

Water Supply Hydrology of the  
Powers Creek Basin and the  
Westbank Irrigation District

Okanagan Basin Implementation Agreement  
Program V

by  
D.B. Letvak  
Senior Hydrological Engineer

July 1981

Water Supply Hydrology of the  
Powers Creek Basin and the  
Westbank Irrigation District

Synopsis

The objective of this study is to assess the water supply capability of the Powers Creek system for irrigation-domestic use and fisheries in-stream flows. Both the existing system (1981) and the proposed system with more storage developed on the mainstem of Powers Creek were analysed.

Estimates were made of annual and monthly runoff for all sub-basins in the system for the mean year and low runoff years of different return periods. A variety of drought sequences were assumed and the water supply capability of the system for these droughts was assessed by a monthly accounting of runoff, demand, and storage.

Results indicate that for the chosen design droughts the existing system can supply 5,920 acre-feet per year for irrigation-domestic use and 3,060 acre-feet per year for fisheries. The proposed system could supply 8,980 acre-feet and 3,060 acre-feet per year for irrigation-domestic use and fisheries, respectively.

TABLE OF CONTENTS

|   | <u>Page</u> |
|---|-------------|
| 1. Introduction .....                               | 1           |
| 2. The Powers Creek System .....                    | 2           |
| 3. Runoff and Demand Information .....              | 2           |
| 3.1 Runoff Estimates .....                          | 2           |
| 3.2 Monthly Runoff Distribution .....               | 2           |
| 3.3 Monthly Demand Distribution .....               | 6           |
| 3.4 Monthly Flows for the Powers Creek System ..... | 7           |
| 4. Storage Calculations .....                       | 9           |
| 5. Results .....                                    | 11          |
| 6. Probability Considerations .....                 | 15          |
| 7. Discussion .....                                 | 18          |
| 8. Conclusions .....                                | 19          |

APPENDICES

|  |    |
|--|----|
| A. Annual Runoff Estimates for West Side Okanagan Valley ..... | A1 |
| B. Powers Creek Runoff-Demand-Storage Calculations .....       | B1 |
| C. Estimating Drought Risk .....                               | C1 |

Water Supply Hydrology of the  
Powers Creek Basin and the  
Westbank Irrigation District

1. INTRODUCTION

Powers Creek was one of three creeks tributary to Okanagan Lake which were designated under the Okanagan Basin Study and Implementation Program for multiple-use water management. The uses considered are water supply for irrigation-domestic use and in-stream flows to support fish habitat. The objective of this study is to assess how much water the Powers Creek basin with its existing and proposed future system of storage and diversion works can reliably supply for these uses (this will be referred to as the system yield).

It should be noted that previous water supply studies have been carried out for Powers Creek and Westbank I.D. Several major ones are:

1. D.E. Reksten, Preliminary Report on Powers Creek Water Yield for Westbank Irrigation District, B.C. Department of Lands, Forests, and Water Resources, December 1971.
2. Associated Engineering Services Ltd., (G.A. Bridger - Project Engineer), Westbank Water Study, November 1975.
3. Some hydrological estimates for Powers Creek were produced for the Okanagan Basin Study. These are presented in the Technical Supplements to the Main Report, Canada-British Columbia Okanagan Basin Agreement, March 1974.

The system of storage works considered in this study is different from that considered in the previous ones, so the results are not directly comparable. The runoff estimates developed for this study tend to confirm those of the Reksten study, which differed from those of the Okanagan Basin Study used in the A.E.S.L. report.

## 2. THE SYSTEM

### 2.1 Sub-Basins

The Powers Creek water collection system is shown in Figure 1. The system consists of ten sub-basins, including five reservoirs and three diversions. Table 1 gives a description of each sub-basin in the system (in the same numbering sequence as in Figure 1).

