative picture of the potential magnitude of the overall system loss. In total, a significant amount of system loss amounting to approximately 2,500 acre-feet may be lost in the system throughout a given season. Even considering that if only 50% of this projected loss was realized, this amount (1,250 acre-feet) still constitutes close to 25% of Summit's total average annual deliveries. In comparison to system storage, these projections of system loss appear to be rather high. However, system loss will undoubtedly affect the overall company operations and subsequent deliveries. Since system loss is somewhat of an unknown, it would be worthwhile for the company to identify significant problem areas and potential ways to mitigate such losses.

***Reservoir Operations***

As previously discussed, Summit's storage rights total 7,066 acre-feet under various priorities. Of this amount, the Division of Wildlife has obtained a perpetual easement on Joe Moore, Summit, and Puett Reservoirs for recreational and associated uses. A minimum fish pool level is maintained in each of the three reservoirs. The following elevations above outlet gate are maintained for the fish pools:

- Joe Moore: 3 feet as measured at the depth gauge. The estimated storage associated with this reservoir level may be in the range of 10 acre-feet. This was estimated based on elevation and storage information obtained from the SEO records.
- Summit: 6 feet as measured at the depth gauge. The estimated storage associated with this reservoir level may be in the range of 650 acre-feet. This was estimated based on elevation and storage information obtained from the SEO records.
- Puett: 12 feet as measured at the depth gauge. At this time, the estimated storage associated with this reservoir level is not known.

Summit and Puett Reservoirs serve as the main point of delivery for stored water with Summit Reservoir making the bulk of the releases. Since water is released from Summit to meet irrigation demands both directly from Summit Reservoir and via Puett Reservoir, releases from Summit Reservoir were used to determine total actual deliveries.

Over the period of 1955 through 2009, the reported Summit Reservoir outlet releases reflect that on average, approximately 6,400 acre-feet have been released on an annual basis as reflected in **Appendix A**, Table A-4. In comparison to the total diversions from the Summit and Turkey Creek Ditches of 5,280 acre-feet, total releases from Summit Reservoir don't appear to correlate to diversions. After considering transit, evaporative, and other losses, releases from storage would likely be less than diversions unless another source of supply was introduced which is not the case with the Summit system. However, the extremes in releases reflect a minimum of 220 acre-feet which occurred in 2002, and a maximum of 16,200 which occurred in 1979. For the 362.5 company shares delivered below Summit and Puett Reservoir, deliveries equate to approximately 18 acre-feet per share on average and range from a low of 0.6 acre-feet per share to a maximum of 45 acre-feet per share.

Considering that on average, 5,280 acre-feet is diverted and delivered through the Summit and Turkey Creek Ditches, the difference between Summit Reservoir releases and reported diversions may be attributable to a minor amount of carryover storage but most likely due to inaccuracies in the flume readings and probably with the readings from Summit Reservoir. However, to simplify our evaluation, the average storage releases were considered in meeting total overall demands understanding that a portion of the total demands are met above Summit and Joe Moore Reservoirs by direct diversions. Summit may need to consider evaluating the accuracies of its measuring flumes.

***Water Demands***

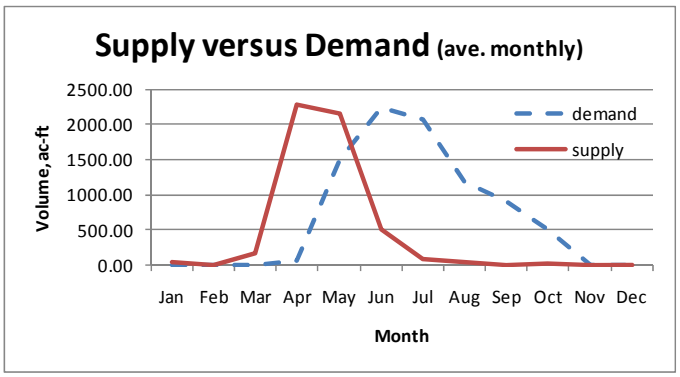
Information provided to us reflected a general crop mix including yards, gardens, alfalfa, hay, and pasture. The SEO records reflect that the irrigated parcels are made up of a mix of crops including alfalfa, pasture grass, orchard, and beans. Although the general crop mix as reported by the SEO is somewhat different, we used the SEO information as a basis for our analysis regarding system demands as discussed further in this report. Using this data will provide a general idea as to how crop demands may fluctuate over a given year.

Using the SEO information, we determined an average annual crop irrigation requirement of approximately 2.6 acre-feet per acre or a total system irrigation demand of approximately 8,400 acre-feet.

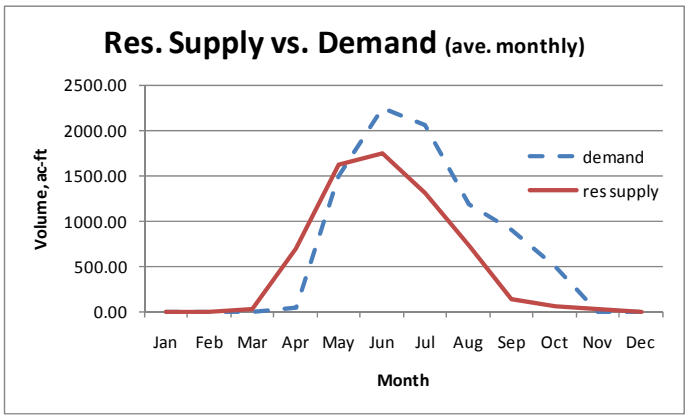
***Supply vs. Demand***

As with many irrigation systems, the supply is typically available early in the season during the runoff period then diminishes during the remainder months of the year. Without storage, meeting crop demands later in the year is limited and the supply may only meet a portion of the remaining demand.

The Summit system is such that over 90% of the average total annual supply is available over the March through June months. The following chart depicts the average monthly diversions as compared to the average monthly demand. As can be seen from the chart, crop demands are steadily increasing over the early months of the irrigation season then peak in or around July or August. Only about one-third of the total crop demands are reflected in the April through June months; the remaining two-thirds are spread over the rest of the irrigation season. Generally speaking, this pattern would be similar for crops that may be irrigated under Summit's system. The difference between the supply and demand curves is basically the volume that needs to be met from storage. The chart also reflects the relative difference in timing of when water is diverted versus when the irrigation demands or needs occur. This difference suggests a need for storage.




A similar chart is presented below representing the irrigation demands versus the reservoir supply or releases made from Summit Reservoir. Again, it should be noted that the reservoir supply is not sufficient to meet projected demands.




Of the water released from storage (6,400 acre-feet), only a portion of the water applied will meet crop demands. Since the Summit system is comprised of flood and sprinkler irrigation, an overall application efficiency of 65% may be realized on average. Applying this efficiency to storage releases results in about 4,200 acre-feet of water potentially being available to meet demands. In comparison to the total average annual demands of 8,400 acre-feet, the system is short 4,200 acre-feet on average. In other words, the current water supply and storage system meets only about 50% of the total demands, which is comparable to previous studies. If however, water was delivered to meet 100% of projected demands, nearly 13,000 acre-feet would need to be applied using the same assumptions with regard to application efficiency. This suggests that Summit's storage capacity may need to be more than doubled at a minimum.

***Return Flows***

As a result of irrigation within the Summit system, return flows are generated which then contribute to the flows within the McElmo Creek basin. As a preliminary comparison based on the previous discussion, a general assumption can be made that of the water applied for irrigation, 2,200 acre-feet of return flow may be generated. Conservatively speaking, the returns may be spread throughout the year at a rate of just under 200 acre-feet per month. Considering potential return flows associated with deliveries to meet 100% of the projected demands, the return flow amount may reach 4,500 acre-feet or just under 400 acre-feet per month.