## 3. RUNOFF AND DEMAND INFORMATION

### 3.1 Runoff Estimates

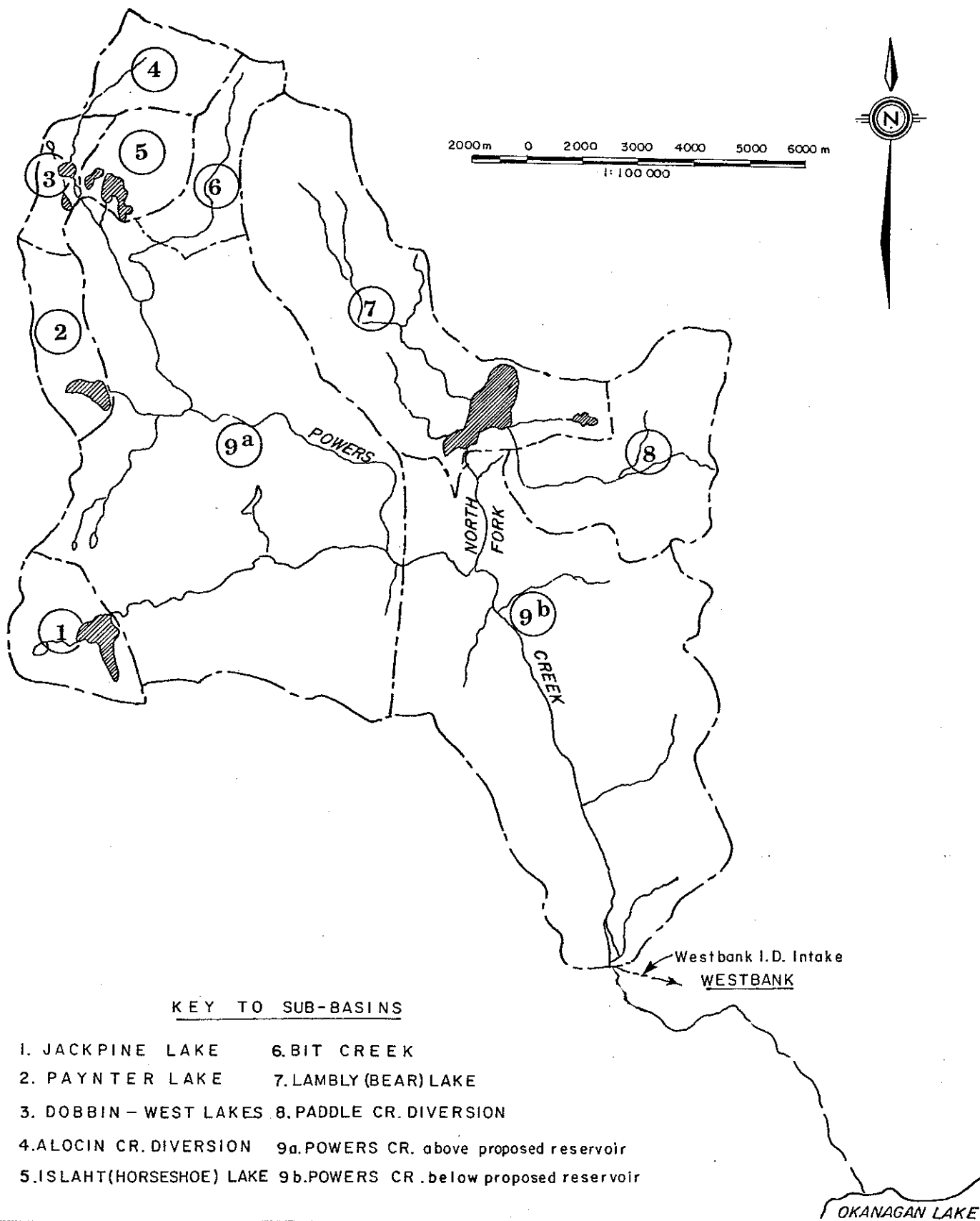
Mean annual runoff estimates have been made for all the Powers Creek sub-basins. Using regional frequency analysis of annual runoff volume, runoff for drought years of various return periods can be calculated. The return period is explained as follows: the annual runoff will be less than or equal to the n-year return period flow on the average once in a period of n-years.

The return period in years ( $t_n$ ) is the inverse of the probability of occurrence ( $P_n$ ) of that flow in any given year  $t_n = \frac{1}{P_n}$ . Taking the 5-year return period for example, the flow during any given year has a probability of  $1/5 = 0.20$  of being less than or equal to the 5-year low flow.

The runoff estimates have been made for the sub-basins by multiple regression analysis of runoff on physiographic variables (elevation, latitude and distance from a barrier), as explained in detail in Appendix A. Table 2 shows the estimates for the Powers Creek sub-basins.

### 3.2 Monthly Runoff Distribution

The monthly distribution of total annual runoff varies from basin to basin and from year to year. However, there are factors



KEY TO SUB-BASINS

- |                            |   |
|----------------------------|---|
| 1. JACKPINE LAKE           | 6. BIT CREEK                            |
| 2. PAYNTER LAKE            | 7. LAMBLY (BEAR) LAKE                   |
| 3. DOBBIN - WEST LAKES     | 8. PADDLE CR. DIVERSION                 |
| 4. ALOCIN CR. DIVERSION    | 9a. POWERS CR. above proposed reservoir |
| 5. ISLAHT (HORSESHOE) LAKE | 9b. POWERS CR. below proposed reservoir |



**Province of British Columbia**  
 Ministry of Environment  
 WATER MANAGEMENT BRANCH

TO ACCOMPANY REPORT ON  
 WATER SUPPLY HYDROLOGY  
 OF THE  
 POWERS CREEK BASIN  
 AND THE WESTBANK IRRIGATION DISTRICT

DATE  
 JULY, 1981

B. LETVAK ENGINEER

FILE No. DWG No. **FIGURE 1**

TABLE 1

## Sub-basins of Powers Creek Basin

| Sub-Basin                                       | Basin Area<br>(sq. mi.) | Reservoir<br>Storage<br>(ac-ft) | Notes  |
|---|-------------------------|---------------------------------|--|
| 1. Jackpine Lake                                | 1.8                     | 992                             |  |
| 2. Paynter Lake                                 | 1.4                     | 384                             |  |
| 3. Dobbin-West                                  | 0.8                     | 600                             | Alocin Creek water is diverted into Dobbin-West basin except during the summer dry months.   |
| 4. Alocin Creek                                 | 1.4                     | -                               | Annual diversion 475 acre-feet maximum. No diversion from June 16 to September 30.   |
| 5. Islaht (Horseshoe) Lake                      | 1.3                     | 800                             | Bit Creek is diverted into Islaht Lake basin.  |
| 6. Bit Creek Diversion                          | 1.6                     | -                               | Year round diversion of all runoff except extreme peaks.   |
| 7. Lambly (Bear) Lake                           | 7.4                     | 2,565                           | Lambly Creek above Lambly Lake is totally diverted into the Powers Creek basin.  |
| 8. Paddle Creek Diversion                       | 4.0                     | -                               | Diverted into Lambly Lake basin. Capacity of 50 cfs passes all but high peak flows.  |
| 9A. Powers Creek Basin above proposed reservoir | 16.4                    | up to 5,000                     | This basin receives discharge from Jackpine, Dobbin-West, Paynter, and Islaht Lakes, plus local runoff.  |
| 9B. Powers Creek basin below proposed reservoir | 16.2                    | -                               | This basin receives discharge from the basin above the proposed reservoir site, and Lambly Lake, as well as local runoff. The Westbank I.D. intake structure is at the bottom of this basin. |

TABLE 2

Annual Runoff Estimates for Westbank I.D. Sub-basins  
(acre-feet)

| Map #              | Powers Creek Sub-basins        | Mean Year | RETURN PERIOD |        |        |        |         |
|--------------------|--------------------------------|-----------|---------------|--------|--------|--------|---------|
|                    |                                |           | 2.5 yr.       | 5 yr.  | 10 yr. | 20 yr. | 100 yr. |
| P1                 | Jackpine Lake                  | 668       | 578           | 448    | 361    | 295    | 184     |
| P2                 | Paynter Lake                   | 620       | 536           | 415    | 335    | 274    | 171     |
| P3                 | Dobbin-West Lakes              | 433       | 374           | 290    | 234    | 191    | 119     |
| P4                 | Alocin Diversion               | 920       | 796           | 616    | 497    | 407    | 253     |
| P5                 | Islaht Lake                    | 781       | 676           | 523    | 422    | 345    | 215     |
| P6                 | Bit Creek                      | 1,079     | 933           | 723    | 583    | 477    | 297     |
| P7                 | Lambly Lake                    | 3,405     | 2,945         | 2,281  | 1,838  | 1,505  | 936     |
| P8                 | Paddle Creek Diversion         | 1,811     | 1,567         | 1,213  | 978    | 800    | 498     |
| P9                 | Lower Powers Creek             | 11,374    | 9,839         | 7,621  | 6,141  | 5,027  | 3,128   |
| P9a                | Powers Cr. above proposed Res. | 7,397     | 6,398         | 4,956  | 3,994  | 3,269  | 2,034   |
| P9b                | Powers Cr. below proposed Res. | 3,977     | 3,441         | 2,665  | 2,148  | 1,758  | 1,094   |
| TOTAL Powers Creek |                                | 21,090    | 18,244        | 14,130 | 11,389 | 9,321  | 5,801   |

which appear to influence the monthly flow distribution with some consistency, mainly elevation and latitude of the watershed.

The sub-basins of Powers Creek can be divided into two groups based on their runoff distributions, one for higher elevation sub-basins and another for lower elevation sub-basins. Dobbin-West, Paynter and Islaht sub-basins are included in the high elevation distribution and Jackpine, Lambly, Upper and Lower Powers Creek sub-basins are included in the low elevation distribution. The monthly distributions for these basins was based on data for other Okanagan Valley streams, and are as follows:

Monthly % of Annual Runoff

| <u>Month</u>  | <u>Higher<br/>Sub-Basins</u> | <u>Lower<br/>Sub-Basins</u> |
|---------------|------------------------------|-----------------------------|
| Jan.          | 1.5                          | 2.2                         |
| Feb.          | 1.5                          | 2.2                         |
| Mar.          | 1.8                          | 2.9                         |
| Apr.          | 6.5                          | 9.6                         |
| May           | 42.4                         | 41.0                        |
| June          | 30.0                         | 21.9                        |
| July          | 6.0                          | 6.6                         |
| Aug.          | 2.8                          | 3.3                         |
| Sept.         | 2.2                          | 2.9                         |
| Oct.          | 2.0                          | 2.7                         |
| Nov.          | 1.8                          | 2.5                         |
| Dec.          | 1.5                          | 2.2                         |
| <u>Annual</u> | <u>100.0%</u>                | <u>100.0%</u>               |

### 3.3 Monthly Demand Distribution

The Powers Creek System has two major demands upon it. The largest demand is from the Westbank Irrigation District for irrigation and domestic use. There are also some relatively small ( $\approx$  260 acre-feet per year) water licences below the Westbank I.D.

intake which will be considered as part of the Westbank demand. The monthly distribution of Westbank I.D. demand is based on recorded data for 1977-79. For these years, the average annual demand was 4,147 acre-feet. There is also a minimum in-stream flow requirement for fisheries as stated in the Okanagan Basin Study. This fisheries flow is a controlled release to Powers Creek below the Westbank I.D. intake. The distributions for these demands are illustrated in the following table:

| Month  | Fisheries<br>% | Irrigation-Domestic<br>% |
|--------|----------------|--------------------------|
| Jan.   | 7.84           | 1.1                      |
| Feb.   | 7.84           | 1.2                      |
| Mar.   | 7.84           | 1.3                      |
| Apr.   | 7.84           | 3.3                      |
| May    | 9.81           | 14.0                     |
| June   | 7.84           | 25.1                     |
| July   | 7.84           | 26.8                     |
| Aug.   | 7.84           | 19.7                     |
| Sept.  | 9.81           | 3.3                      |
| Oct.   | 9.81           | 1.8                      |
| Nov.   | 7.84           | 1.3                      |
| Dec.   | 7.84           | 1.1                      |
| Annual | ≈ 100.00%      | 100.0%                   |

#### 3.4 Monthly Flows for the Powers Creek System

For the Powers Creek reservoir sub-basins described in this report, estimates were made of monthly runoff for the mean year on the basis of the monthly distribution and annual runoff estimates described earlier. Table 3 shows the monthly volume runoff for each sub-basin in a mean year.