Since water is originally taken from Lost Canyon Creek, a tributary of the Dolores River, and used in the McElmo Creek basin, a tributary of the San Juan River, Summit's water rights can be considered transbasin water rights. Therefore, the increased return flows generated from additional storage that would be used for irrigation are also considered transbasin and may be recaptured and reused. Such return flows could potentially be utilized to meet downstream augmentation needs if not already intercepted by MVIC or the Dolores Water Conservancy District (DWCD). This may provide some opportunity for Summit, MVIC, or possibly DWCD with respect to future uses and may warrant further investigations. Increased return flows may also provide an enhancement to downstream environmental needs and may alleviate other associated concerns with water development and use within the area.

***System Capacity Restrictions***

It would appear that restrictions within the Summit system include limited ditch and reservoir capacity. For example, the Turkey Creek Ditch was decreed for a total of 90 cfs however, the SEO records reflect a maximum diversion rate of 50 cfs which was reported in 2005. The Summit Ditch has in more recent years reflected diversions at or near the decreed rate of 135 cfs. However, it appears that at times, the ditch capacities have been maximized. Therefore, increasing storage capacity at the existing sites or possibly creating new storage may need to be considered along with general ditch improvements.

Capacity in Joe Moore, Summit, and Puett Reservoirs has been transferred to the Division of Wildlife, which to some extent, limits the amount of deliveries that may be made for irrigation. Summit Reservoir has had a fill restriction in place for a few years which again, limits the amount of water that may be held in storage. Also, residential development downstream of the reservoirs, particularly with Summit, has caused additional concerns for the company. All the reservoirs are classified as "high hazard" and company insurance rates have significantly increased. To the extent required by the State Engineer's Office, Summit maintains its facilities by completing on-going and regular maintenance.

***Maintenance***

Several studies have been completed regarding improvements to Summit's system.[1] In these reports, various recommendations were made concerning various structures within the system including diversion points, measuring devices, ditch lining and maintenance, delivery restrictions, and reservoir operations.

In recent years, Summit has made improvements to its system which included the following:

- Joe Moore Dam spillway reconstruction
- Summit Dam outlet works, toe drains, and weirs
- Replaced the Railroad siphon on Summit Ditch (Lost Canyon)
- Installed over 6,000 feet of pvc pipe in two sections of the Main Ditch

To assist the Company in paying for the necessary repairs, Summit has received three separate loans from the CWCB. Since 1978, $579,221 has been spent on system improvements and for a

[1] Feasibility Report for Summit Reservoir Improvements, October 1983, Harris Water Engineering; Summit Reservoir and Irrigation Company 1985 Planning Report, Harris Water Engineering; Summit Ridge Irrigation Company Measure Plan Preliminary Report, January 1993, USDA Soil Conservation Service.

small company, the total cost on a per share basis ($1,448 per share) is significant. The remaining shareholder debt on the balance of the CWCB loans is $836 per share.

Recently in 2008, the Summit system required extensive repairs and maintenance. A contractor was hired at an expense of over $20,000 to complete the necessary work which was paid from a one-time share assessment of $40 per share. This may be an area in which MVIC could provide assistance to Summit by providing manpower and equipment to complete on-going or regular maintenance or during times that extensive repairs are needed. As with any water supply system, completing a risk assessment would identify areas that may significantly impact the overall operation of the system and therefore, may need to be addressed through an on-going capital improvement plan to minimize risk.

***Cost of Delivery***

Current annual charges are $200.00 per shareholder account fee plus $150.00 per share annual assessment. In total, the company receives about $89,800 from its shareholders which is used to offset loan payments and pay for system improvements. This amount is based on 149 shareholder accounts and 400 shares.

As previously described, Summit delivers approximately 6,400 acre-feet of water on average from Summit Reservoir. Equating this to the annual cost to shareholders, the average cost of delivery is approximately $14.00 per acre-foot of delivery.

**MONTEZUMA VALLEY IRRIGATION COMPANY**

***General***

The Montezuma Valley Irrigation Company (MVIC) system spans the Montezuma Valley, encompassing areas north and south of Cortez and west. The general location of the MVIC system is reflected in **Figure 1**.

With the development of the Dolores Project, MVIC entered into several contracts which have an effect of controlling annual operations. These contracts include the following:

- September 1977 Contract between the Dolores Water Conservancy District and MVIC.
- April 1989 Contract between Department of the Interior, Dolores Water Conservancy District, MVIC, and the Ute Mountain Ute Tribe.
- August 2002 Purchase Agreement between MVIC and the Dolores Water Conservancy District.

Furthermore, the Dolores Water Conservancy District entered into a contract with the Department of the Interior regarding repayment of the Dolores Project and delivery of Project Water. The terms of this agreement mandate Project operations from which, MVIC receives delivery of Project Water.

This study does not attempt to provide any interpretation of the various contracts or agreements associated with the Dolores Project. Rather, the contractual documents are only referenced as information that may be pertinent to future follow-up review if required.

***Water Rights***

MVIC's operations are all located downstream of Summit's system and further, Summit is outside of MVIC's service area. Since the development of McPhee Reservoir, water attributable to MVIC's water rights is delivered through the reservoir. In total, MVIC's system includes over 120 miles of canals and laterals. MVIC controls 33,284 Class A shares and 1,500 Class B shares. MVIC's water right portfolio is made up of both direct flow and storage rights as reflected in the following table. It should be noted that the following summary does not include other minor rights or portions of water rights that were sold or transferred to other parties.

**MVIC WATER RIGHTS SUMMARY**

| STRUCTURE | CASE NO. | DECREED AMOUNT (cfs) | DECREED AMOUNT (ac-ft) | APPROPRIATION DATE | ADJUDICATION DATE |
|---|---|---|---|---|---|
| MAIN CANAL NO. 1 & NO. 2 | CA0473 | 795.0 | | 11/25/1885 | 2/1/1892 |
| MAIN CANAL NO. 1 | CA0967 | 90 | | 11/25/1885 | 3/22/1963 |
| GROUNDHOG RESERVOIR | CA0967 | | 10,623.0 | 8/1/1905 | 12/18/1933 |
| | | | 11,086.0 | 10/24/1929 | 12/18/1933 |
| | | **total** | 21,709.0 | | |
| NARRAGUINNEP RESERVOIR | CA0967 | | 5,969.0 | 3/15/1888 | 12/18/1933 |
| | CA0967 | | 3,306.0 | 10/28/1907 | 12/18/1933 |
| | CA0967 | | 11,527.0 | 8/17/1922 | 12/18/1933 |
| | CA0967 | | 1,653.0 | 5/1/1956 | 3/22/1963 |
| | | **total** | 22,455.0 | | |
| TOTTEN RESERVOIR | | | 400.0 | 4/25/1907 | 12/18/1933 |
| | | | 3,000.0 | 2/1/1951 | 3/22/1963 |
| | | **total** | 3,400.0 | | |

As stated previously, MVIC's water rights are senior to Summit's and therefore, during drought conditions, MVIC would call out Summit's rights. In such cases, diversions under Summit's water rights would be limited and reliance upon stored water would be imperative.

***Company Operations***

MVIC operates is system pursuant to various agreements with the Dolores Water Conservancy District (District), and the Bureau of Reclamation (Bureau). Generally speaking, MVIC delivers water to its shareholders through McPhee Reservoir which is managed by the District; the District administers project and joint-use facilities within its boundaries. Again, the operations as governed by the various agreements have not been reviewed as part of this study.

Historically, MVIC's Main Canals 1 and 2 were used to deliver water to lands south of the present day location of McPhee Reservoir. Construction of McPhee Reservoir slightly altered operations, and presently, deliveries are made to the respective canals via releases from McPhee Reservoir. Lands served by Main Canals 1 & 2 (aka, Dolores Tunnel and Great Cut Dike) are

generally located in the McElmo Creek basin. Additionally, the Ute Lateral, which basically flows west from McPhee Reservoir, is used to provide water to lands located in the Yellow Jacket Canyon drainage basin.

***Diversions***
Total diversions by MVIC are limited by contract to a total of 153,400 acre-feet per year. Additionally, MVIC receives delivery of project water for use on irrigable lands as defined in the DPR.

Historically, MVIC's total diversions including both direct flow and storage in Groundhog Reservoir have averaged approximately 125,000 acre-feet based on records over the years of 1986 through 2007. MVIC also utilizes storage in Narraguinnep Reservoir which accounts for another 15,500 acre-feet on average. In total, approximately 140,500 acre-feet on average has been delivered through the MVIC system.

***System Loss***
MVIC has made a number of improvements to its system including ditch lining and piping which has resulted in an increase in system efficiencies. Although overall system loss has not been quantified, a reasonable assumption may be 25%. MVIC continues to improve its delivery system thus reducing losses.

***Reservoir Operations***
Pursuant to contract, a portion of MVIC's water is stored in McPhee Reservoir which is later released to supplement diversions. Additionally, the District delivers Project Water from McPhee Reservoir for various uses including irrigation. However, Project Water can only be used on what is defined as irrigable lands and therefore, cannot be applied on all of the lands served by MVIC within its service area.

Groundhog Reservoir is located higher in the watershed above McPhee Reservoir and is decreed for a total of 21,709 acre-feet absolute. Of this amount, 3,960 acre-feet has been dedicated to the Division of Wildlife (DOW) for a fish pool pursuant to a 1975 agreement with the Division. Groundhog Reservoir is located on a tributary to the Dolores River and is used to supplement diversions through Main Canals No. 1 and No. 2 particularly during the summer months when the flow in the Dolores River declines.

Narraguinnep Reservoir provides supplemental water during the irrigation season and is typically drained each year. Water from this reservoir is delivered primarily to Canal No. 1.

***Demands***
The Definite Plan Report (DPR) which was developed for the Dolores Project identified and projected demands within the MVIC system. MVIC's operations with regard to the Dolores Project are based on irrigation of 37,500 acres at a projected demand of 4.01 acre-feet per acre (150,400 ac-ft). Of this amount, 11,200 of Class 6 lands cannot receive project water; the remaining acreage of 26,300 acres was defined as irrigable lands and could then receive Project Water.

***Supply vs. Demand***
Utilizing company storage as well as Project Water deliveries, MVIC has been able to meet current demands within the system as well as on occasion, lease water to the Ute Mountain Ute Tribe. The ability to meet demands and lease water indicates an effective and efficient water system considering use of both direct flow and storage rights.

***Return Flows***
Water delivered from Groundhog Reservoir and Main Canals under MVIC's water rights is used in the McElmo Creek basin and therefore, is considered a transbasin diversion since these facilities are associated with diversions from the Dolores River basin. Similar to Summit's operations, recapture of transbasin diversion return flows may provide opportunities among the systems.

Assuming that MVIC delivers on average 140,500 acre-feet per year and that system loss and application efficiencies are 25% and 65%, respectively (similar to Summit), then the water available to meet crop demands would be about 68,500 acre-feet. The return flows generated on average (after accounting for transit loss) may be about 36,800 acre-feet, which on a monthly basis, equates to just over 3,000 acre-feet per month.

***Capacity Restrictions***
Under current existing operations, the MVIC system does not experience any restrictions with exception to releases from Groundhog or Narraguinnep Reservoirs. Releases from these facilities are managed considering stream channel conditions or receiving ditch capacity.

***Maintenance***
MVIC has an extensive crew that is used to complete on-going and regular maintenance of its facilities. This crew may also be available to assist Summit with its maintenance throughout the year.

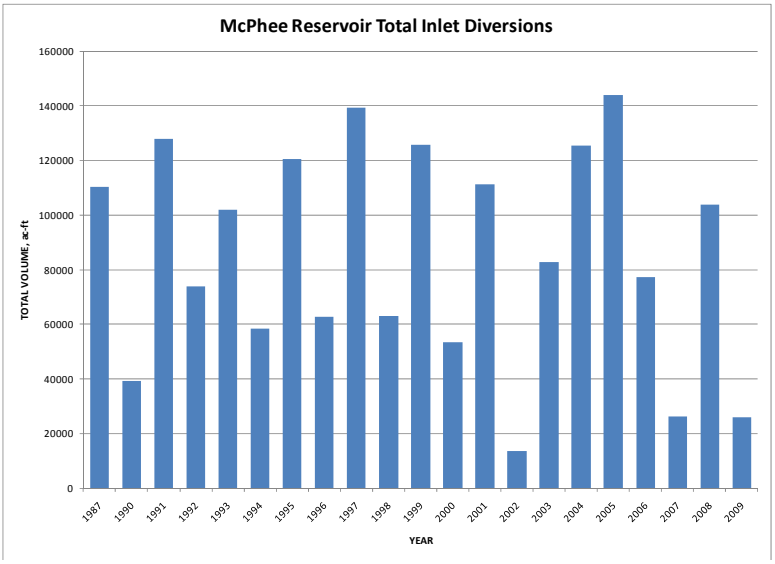
**DOLORES PROJECT**

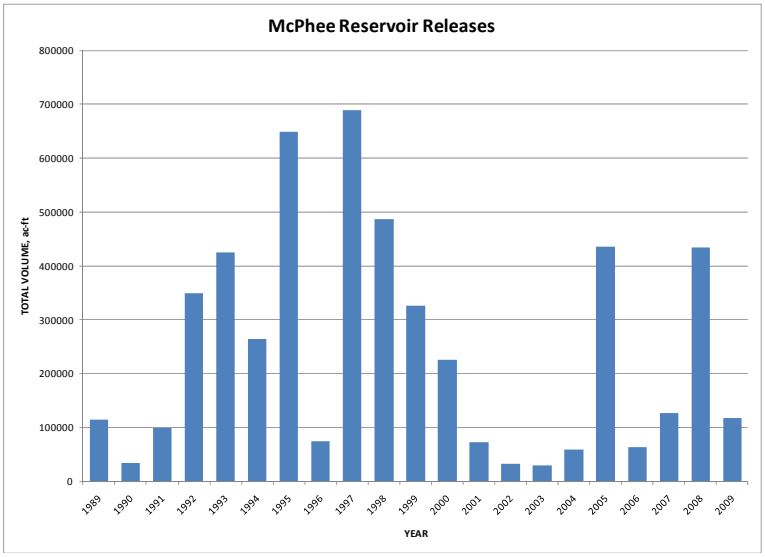
The Dolores Project is located in the Dolores and San Juan River Basins and uses water from the Dolores River for a multitude of uses including irrigation, municipal, and industrial uses. Areas served by the Project include Dove Creek area, the Montezuma Valley, and south to the Ute Mountain Ute Indian Reservation. Water deliveries from the Dolores Project are contracted through and administered by the Dolores Water Conservancy District (District). The Project may provide a full and supplemental supply for irrigation of over 61,000 acres. The areas served by the Project fall within the boundaries of the District which also includes the MVIC service area.

The main water rights associated with the Dolores Project include a 585 cfs right for the McPhee Reservoir Inlet and a 750,000 acre-foot storage right. Both of these appropriations have a 1963 adjudication date and a 1940 appropriation date. These rights are fairly junior in the basin and therefore, are junior to the Summit and MVIC water rights. A summary of the water rights associated with the Dolores Project is listed below.

| STRUCTURE | DECREED AMOUNT (cfs) | DECREED AMOUNT (ac-ft) | APPROPRIATION DATE | ADJUDICATION DATE |
|---|---|---|---|---|
| MCPHEE RESERVOIR | | 750,000 | 9/10/1940 | 3/22/1963 |
| | | | | |
| MCPHEE RESERVOIR INLET | 585 | | 9/10/1940 | 3/22/1963 |

The Dolores Project was completed around 1987 and has provided supplemental water since that time. Total annual diversions as reported for the inlet have varied over the years and have averaged approximately 85,100 acre-feet on an annual basis. During the drought of 2002, total diversions only amounted to a total of 13,600 acre-feet. As a junior water right in the basin, the carryover capacity of the reservoir is substantial and can provide a supplemental source during drought conditions. The variance in diversions and releases is reflected in the following charts.