Annual runoff for below average years is taken to be a percentage of the mean year value, derived from the regional frequency curve of annual volume runoff, as described in Appendix A. The monthly distribution is assumed to be the same as that for

TABLE 3

Mean Year Monthly Runoff in Powers Creek Sub-basins  
(Acre-feet)

| Month     | High Elev. % Distribution | Paynter Reservoir | Dublin-West Reservoir | Alocin* Diversion* | Isiaht Reservoir | Bit Creek Diversion | Low Elev. % Distribution | Jackpine | Lambly Reservoir | Paddle | Powers Cr. above proposed reservoir | Powers Cr. below proposed reservoir | Powers Creek existing system | TOTAL RUNOFF ACRE-FEET |
|-----------|---------------------------|-------------------|-----------------------|--------------------|------------------|---------------------|--------------------------|----------|------------------|--------|-------------------------------------|-------------------------------------|------------------------------|------------------------|
| JANUARY   | 1.5                       | 9.3               | 6.5                   | 13.8               | 11.7             | 16.2                | 2.2                      | 14.7     | 74.9             | 39.9   | 162.7                               | 87.5                                | 250.2                        | 437.2                  |
| FEBRUARY  | 1.5                       | 9.3               | 6.5                   | 13.8               | 11.7             | 16.2                | 2.2                      | 14.7     | 74.9             | 39.9   | 162.7                               | 87.5                                | 250.2                        | 437.2                  |
| MARCH     | 1.8                       | 11.2              | 7.8                   | 16.6               | 14.1             | 19.4                | 2.9                      | 19.4     | 98.7             | 52.5   | 214.5                               | 115.3                               | 329.8                        | 569.5                  |
| APRIL     | 6.5                       | 40.3              | 28.1                  | 59.8               | 50.7             | 70.1                | 9.6                      | 64.1     | 326.9            | 173.8  | 710.1                               | 381.8                               | 1091.9                       | 1095.7                 |
| MAY       | 42.4                      | 262.9             | 183.6                 | 390.1              | 331.1            | 457.5               | 41.0                     | 273.9    | 1396.1           | 742.5  | 3032.8                              | 1630.6                              | 4663.4                       | 8701.1                 |
| JUNE      | 30.0                      | 186.0             | 129.9                 | 276.0              | 234.3            | 323.7               | 21.9                     | 146.3    | 745.7            | 316.6  | 1620.0                              | 871.0                               | 2491.0                       | 4929.5                 |
| JULY      | 6.0                       | 37.2              | 26.0                  | 55.2               | 46.9             | 64.8                | 6.6                      | 44.1     | 224.7            | 119.5  | 188.2                               | 262.5                               | 750.7                        | 1369.1                 |
| AUGUST    | 2.8                       | 17.3              | 12.1                  | 25.7               | 21.9             | 30.2                | 3.3                      | 22.0     | 112.4            | 59.7   | 244.1                               | 131.2                               | 375.3                        | 676.6                  |
| SEPTEMBER | 2.2                       | 13.6              | 9.5                   | 20.2               | 17.2             | 23.7                | 2.9                      | 19.4     | 98.8             | 52.5   | 214.5                               | 115.3                               | 329.8                        | 584.7                  |
| OCTOBER   | 2.0                       | 12.4              | 8.7                   | 18.4               | 15.6             | 21.6                | 2.7                      | 18.0     | 91.9             | 48.9   | 199.7                               | 107.4                               | 307.1                        | 542.6                  |
| NOVEMBER  | 1.8                       | 11.2              | 7.8                   | 16.6               | 14.1             | 19.4                | 2.5                      | 16.7     | 85.1             | 45.3   | 185.0                               | 99.4                                | 284.4                        | 500.6                  |
| DECEMBER  | 1.5                       | 9.3               | 6.5                   | 13.8               | 11.7             | 16.2                | 2.2                      | 14.7     | 74.9             | 39.9   | 162.7                               | 87.5                                | 250.2                        | 437.2                  |
| TOTAL     | 100.0%                    | 620.0             | 433.0                 | 920.0              | 781.0            | 1079.0              | 100.0%                   | 668.0    | 3405.0           | 1811.0 | 7397.0                              | 3977.0                              | 11374.0                      | 21091.0                |

\* Note that this diversion into Isiaht is limited to 475 acre-feet per year with no diversion between June 16 and September 30.

a mean runoff year.

#### 4. STORAGE CALCULATIONS

Monthly computations of system inflows, demands and storage were carried out for a variety of annual runoff series to determine the annual demand which can be met by the system. The calculations involve a monthly comparison of demand with net inflow to the reservoirs and the lower sub-basins, resulting in a monthly storage change for each reservoir.

The different flow series tested consisted of two mean years followed by one or more drought years followed by two more mean years. The two mean years preceding the drought ensure that the system storages are at average carry over going into the drought. The two mean years after the drought are to observe the storage recovery of the system.

The fisheries demand usually used in the computations is 3,060 acre-feet per year, from the Okanagan Basin Study (lower values were also tested), distributed monthly as shown earlier. Operational waste, or water unintentionally released to the creek below the intake, was assumed to be 1,100 acre-feet per year. This was arrived at on the basis of conversations with Mr. G. Loverin, Westbank I.D. Manager, and giving consideration to the balancing storage at the intake pond and elsewhere in the system, and the travel time from the nearest reservoir. This waste is deducted from the flows in the unregulated sub-basin above the intake, and is distributed monthly in the same way as the sub-basin flows. Irrigation-domestic demand is distributed through the year as described previously.