## INSTREAM FLOW RIGHTS

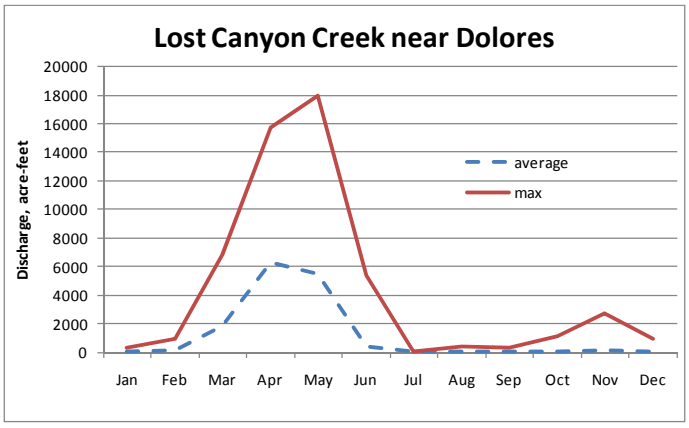
CWCB holds several decreed instream flow rights within the Dolores River basin. However, the water rights were filed in 1975 and later and therefore, would be junior to both Summit and MVIC's operations under its existing decreed water rights. Additionally, CWCB does not currently hold any instream flow rights on either Lost Canyon Creek or Turkey Creek. With respect to the existing instream flow rights on the Dolores River, any new appropriations or potential future changes would need to consider the potential impacts upon these existing rights.

## TURKEY CREEK

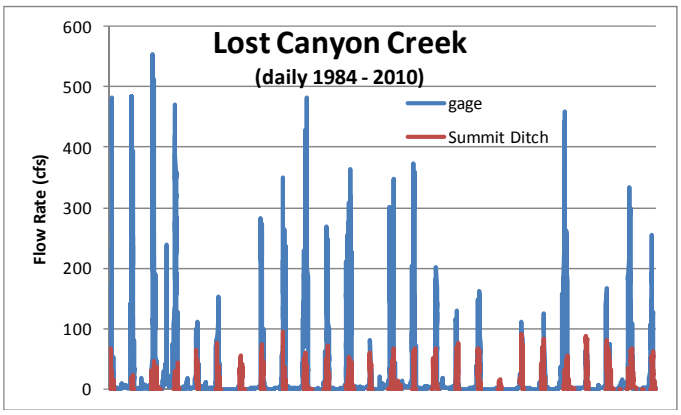
Data concerning flows on Turkey Creek was obtained from the USGS for the Lost Canyon Creek near Dolores gage (Station #09166950). Based on this information, the total volume reported is approximately 14,672 acre-feet on an average annual basis. Of this amount, approximately 95% of the total annual volume occurs during the March through June period. It should be noted that since the gage is located near Dolores, any diversion by upstream water rights would not be reflected in the gage flow during the irrigation season; no attempt has been made to correct the gage flow to reflect total flow. Therefore, during the storage and irrigation season, additional water would likely have been diverted by upstream water rights to the extent these rights were in priority. However, it should be noted that during this same period, diversions were being made by Summit as previously described. The following table and charts summarize the flow from Lost Canyon Creek near Dolores.

*monthly mean, ac-ft*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| average | 87 | 139 | 1837 | 6297 | 5488 | 438 | 15 | 29 | 46 | 100 | 184 | 101 | 14762 |
| max | 307 | 922 | 6793 | 15747 | 17981 | 5425 | 59 | 430 | 360 | 1088 | 2689 | 910 | 36077 |




A review of the daily gaged Lost Canyon Creek flows was made with respect to the daily diversions through Summit Ditch. The following chart reflects stream flows and diversions over the period of 1984 through 2010 and as can be seen from the chart, Summit's diversions are only a small portion of the peak flows and generally fall below 100 cfs.




It should be noted that although flow is available during the year, on an average monthly basis, the bulk of the water would be available during February through June. Since it would be difficult to deliver water during the winter months through existing ditches, a new storage facility may make sense to capture flows during the non-irrigation season. Although flow may be available during the summer months, the Summit Ditch is usually at or near capacity and again, without a facility to capture available flow, it could not be delivered. Water storage at a new facility would need to be developed under a junior appropriation and again, would be subject to the water rights for the Dolores Project.

***Existing Water Rights***

The State Engineer's Office records were reviewed with respect to existing water rights on Lost Canyon Creek. Several water rights were noted which include other ditches, wells, reservoirs, and springs. With exception to two small water rights identified as the Royce and Risley Ditch (priority D-13 for 1.0 cfs) and the Sellars & McClane Sup Ditch (priority 62-20 for 2.5 cfs), all of Summit's water rights are senior to other existing water rights on Lost Canyon Creek. The water rights held by MVIC and DCWD would be senior to the existing rights as well. However, during the non-irrigation season, there may be opportunities to store water when it is available particularly if the water rights associated with the Dolores Project and MVIC storage are satisfied.

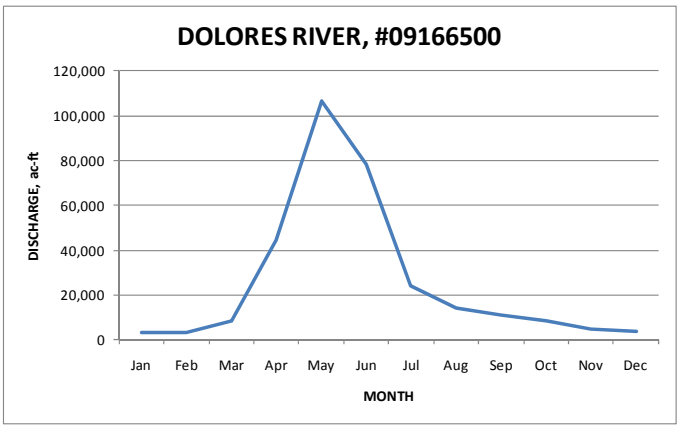
## DOLORES RIVER

The USGS has maintained a river gage on the Dolores River near Dolores, Colorado since around 1895. Measured flow provides a summary of fluctuations within the Dolores River basin, particularly during wet and dry cycles. Following is a summary of the data obtained from the USGS for the Dolores River gage:

**DOLORES RIVER AT DOLORES, CO., STA ID USGS 09166500**

Mean discharge, acre-feet

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| average | 3,199 | 3,140 | 8,271 | 44,438 | 106,744 | 78,376 | 24,267 | 14,392 | 10,821 | 8,400 | 4,989 | 3,614 | 301,423 |
| min | 1,186 | 1,110 | 1,537 | 9,393 | 14,422 | 3,998 | 3,406 | 1,783 | 1,993 | 1,598 | 1,190 | 1,217 | 13,609 |
| max | 9,282 | 7,751 | 28,130 | 116,303 | 222,840 | 206,430 | 91,595 | 39,951 | 80,549 | 76,657 | 26,973 | 12,209 | 614,263 |




Similar to the information that was reviewed for Lost Canyon Creek, the Dolores River also reflects peak flows during the April through June timeframe. Outside of this period, the flows drop off rapidly and river discharge typically is well below 20,000 acre-feet per month.

The Dolores Project takes advantage of these peaking flows and captures the runoff water in McPhee Reservoir. Without the benefit of storage, reliance upon the native flow during the summer months for irrigation would be difficult.

## CONCEPTS OF A COMPANY MERGER

The concepts of a merger between Summit and MVIC have evolved since the original discussions began. At the onset of this study, discussions were held between company representatives to preliminarily explore how cooperation between the companies could enhance the overall operations of each and likewise, benefit the surrounding communities. Without a doubt, enhancing Summit's delivery and storage system would benefit the shareholders in the Summit Company, but would not directly benefit other users in the basin. However, enhancing Summit's system will provide additional return flows which, if recaptured, could be used to meet additional demands or possibly, serve as a source for environmental needs. Certainly, neither company would want to assume any further liabilities nor increase costs to its shareholders.

Construction of a storage reservoir upstream of Summit's existing Lost Canyon Creek diversion structure to store junior water rights or water diverted under an alternate point of diversion for existing storage for existing water rights owned by Summit or MVIC, the water could then be available to meet the irrigation needs of the company when droughts occur or could provide additional water supplies. The water stored by MVIC could be delivered to its shareholders by potentially utilizing the Summit Reservoir and Irrigation system when excess capacity existed. Obviously a new storage structure would require easements and approval of the Forest Service.

Considering the potential of coordination of efforts between Summit and MVIC, a number of possibilities could exist which may include the following:

Coordination of maintenance efforts.

- Reduction in liabilities.
- Enhance delivery & maximize diversions through modernization of facilities and real time monitoring.

- Extend season for Summit and enhance crop production as a result of additional storage.
- Potentially allow for irrigation of other lands previously irrigated under the Summit system.
- Potentially allow for leasing of supplies to other entities which may include leasing for augmentation purposes or instream flows.
- Establish a program to maintain dominion and control of all return flows for use and reuse.

Another option discussed included delivering water to lands located within the MVIC service area boundaries via Summit's system. These lands would be considered Class 6 lands. The lands are located south of Highway 160, south of Stinking Springs Canyon. Mr. Siscoe indicated that at some point in time, these lands were possibly served by a private lateral, remnants which are still evident. The area includes about 1,000 acres could potentially be irrigated. Water to serve these lands would be delivered from junior storage then be possibly routed through Summit's system.

Finally, it is apparent that at times, significant flows exist on Lost Canyon Creek that could be captured and put into storage for later use. Storage at a new site would be subject to other basin water rights, but conceptually, capturing high flows may alleviate times that Summit's water rights are called out or simply serve as a supplemental source.

***SUMMARY OF FINDINGS FOR SUMMIT***

A cooperative arrangement with MVIC could provide the following benefits particularly considering potential development of additional storage:

- Improved or reduced costs and increased maintenance efficiencies.
- Improve diversion efficiencies through modernization and real time monitoring.
- More consistent deliveries if additional storage occurs.
- Extended irrigation season with the development of additional storage.
- Increased crop yield and revenue.
- Increase water right and property value.

Changes in operations could potentially raise the following concerns:

- Evaluation of Summit's existing storage water rights.
- Increased costs for infrastructure development or improvements for Summit shareholders.

***SUMMARY OF FINDINGS FOR MVIC***

A cooperative arrangement with Summit could provide the following benefits:

- Potential for increased Summit return flows if additional storage occurs.
- Overall community benefit which may not be tangible.
- Potential for additional lands to be brought into irrigation in the event additional storage is developed.
- Annual revenue from equipment/staff use.

Changes in operations could potentially raise the following concerns:

- Potentially add new liabilities.
- Potential for additional costs to shareholders.

***SUMMARY OF FINDINGS FOR DWCD***

A cooperative arrangement with Summit and MVIC could provide the following benefits:

- Potential for use of Summit's and MVIC's return flows.
- Additional storage capacity if a new storage site was developed; could supplement McPhee Reservoir storage.
- Additional water for lease if additional storage is developed and water then made available to shareholders.

Changes in operations could potentially raise the following concerns:

- Reduction in river flows and impact in stream flow right in the Dolores but increase flows potential in McElmo Creek.

**WATER RIGHT MODIFICATIONS**

Considering the systems potentially involved in possible coordination (Summit, MVIC, and possibly DWCD), existing water rights may need to be modified to allow for the proposed operations. Additionally, new water rights may need to be filed in Water Court to provide for additional storage or other related operations. Consideration into further development of water storage or potential changes in operations should also consider limitations under existing water rights as well as potential cooperative operations among the three companies.

# FIGURES

**Legend**

- Approx. Summit System Boundary
- Approx. MVIC System Area

McPhee Reservoir

DOLORES

CORTEZ

MANCOS

**Approx. MVIC System Area**

**Approx. Summit System Area**

0 1.5 3 Miles

1:158,400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# SUMMIT AND MVIC SYSTEMS

Vicinity Map

| No. | Rev. Date | Revision Description |
|---|---|---|
| | | |

Date: 11 Aug 2010
Job #: 08-148
Drawn By: JMD

Figure: **1**

Of: 2

Printed: August 11, 2010 by JMD
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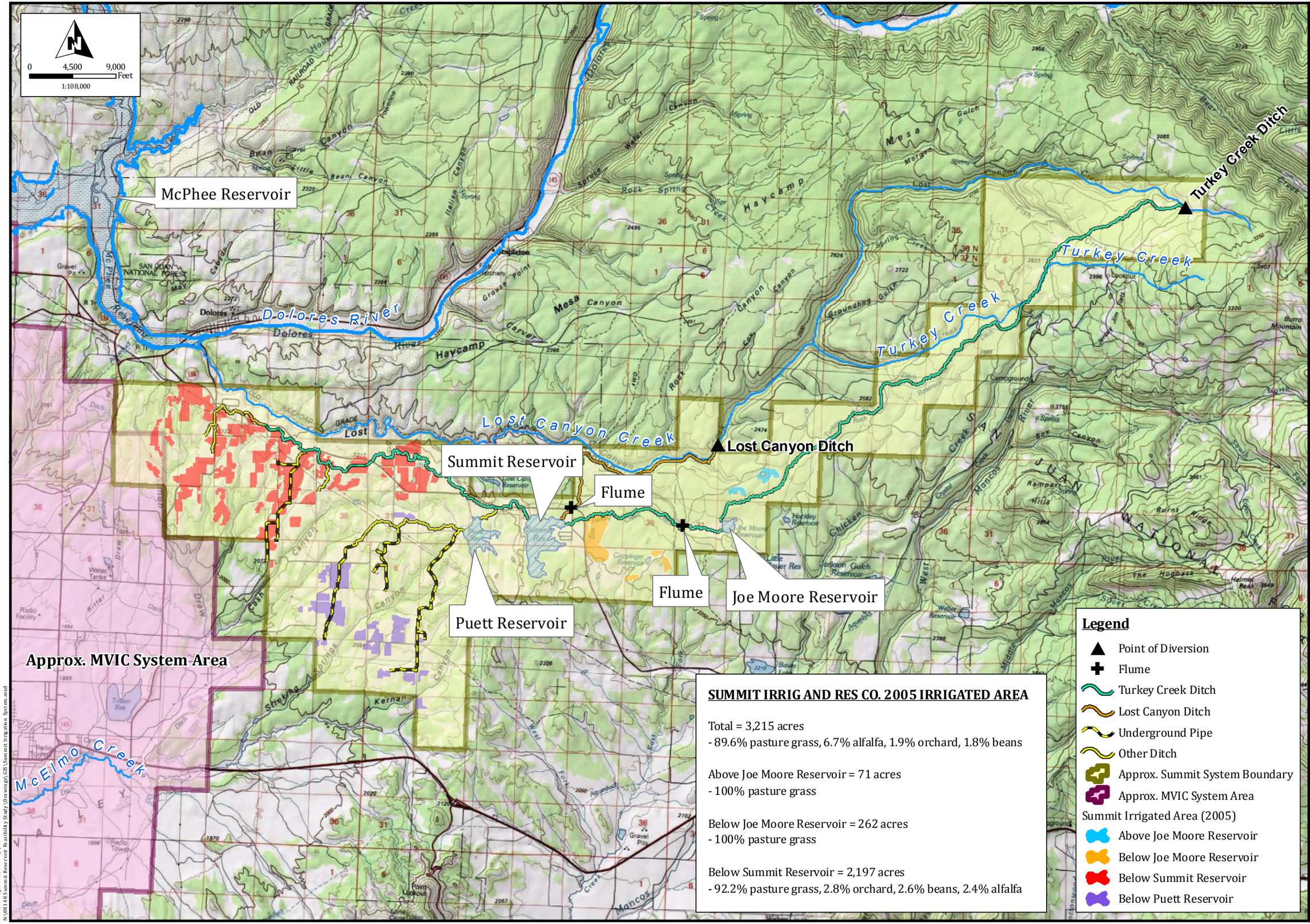