Reservoir releases needed to meet the demand are distributed among the reservoirs in the same proportion each month. The reservoir

release distribution depends on the annual volume of inflow and storage for each reservoir, and was chosen (with some trial and error) to maximize the water supply. This was done for the existing system with 5,341 acre-feet storage and the proposed system with 10,341 acre-feet storage. In a month when one or more reservoirs run out of water, the others provide further releases in proportion to their allotted shares.

The live storages and release distributions for the existing and proposed systems are shown in the following table:

Reservoir Release Distributions

| Reservoir   | Live Storage<br>acre-feet | Reservoir Release Distribution % |                 |
|-------------|---------------------------|----------------------------------|-----------------|
|             |                           | Existing System                  | Proposed System |
| Jackpine    | 992                       | 8%                               | 7%              |
| Paynter     | 384                       | 7%                               | 5%              |
| Dobbin-West | 600                       | 10%                              | 8%              |
| Islaht      | 800                       | 20%                              | 11%             |
| Lambly      | 2,565                     | 55%                              | 29%             |
| Proposed    | 5,000                     | -                                | 40%             |
|             |                           | 100%                             | 100%            |

The reservoirs were assumed to be full at the beginning of the flow series. Each month, the total demand was computed - this is the sum of irrigation-domestic and fisheries demands. The monthly total demand is supplied by runoff from the unregulated sub-basin (from which waste has been deducted) if possible. If more water is needed, the required amount is released from the reservoirs as described above. The monthly inflow, outflow (release), change in storage, and month-end storage are computed for each reservoir. When, for a given flow series (drought), the annual demands are such that all the storage in the system is just used, that is the maximum yield (allowable demand) of the system for that drought.

This type of calculation was carried out for a variety of different droughts, for the existing and proposed systems. Typically, the values of waste and fisheries demand were set arbitrarily at some value, and the allowable irrigation-domestic demand (yield) was found for the given drought. For the proposed system, the yield was also assessed for smaller sizes of the proposed reservoir, using the release distribution determined for the 5,000 acre-foot proposed reservoir (which may not be optimum for the smaller sizes).

An example of the storage calculation is given in Table 4, for the case of two 1 in 20 low flow years and the existing system. Copies of the storage calculations for a large number of droughts and both systems are shown in Appendix B.

## 5. RESULTS

The results of the storage calculations are shown in Table 5, for the existing system and for the proposed system with the additional 5,000 acre-foot reservoir. Figure 2 is a graphical representation of the irrigation-domestic yields of the existing and proposed systems for several one and two year droughts. Also included in the graph are yields for the proposed system with reservoir sizes varying between 0 and 5,000 acre-feet. These intermediate yields were determined from computer runs with the smaller proposed reservoir in the system, as well as from interpolation of the storage calculation results as shown in Figure 3 (which is shown later in this report).

The results indicate that, not surprisingly, the more extreme the design drought the less water the system can supply for irrigation-domestic and fisheries uses. Also, the greater the system storage, the greater the yield for a given design drought.

TABLE 4

EXAMPLE OF RUNOFF-DEMAND-STORAGE CALCULATIONS

EXISTING SYSTEM (STORAGE = 5341 AC-FT)