**Approx. MVIC System Area**

**SUMMIT IRRIG AND RES CO. 2005 IRRIGATED AREA**

Total = 3,215 acres
- 89.6% pasture grass, 6.7% alfalfa, 1.9% orchard, 1.8% beans

Above Joe Moore Reservoir = 71 acres
- 100% pasture grass

Below Joe Moore Reservoir = 262 acres
- 100% pasture grass

Below Summit Reservoir = 2,197 acres
- 92.2% pasture grass, 2.8% orchard, 2.6% beans, 2.4% alfalfa

**Legend**

- Point of Diversion
- Flume
- Turkey Creek Ditch
- Lost Canyon Ditch
- Underground Pipe
- Other Ditch
- Approx. Summit System Boundary
- Approx. MVIC System Area

Summit Irrigated Area (2005)

- Above Joe Moore Reservoir
- Below Joe Moore Reservoir
- Below Summit Reservoir
- Below Puett Reservoir


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# SUMMIT RESERVOIR AND IRRIGATION COMPANY

Overview Map

| No. | Rev. Date | Revision Description |
|---|---|---|
| | | |

Date: 11 Aug 2010
Job #: 08-148
Drawn By: JMD

Figure: **2**

Of: 2

Printed: August 11, 2010 by JMD
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# APPENDIX A

# TABLES

TABLE A-1

SUMMIT DITCH
Summary of Diversions

*all values in acre-feet*

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1951 | 0 | 0 | 0 | 915 | 2747 | 274 | 0 | 0 | 0 | 0 | 0 | 0 | 3936 |
| 1952 | 0 | 0 | 0 | 1529 | 966 | 954 | 42 | 0 | 0 | 0 | 0 | 0 | 3492 |
| 1953 | 0 | 0 | 0 | 2204 | 2711 | 493 | 0 | 0 | 0 | 0 | 0 | 0 | 5408 |
| 1954 | 0 | 0 | 0 | 2289 | 1722 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 4028 |
| 1955 | 0 | 0 | 0 | 2366 | 2979 | 292 | 36 | 79 | 0 | 0 | 0 | 0 | 5752 |
| 1956 | 0 | 0 | 327 | 3872 | 2057 | 192 | 0 | 0 | 0 | 0 | 0 | 0 | 6448 |
| 1974 | 0 | 0 | 0 | 1419 | 1620 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3039 |
| 1975 | 0 | 0 | 0 | 920 | 3237 | 1853 | 327 | 0 | 0 | 0 | 0 | 0 | 6336 |
| 1976 | 0 | 0 | 0 | 4081 | 3378 | 189 | 0 | 0 | 0 | 0 | 0 | 0 | 7648 |
| 1977 | 0 | 0 | 0 | 384 | 206 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 610 |
| 1978 | 0 | 0 | 0 | 4135 | 2733 | 1309 | 22 | 0 | 0 | 0 | 0 | 0 | 8199 |
| 1979 | 0 | 0 | 0 | 4593 | 3982 | 1654 | 160 | 0 | 0 | 0 | 0 | 0 | 10389 |
| 1980 | 0 | 0 | 0 | 1512 | 3196 | 1036 | 0 | 0 | 0 | 0 | 0 | 0 | 5743 |
| 1981 | 0 | 0 | 0 | 2463 | 2965 | 328 | 0 | 0 | 0 | 0 | 0 | 0 | 5756 |
| 1982 | 0 | 0 | 31 | 2133 | 871 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3036 |
| 1983 | 0 | 0 | 0 | 670 | 677 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 1372 |
| 1984 | 0 | 0 | 0 | 2193 | 530 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 2734 |
| 1985 | 0 | 0 | 0 | 424 | 216 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 641 |
| 1986 | 0 | 0 | 649 | 843 | 117 | 119 | 8 | 0 | 0 | 0 | 0 | 0 | 1736 |
| 1987 | 0 | 0 | 0 | 472 | 13 | 536 | 0 | 0 | 0 | 0 | 0 | 0 | 1021 |
| 1988 | 0 | 0 | 0 | 2304 | 282 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2585 |
| 1989 | 0 | 0 | 917 | 1502 | 150 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2569 |
| 1990 | 0 | 0 | 0 | 1205 | 1997 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3201 |
| 1991 | 0 | 0 | 0 | 2252 | 753 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3005 |
| 1992 | 0 | 0 | 0 | 2360 | 299 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2659 |
| 1993 | 0 | 0 | 0 | 1740 | 97 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 1846 |
| 1994 | 0 | 0 | 118 | 1387 | 1468 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2973 |
| 1995 | 0 | 0 | 56 | 780 | 1189 | 350 | 16 | 0 | 0 | 0 | 0 | 0 | 2390 |
| 1996 | 0 | 0 | 0 | 1910 | 868 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2778 |
| 1997 | 0 | 0 | 4 | 864 | 1787 | 54 | 10 | 267 | 29 | 0 | 0 | 0 | 3014 |
| 1998 | 0 | 0 | 0 | 1069 | 2228 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3297 |
| 1999 | 0 | 0 | 1017 | 1133 | 1131 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 3300 |
| 2000 | 0 | 0 | 0 | 1572 | 1029 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2601 |
| 2001 | 0 | 0 | 0 | 2175 | 1032 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3208 |
| 2002 | 0 | 0 | 8 | 561 | 151 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 719 |
| 2003 | 0 | 0 | 0 | 2748 | 910 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3658 |
| 2004 | 0 | 0 | 760 | 1914 | 720 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3394 |
| 2005 | 0 | 0 | 0 | 631 | 1780 | 1247 | 134 | 30 | 15 | 0 | 0 | 0 | 3836 |
| 2006 | 0 | 0 | 0 | 2774 | 373 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3147 |
| 2007 | 0 | 0 | 1406 | 2662 | 1553 | 286 | 0 | 0 | 0 | 0 | 0 | 0 | 5907 |
| 2008 | 0 | 0 | 161 | 335 | 3269 | 1216 | 103 | 0 | 0 | 0 | 0 | 0 | 5084 |
| 2009 | 0 | 0 | 0 | 893 | 2426 | 202 | 0 | 0 | 0 | 0 | 0 | 0 | 3521 |
| average | 0 | 0 | 130 | 1766 | 1486 | 302 | 20 | 9 | 1 | 0 | 0 | 0 | 3715 |
| max | 0 | 0 | 1406 | 4593 | 3982 | 1853 | 327 | 267 | 29 | 0 | 0 | 0 | 10389 |
| min | 0 | 0 | 0 | 335 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 610 |

TABLE A-2

TURKEY CREEK DITCH
Summary of Diversions

*all values in acre-feet*

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1951 | 0 | 0 | 0 | 157 | 852 | 365 | 45 | 0 | 0 | 0 | 0 | 0 | 1420 |
| 1952 | 0 | 0 | 0 | 1230 | 2053 | 1628 | 416 | 113 | 0 | 0 | 0 | 0 | 5440 |
| 1953 | 0 | 0 | 0 | 395 | 869 | 562 | 87 | 63 | 0 | 0 | 0 | 0 | 1976 |
| 1954 | 0 | 0 | 0 | 572 | 778 | 162 | 96 | 67 | 0 | 0 | 0 | 0 | 1674 |
| 1955 | 0 | 0 | 0 | 336 | 1091 | 429 | 63 | 182 | 46 | 0 | 0 | 0 | 2148 |
| 1956 | 0 | 0 | 148 | 568 | 1258 | 458 | 79 | 23 | 0 | 0 | 0 | 0 | 2534 |
| 1974 | 0 | 0 | 0 | 54 | 654 | 79 | 103 | 61 | 48 | 75 | 0 | 0 | 1074 |
| 1975 | 0 | 0 | 0 | 0 | 1045 | 543 | 432 | 83 | 0 | 0 | 0 | 0 | 2104 |
| 1976 | 0 | 0 | 0 | 460 | 919 | 204 | 0 | 0 | 0 | 0 | 0 | 0 | 1582 |
| 1977 | 0 | 0 | 0 | 31 | 201 | 16 | 8 | 0 | 0 | 0 | 0 | 0 | 255 |
| 1978 | 0 | 0 | 0 | 623 | 1292 | 564 | 59 | 0 | 0 | 0 | 0 | 0 | 2538 |
| 1979 | 0 | 0 | 0 | 0 | 0 | 262 | 284 | 81 | 0 | 0 | 0 | 0 | 628 |
| 1980 | | | | | | | | | | | | | |
| 1981 | 0 | 0 | 0 | 485 | 639 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1124 |
| 1982 | 0 | 0 | 0 | 682 | 520 | 0 | 34 | 67 | 119 | 123 | 0 | 0 | 1545 |
| 1983 | 0 | 0 | 0 | 54 | 1488 | 1153 | 0 | 0 | 0 | 0 | 0 | 0 | 2694 |
| 1984 | 0 | 0 | 46 | 823 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 891 |
| 1985 | 0 | 0 | 0 | 586 | 519 | 3 | 0 | 0 | 0 | 37 | 0 | 0 | 1145 |
| 1986 | 1524 | 0 | 0 | 883 | 655 | 680 | 211 | 206 | 60 | 280 | 0 | 0 | 4501 |
| 1987 | 0 | 0 | 0 | 1000 | 239 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 1247 |
| 1988 | 0 | 0 | 3 | 812 | 520 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1336 |
| 1989 | 0 | 0 | 0 | 916 | 273 | 0 | 8 | 9 | 0 | 0 | 0 | 0 | 1206 |
| 1990 | 0 | 0 | 0 | 23 | 103 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 142 |
| 1991 | 0 | 0 | 0 | 505 | 656 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1161 |
| 1992 | 0 | 0 | 0 | 516 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 815 |
| 1993 | 0 | 0 | 216 | 725 | 378 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 1324 |
| 1994 | 0 | 0 | 61 | 598 | 695 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1353 |
| 1995 | 0 | 0 | 114 | 437 | 582 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 1151 |
| 1996 | 0 | 0 | 0 | 0 | 117 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 117 |
| 1997 | 0 | 0 | 0 | 533 | 685 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 1238 |
| 1998 | 0 | 0 | 282 | 1037 | 616 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1935 |
| 1999 | 0 | 0 | 0 | 315 | 451 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 778 |
| 2000 | 0 | 0 | 0 | 74 | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 143 |
| 2001 | 0 | 0 | 0 | 199 | 280 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 480 |
| 2002 | | | | | | | | | | | | | |
| 2003 | 0 | 0 | 0 | 338 | 231 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 569 |
| 2004 | 0 | 0 | 9 | 546 | 520 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 1127 |
| 2005 | 0 | 0 | 0 | 1345 | 1769 | 111 | 0 | 0 | 0 | 0 | 0 | 0 | 3225 |
| 2006 | 0 | 0 | 0 | 200 | 357 | 129 | 0 | 0 | 0 | 0 | 0 | 0 | 686 |
| 2007 | 0 | 0 | 411 | 514 | 904 | 115 | 0 | 0 | 0 | 0 | 0 | 0 | 1944 |
| 2008 | 0 | 0 | 365 | 1321 | 1289 | 157 | 169 | 36 | 0 | 0 | 0 | 0 | 3336 |
| 2009 | 0 | 0 | 0 | 805 | 1131 | 104 | 0 | 0 | 0 | 0 | 0 | 0 | 2040 |
| average | 38 | 0 | 41 | 517 | 676 | 196 | 52 | 25 | 7 | 13 | 0 | 0 | 1566 |
| max | 1524 | 0 | 411 | 1345 | 2053 | 1628 | 432 | 206 | 119 | 280 | 0 | 0 | 5440 |
| min | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 117 |

TABLE A-3

SUMMIT DITCH and TURKEY CREEK DITCH
Summary of Total Diversions

*all values in acre-feet*

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1951 | 0 | 0 | 0 | 1072 | 3599 | 639 | 45 | 0 | 0 | 0 | 0 | 0 | 5355 |
| 1952 | 0 | 0 | 0 | 2759 | 3019 | 2583 | 458 | 113 | 0 | 0 | 0 | 0 | 8932 |
| 1953 | 0 | 0 | 0 | 2599 | 3580 | 1055 | 87 | 63 | 0 | 0 | 0 | 0 | 7384 |
| 1954 | 0 | 0 | 0 | 2861 | 2500 | 179 | 96 | 67 | 0 | 0 | 0 | 0 | 5702 |
| 1955 | 0 | 0 | 0 | 2703 | 4070 | 721 | 99 | 261 | 46 | 0 | 0 | 0 | 7900 |
| 1956 | 0 | 0 | 475 | 4440 | 3314 | 651 | 79 | 23 | 0 | 0 | 0 | 0 | 8982 |
| 1974 | 0 | 0 | 0 | 1473 | 2274 | 79 | 103 | 61 | 48 | 75 | 0 | 0 | 4113 |
| 1975 | 0 | 0 | 0 | 920 | 4282 | 2396 | 759 | 83 | 0 | 0 | 0 | 0 | 8439 |
| 1976 | 0 | 0 | 0 | 4541 | 4296 | 394 | 0 | 0 | 0 | 0 | 0 | 0 | 9231 |
| 1977 | 0 | 0 | 0 | 415 | 408 | 35 | 8 | 0 | 0 | 0 | 0 | 0 | 866 |
| 1978 | 0 | 0 | 0 | 4758 | 4025 | 1873 | 81 | 0 | 0 | 0 | 0 | 0 | 10737 |
| 1979 | 0 | 0 | 0 | 4593 | 3982 | 1916 | 444 | 81 | 0 | 0 | 0 | 0 | 11017 |
| 1980 | 0 | 0 | 0 | 1512 | 3196 | 1036 | 0 | 0 | 0 | 0 | 0 | 0 | 5743 |
| 1981 | 0 | 0 | 0 | 2948 | 3604 | 328 | 0 | 0 | 0 | 0 | 0 | 0 | 6880 |
| 1982 | 0 | 0 | 31 | 2815 | 1391 | 0 | 34 | 67 | 119 | 123 | 0 | 0 | 4580 |
| 1983 | 0 | 0 | 0 | 724 | 2165 | 1178 | 0 | 0 | 0 | 0 | 0 | 0 | 4066 |
| 1984 | 0 | 0 | 46 | 3016 | 553 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 3625 |
| 1985 | 0 | 0 | 0 | 1011 | 735 | 3 | 0 | 0 | 0 | 37 | 0 | 0 | 1786 |
| 1986 | 1524 | 0 | 649 | 1726 | 773 | 799 | 219 | 206 | 60 | 280 | 0 | 0 | 6237 |
| 1987 | 0 | 0 | 0 | 1472 | 252 | 545 | 0 | 0 | 0 | 0 | 0 | 0 | 2268 |
| 1988 | 0 | 0 | 3 | 3116 | 802 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3921 |
| 1989 | 0 | 0 | 917 | 2418 | 423 | 0 | 8 | 9 | 0 | 0 | 0 | 0 | 3775 |
| 1990 | 0 | 0 | 0 | 1227 | 2100 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 3344 |
| 1991 | 0 | 0 | 0 | 2757 | 1409 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4166 |
| 1992 | 0 | 0 | 0 | 2876 | 598 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3474 |
| 1993 | 0 | 0 | 216 | 2464 | 475 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 3171 |
| 1994 | 0 | 0 | 179 | 1985 | 2163 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4327 |
| 1995 | 0 | 0 | 170 | 1217 | 1770 | 369 | 16 | 0 | 0 | 0 | 0 | 0 | 3542 |
| 1996 | 0 | 0 | 0 | 1910 | 986 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2896 |
| 1997 | 0 | 0 | 4 | 1397 | 2471 | 74 | 10 | 267 | 29 | 0 | 0 | 0 | 4251 |
| 1998 | 0 | 0 | 282 | 2106 | 2845 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5232 |
| 1999 | 0 | 0 | 1017 | 1449 | 1582 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 4077 |
| 2000 | 0 | 0 | 0 | 1646 | 1099 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2744 |
| 2001 | 0 | 0 | 0 | 2374 | 1313 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3687 |
| 2002 | 0 | 0 | 8 | 561 | 151 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 719 |
| 2003 | 0 | 0 | 0 | 3086 | 1141 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4226 |
| 2004 | 0 | 0 | 769 | 2461 | 1240 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 4520 |
| 2005 | 0 | 0 | 0 | 1975 | 3549 | 1358 | 134 | 30 | 15 | 0 | 0 | 0 | 7061 |
| 2006 | 0 | 0 | 0 | 2974 | 730 | 129 | 0 | 0 | 0 | 0 | 0 | 0 | 3832 |
| 2007 | 0 | 0 | 1817 | 3176 | 2458 | 401 | 0 | 0 | 0 | 0 | 0 | 0 | 7851 |
| 2008 | 0 | 0 | 526 | 1656 | 4558 | 1373 | 272 | 36 | 0 | 0 | 0 | 0 | 8420 |
| 2009 | 0 | 0 | 0 | 1698 | 3556 | 306 | 0 | 0 | 0 | 0 | 0 | 0 | 5561 |
| average | 38 | 0 | 171 | 2284 | 2162 | 498 | 73 | 34 | 8 | 13 | 0 | 0 | 5280 |
| max | 1524 | 0 | 1817 | 4758 | 4558 | 2583 | 759 | 267 | 119 | 280 | 0 | 0 | 11017 |
| min | 0 | 0 | 0 | 415 | 151 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 719 |