TWO 1 IN 20 LOW RUNOFF YEARS

| DEMAND SUB-BASIN INFLOW           | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAMBLY       |          |               |       |
|-----------------------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|-------|
|                                   | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |       |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 226.         | 14.      | 6.            | 600.         | 15.      | 8.            | 992.         | 9.       | 3.            | 384.         | 28.      | 11.           | 800.         | 115.     | 68.           | 2565. |
| 318.                              | 226.         | 14.      | 5.            | 600.         | 15.      | 8.            | 992.         | 10.      | 4.            | 384.         | 28.      | 10.           | 800.         | 115.     | 64.           | 2565. |
| 324.                              | 298.         | 18.      | 15.           | 600.         | 19.      | 17.           | 992.         | 11.      | 9.            | 384.         | 33.      | 28.           | 800.         | 151.     | 137.          | 2565. |
| 454.                              | 986.         | 63.      | 63.           | 600.         | 64.      | 64.           | 992.         | 40.      | 40.           | 384.         | 121.     | 121.          | 800.         | 501.     | 501.          | 2565. |
| 1208.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                             | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                             | 339.         | 12.      | -106.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 469.         | 172.     | -476.         | 1719. |
| 514.                              | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                              | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                              | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                              | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 226.         | 14.      | 6.            | 406.         | 15.      | 8.            | 896.         | 9.       | 3.            | 279.         | 28.      | 11.           | 517.         | 115.     | 68.           | 2044. |
| 318.                              | 226.         | 14.      | 5.            | 411.         | 15.      | 8.            | 904.         | 10.      | 4.            | 283.         | 28.      | 10.           | 526.         | 115.     | 64.           | 2108. |
| 324.                              | 298.         | 18.      | 15.           | 427.         | 19.      | 17.           | 921.         | 11.      | 9.            | 292.         | 33.      | 28.           | 554.         | 151.     | 137.          | 2245. |
| 454.                              | 986.         | 63.      | 63.           | 489.         | 64.      | 64.           | 985.         | 40.      | 40.           | 332.         | 121.     | 121.          | 675.         | 501.     | 501.          | 2565. |
| 1208.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                             | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                             | 339.         | 12.      | -106.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 469.         | 172.     | -476.         | 1719. |
| 514.                              | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                              | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                              | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                              | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |
| LOW RUNOFF YEAR ( 44.20% OF MEAN) |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 86.          | 9.       | -14.          | 387.         | 7.       | -11.          | 877.         | 4.       | -12.          | 264.         | 12.      | -33.          | 473.         | 51.      | -73.          | 1903. |
| 318.                              | 86.          | 9.       | -14.          | 373.         | 7.       | -12.          | 865.         | 4.       | -12.          | 252.         | 12.      | -34.          | 439.         | 51.      | -76.          | 1827. |
| 324.                              | 114.         | 11.      | -10.          | 363.         | 8.       | -8.           | 856.         | 5.       | -10.          | 243.         | 15.      | -27.          | 412.         | 67.      | -49.          | 1778. |
| 454.                              | 377.         | 39.      | 31.           | 394.         | 28.      | 22.           | 879.         | 18.      | 12.           | 255.         | 53.      | 38.           | 450.         | 221.     | 179.          | 1957. |
| 1208.                             | 1610.        | 254.     | 254.          | 600.         | 121.     | 121.          | 992.         | 116.     | 116.          | 371.         | 349.     | 349.          | 799.         | 945.     | 945.          | 2565. |
| 1867.                             | 860.         | 179.     | 79.           | 600.         | 65.      | -16.          | 976.         | 82.      | 12.           | 383.         | 247.     | 45.           | 800.         | 505.     | -49.          | 2516. |
| 1977.                             | 259.         | 11.      | -160.         | 440.         | 19.      | -118.         | 858.         | 16.      | -104.         | 279.         | 50.      | -294.         | 506.         | 152.     | -793.         | 1724. |
| 1517.                             | 129.         | 5.       | -133.         | 306.         | 10.      | -101.         | 757.         | 8.       | -90.          | 189.         | 23.      | -254.         | 252.         | 76.      | -687.         | 1037. |
| 514.                              | 114.         | 4.       | -36.          | 271.         | 8.       | -24.          | 733.         | 6.       | -22.          | 168.         | 18.      | -62.          | 190.         | 67.      | -153.         | 883.  |
| 417.                              | 106.         | 12.      | -19.          | 252.         | 8.       | -17.          | 716.         | 6.       | -16.          | 152.         | 16.      | -46.          | 144.         | 62.      | -109.         | 775.  |
| 324.                              | 98.          | 11.      | -12.          | 240.         | 8.       | -11.          | 706.         | 5.       | -11.          | 141.         | 15.      | -31.          | 113.         | 57.      | -67.          | 708.  |
| 311.                              | 86.          | 9.       | -14.          | 226.         | 7.       | -11.          | 694.         | 4.       | -12.          | 129.         | 12.      | -33.          | 81.          | 51.      | -73.          | 635.  |
| LOW RUNOFF YEAR ( 44.20% OF MEAN) |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 86.          | 9.       | -14.          | 213.         | 7.       | -11.          | 683.         | 4.       | -12.          | 117.         | 12.      | -33.          | 48.          | 51.      | -73.          | 562.  |
| 318.                              | 86.          | 9.       | -14.          | 198.         | 7.       | -12.          | 671.         | 4.       | -12.          | 105.         | 12.      | -34.          | 14.          | 51.      | -76.          | 486.  |
| 324.                              | 114.         | 11.      | -10.          | 188.         | 8.       | -8.           | 663.         | 5.       | -10.          | 96.          | 15.      | -14.          | 0.           | 67.      | -62.          | 423.  |
| 454.                              | 377.         | 39.      | 31.           | 220.         | 28.      | 22.           | 685.         | 18.      | 12.           | 108.         | 53.      | 38.           | 38.          | 221.     | 179.          | 603.  |
| 1208.                             | 1610.        | 254.     | 254.          | 600.         | 121.     | 121.          | 806.         | 116.     | 116.          | 224.         | 349.     | 349.          | 387.         | 945.     | 945.          | 1548. |
| 1867.                             | 860.         | 179.     | 79.           | 552.         | 65.      | -16.          | 790.         | 82.      | 12.           | 236.         | 247.     | 45.           | 432.         | 505.     | -49.          | 1499. |
| 1977.                             | 259.         | 11.      | -160.         | 392.         | 19.      | -119.         | 672.         | 18.      | -104.         | 132.         | 56.      | -294.         | 138.         | 152.     | -793.         | 707.  |
| 1517.                             | 129.         | 5.       | -172.         | 220.         | 10.      | -132.         | 540.         | 8.       | -117.         | 15.          | 23.      | -138.         | 0.           | 76.      | -707.         | 0.    |
| 514.                              | 114.         | 4.       | -36.          | 271.         | 8.       | -24.          | 418.         | 6.       | -22.          | 168.         | 18.      | -62.          | 190.         | 67.      | -153.         | 883.  |
| 417.                              | 106.         | 12.      | -19.          | 252.         | 8.       | -17.          | 716.         | 6.       | -16.          | 152.         | 16.      | -46.          | 144.         | 62.      | -109.         | 775.  |
| 324.                              | 98.          | 11.      | -12.          | 240.         | 8.       | -11.          | 706.         | 5.       | -11.          | 141.         | 15.      | -31.          | 113.         | 57.      | -67.          | 708.  |
| 311.                              | 86.          | 9.       | -14.          | 226.         | 7.       | -11.          | 694.         | 4.       | -12.          | 129.         | 12.      | -33.          | 81.          | 51.      | -73.          | 635.  |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 226.         | 14.      | 6.            | 406.         | 15.      | 8.            | 896.         | 9.       | 3.            | 279.         | 28.      | 11.           | 517.         | 115.     | 68.           | 2044. |
| 318.                              | 226.         | 14.      | 5.            | 411.         | 15.      | 8.            | 904.         | 10.      | 4.            | 283.         | 28.      | 10.           | 526.         | 115.     | 64.           | 2108. |
| 324.                              | 298.         | 18.      | 15.           | 427.         | 19.      | 17.           | 921.         | 11.      | 9.            | 292.         | 33.      | 28.           | 554.         | 151.     | 137.          | 2245. |
| 454.                              | 986.         | 63.      | 63.           | 489.         | 64.      | 64.           | 985.         | 40.      | 40.           | 332.         | 121.     | 121.          | 675.         | 501.     | 501.          | 2565. |
| 1208.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                             | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                             | 339.         | 12.      | -106.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 469.         | 172.     | -476.         | 1719. |
| 514.                              | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                              | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                              | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                              | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 226.         | 14.      | 6.            | 406.         | 15.      | 8.            | 896.         | 9.       | 3.            | 279.         | 28.      | 11.           | 517.         | 115.     | 68.           | 2044. |
| 318.                              | 226.         | 14.      | 5.            | 411.         | 15.      | 8.            | 904.         | 10.      | 4.            | 283.         | 28.      | 10.           | 526.         | 115.     | 64.           | 2108. |
| 324.                              | 298.         | 18.      | 15.           | 427.         | 19.      | 17.           | 921.         | 11.      | 9.            | 292.         | 33.      | 28.           | 554.         | 151.     | 137.          | 2245. |
| 454.                              | 986.         | 63.      | 63.           | 489.         | 64.      | 64.           | 985.         | 40.      | 40.           | 332.         | 121.     | 121.          | 675.         | 501.     | 501.          | 2565. |
| 1208.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                             | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                             | 339.         | 12.      | -106.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 469.         | 172.     | -476.         | 1719. |
| 514.                              | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                              | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                              | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                              | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |

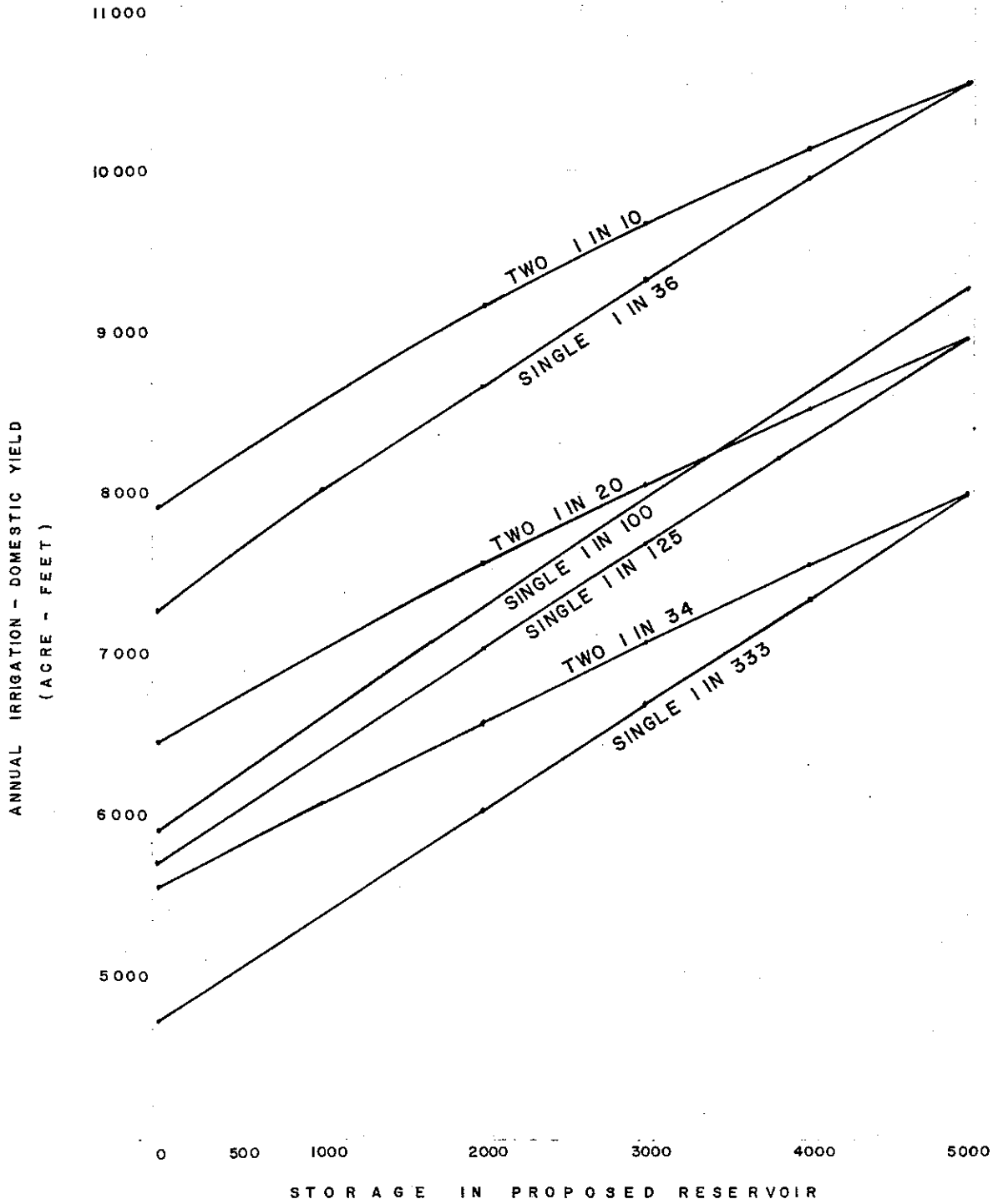
\* IRRIGATION DEMAND = 6481 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