TABLE A-4

SUMMIT RESERVOIR OUITLET
Summary of Releases

*all values in ac-ft*

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1955 | 0 | 0 | 0 | 66 | 1824 | 1944 | 1663 | 688 | 520 | 126 | 0 | 0 | 6831 |
| 1956 | 0 | 0 | 0 | 407 | 2452 | 1827 | 1892 | 861 | 87 | 65 | 254 | 0 | 7845 |
| 1974 | 0 | 0 | 0 | 0 | 1484 | 892 | 0 | 119 | 0 | 131 | 0 | 0 | 2626 |
| 1975 | 0 | 0 | 0 | 0 | 514 | 2218 | 1325 | 1433 | 596 | 0 | 0 | 0 | 6086 |
| 1976 | 0 | 0 | 0 | 831 | 2645 | 1182 | 1403 | 501 | 0 | 0 | 159 | 0 | 6720 |
| 1977 | 0 | 0 | 0 | 0 | 71 | 71 | 0 | 0 | 0 | 0 | 272 | 0 | 415 |
| 1978 | 0 | 0 | 0 | 1235 | 1121 | 2019 | 1265 | 1064 | 0 | 190 | 137 | 0 | 7031 |
| 1979 | 0 | 0 | 0 | 2796 | 2498 | 4514 | 2662 | 2452 | 803 | 238 | 238 | 0 | 16200 |
| 1980 | 0 | 0 | 0 | 420 | 1459 | 2440 | 1301 | 1242 | 238 | 143 | 0 | 0 | 7242 |
| 1981 | 0 | 0 | 0 | 381 | 738 | 1201 | 625 | 617 | 0 | 107 | 0 | 0 | 3669 |
| 1982 | 0 | 0 | 0 | 1133 | 2156 | 1994 | 1431 | 1026 | 0 | 95 | 0 | 54 | 7889 |
| 1983 | 0 | 0 | 0 | 662 | 982 | 2360 | 1819 | 1769 | 852 | 155 | 143 | 0 | 8742 |
| 1984 | 0 | 0 | 0 | 0 | 1460 | 1819 | 1315 | 1266 | 13 | 119 | 0 | 0 | 5992 |
| 1985 | 0 | 0 | 0 | 1833 | 1627 | 1779 | 1195 | 1296 | 101 | 0 | 0 | 0 | 7830 |
| 1986 | 0 | 0 | 675 | 674 | 1312 | 1975 | 1363 | 1365 | 313 | 0 | 0 | 0 | 7678 |
| 1987 | 0 | 0 | 0 | 828 | 1636 | 1874 | 1387 | 1363 | 47 | 0 | 113 | 0 | 7248 |
| 1988 | 0 | 0 | 0 | 1269 | 1892 | 1394 | 1380 | 917 | 127 | 87 | 0 | 0 | 7066 |
| 1989 | 0 | 0 | 0 | 1934 | 1921 | 1452 | 1166 | 794 | 95 | 117 | 0 | 0 | 6855 |
| 1990 | 0 | 0 | 0 | 100 | 754 | 790 | 124 | 141 | 151 | 142 | 0 | 0 | 2202 |
| 1991 | 0 | 0 | 0 | 0 | 2514 | 1749 | 1598 | 744 | 0 | 0 | 0 | 0 | 6605 |
| 1992 | 0 | 0 | 0 | 1569 | 2149 | 1790 | 1543 | 740 | 0 | 0 | 0 | 0 | 7790 |
| 1993 | 0 | 0 | 63 | 595 | 1694 | 1848 | 1617 | 612 | 0 | 0 | 0 | 0 | 6429 |
| 1994 | 0 | 0 | 0 | 698 | 1600 | 1871 | 1737 | 634 | 32 | 63 | 0 | 0 | 6635 |
| 1995 | 0 | 0 | 0 | 323 | 1822 | 1995 | 1563 | 1558 | 227 | 0 | 0 | 0 | 7488 |
| 1996 | 0 | 0 | 0 | 409 | 1891 | 1575 | 737 | 163 | 146 | 0 | 0 | 0 | 4922 |
| 1997 | 0 | 0 | 256 | 78 | 1191 | 2115 | 1656 | 1219 | 374 | 145 | 0 | 0 | 7034 |
| 1998 | 0 | 0 | 0 | 0 | 1351 | 1728 | 1750 | 1137 | 118 | 0 | 0 | 0 | 6084 |
| 1999 | 0 | 0 | 0 | 1792 | 631 | 1560 | 1627 | 698 | 339 | 116 | 0 | 0 | 6763 |
| 2000 | 0 | 0 | 0 | 1390 | 1855 | 1854 | 986 | 0 | 111 | 56 | 0 | 0 | 6252 |
| 2001 | 0 | 0 | 0 | 487 | 2080 | 1806 | 1503 | 0 | 89 | 30 | 0 | 0 | 5993 |
| 2002 | 0 | 0 | 0 | 0 | 220 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 220 |
| 2003 | 0 | 0 | 0 | 609 | 2575 | 1732 | 1793 | 0 | 0 | 0 | 0 | 0 | 6709 |
| 2004 | 0 | 0 | 0 | 1710 | 1771 | 1849 | 1202 | 0 | 0 | 0 | 0 | 0 | 6532 |
| 2005 | 0 | 0 | 0 | 0 | 1493 | 1656 | 1842 | 635 | 0 | 0 | 0 | 0 | 5625 |
| 2006 | 0 | 0 | 0 | 595 | 2154 | 1539 | 613 | 0 | 0 | 0 | 0 | 0 | 4901 |
| 2007 | 0 | 0 | 365 | 1765 | 2166 | 1962 | 1785 | 696 | 0 | 0 | 0 | 0 | 8739 |
| 2008 | 0 | 0 | 0 | 0 | 1900 | 2075 | 1660 | 202 | 0 | 0 | 0 | 0 | 5837 |
| 2009 | 0 | 0 | 0 | 0 | 1813 | 1787 | 1484 | 0 | 0 | 278 | 0 | 0 | 5361 |
| average | 0 | 0 | 36 | 700 | 1616 | 1743 | 1316 | 735 | 142 | 63 | 35 | 0 | 6371 |
| max | 0 | 0 | 675 | 2796 | 2645 | 4514 | 2662 | 2452 | 852 | 278 | 272 | 54 | 16200 |
| min | 0 | 0 | 0 | 0 | 71 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 220 |