TABLE 5  
Results of Storage Calculations

| Drought<br>(approx. return<br>period)                          | % of Mean<br>Annual<br>Runoff | Yield (ac-ft) |                         | Waste<br>(ac-ft) |
|--|-------------------------------|---------------|-------------------------|------------------|
|  |                               | Fisheries     | Irrigation-<br>Domestic |                  |
| <b>A. Existing System</b>                                      |                               |               |                         |                  |
| single 1 in 23   | 42.56                         | 3,060         | 7,919                   | 1,100            |
| two 1 in 10  | 54.00                         |               |                         |                  |
| three 1 in 8   | 58.11                         |               |                         |                  |
| single 1 in 65   | 31.42                         | 3,060         | 6,481                   | 1,100            |
| two 1 in 20  | 44.20                         |               |                         |                  |
| three 1 in 14  | 48.96                         |               |                         |                  |
| single 1 in 143  | 24.86                         | 3,060         | 5,588                   | 1,100            |
| two 1 in 34  | 38.20                         |               |                         |                  |
| three 1 in 21  | 43.37                         |               |                         |                  |
| two 1 in 34  | 38.20                         | 2,040         | 6,538                   | 1,100            |
| two 1 in 34  | 38.20                         | 1,020         | 7,468                   | 1,100            |
| two 1 in 34  | 38.20                         | 3,060         | 5,023                   | 2,000            |
| <b>B. Proposed System (5,000 acre-feet proposed reservoir)</b> |                               |               |                         |                  |
| single 1 in 36   | 37.88                         | 3,060         | 8,976                   | 1,100            |
| two 1 in 10  | 54.00                         |               |                         |                  |
| three 1 in 7   | 60.02                         |               |                         |                  |
| single 1 in 125  | 25.83                         | 3,060         | 8,976                   | 1,100            |
| two 1 in 20  | 44.20                         |               |                         |                  |
| three 1 in 12  | 51.09                         |               |                         |                  |
| single 1 in 333  | 18.55                         | 3,060         | 7,984                   | 1,100            |
| two 1 in 34  | 38.20                         |               |                         |                  |
| three 1 in 18  | 45.54                         |               |                         |                  |
| two 1 in 34  | 38.20                         | 2,040         | 8,983                   | 1,100            |
| two 1 in 34  | 38.20                         | 1,020         | 9,951                   | 1,100            |
| two 1 in 34  | 38.20                         | 3,060         | 7,212                   | 2,000            |

ANNUAL IRRIGATION - DOMESTIC YIELD VERSUS PROPOSED STORAGE

NOTE: 1. FISHERIES FLOW 3060 AC.- FT., WASTE 1100 AC.-FT.  
 2. ZERO STORAGE IN THE PROPOSED RESERVOIR IS EQUIVALENT TO THE EXISTING SYSTEM.



Province of British Columbia  
 Ministry of Environment  
 WATER MANAGEMENT BRANCH

TO ACCOMPANY REPORT ON  
 WATER SUPPLY HYDROLOGY  
 OF THE  
 POWERS CREEK BASIN  
 AND THE WESTBANK IRRIGATION DISTRICT

SCALE: as shown

DATE  
 JULY, 1981

B. LETVAK ENGINEER

FILE No. DWG No. FIGURE 2

The storage calculations shown in Table 5 were arbitrarily based on two year droughts, with three return periods, and the same two year droughts were analysed for the existing and proposed systems. The system yield was determined for the two year drought, and from the one and three year droughts which give the same yield were found.

As shown in Table 5, the single year drought which gave the same yield as the two year drought was more extreme for the proposed system than for the existing system. This implies that the proposed system would have relatively less protection against two year droughts for the same level of protection against one year droughts, compared to the existing system. This is elaborated on in Appendix C.

#### 6. PROBABILITY CONSIDERATIONS

Having determined the water supply capability of the systems (existing and proposed) for different drought return periods and durations, it remains to consider the likelihood of occurrence of the different droughts in order to choose a design drought and the corresponding yield for the system.

Since there is an adequate volume of storage in either system in comparison to the annual runoff, the total volume of annual runoff in drought years is the major factor in limiting the system supply capabilities. That is, annual volume is more important than timing within the year, summer low flows, etc. Analysis of runoff data for the Okanagan Lake basin and tributary basins indicates that the annual volume of runoff in any year is statistically independent of the runoff in the preceding year. This makes it possible to assess the probabilities of occurrence of the single and multiple year droughts. The probability of multiple year droughts is the product of the probabilities of the component years - for example, the

probability in any two years of two consecutive 1 in 10 low runoff years (each with a probability of 0.10) is  $0.10 \times 0.10 = 0.01$  or 1%. Calculations of this nature were made for all the droughts tested for the existing and proposed system. The results indicate that for droughts of various duration with the same yield, the single year droughts have the highest probabilities of occurrence. This is shown in Figure 3, which is a graph of irrigation yield vs. probability of 1, 2, and 3 year droughts.

It is possible to compute the risk of at least one (i.e., one or more) occurrence of a single year drought of less than or equal to a particular probability in a given time period. Where "p" is the probability of the single year drought and "r" is the period of years, the risk "R" is found by:

$$R = 1 - (1 - p)^r$$

For example, the risk of at least one occurrence of a one hundred year low runoff year ( $p = 0.01$ ) in 30 years is:

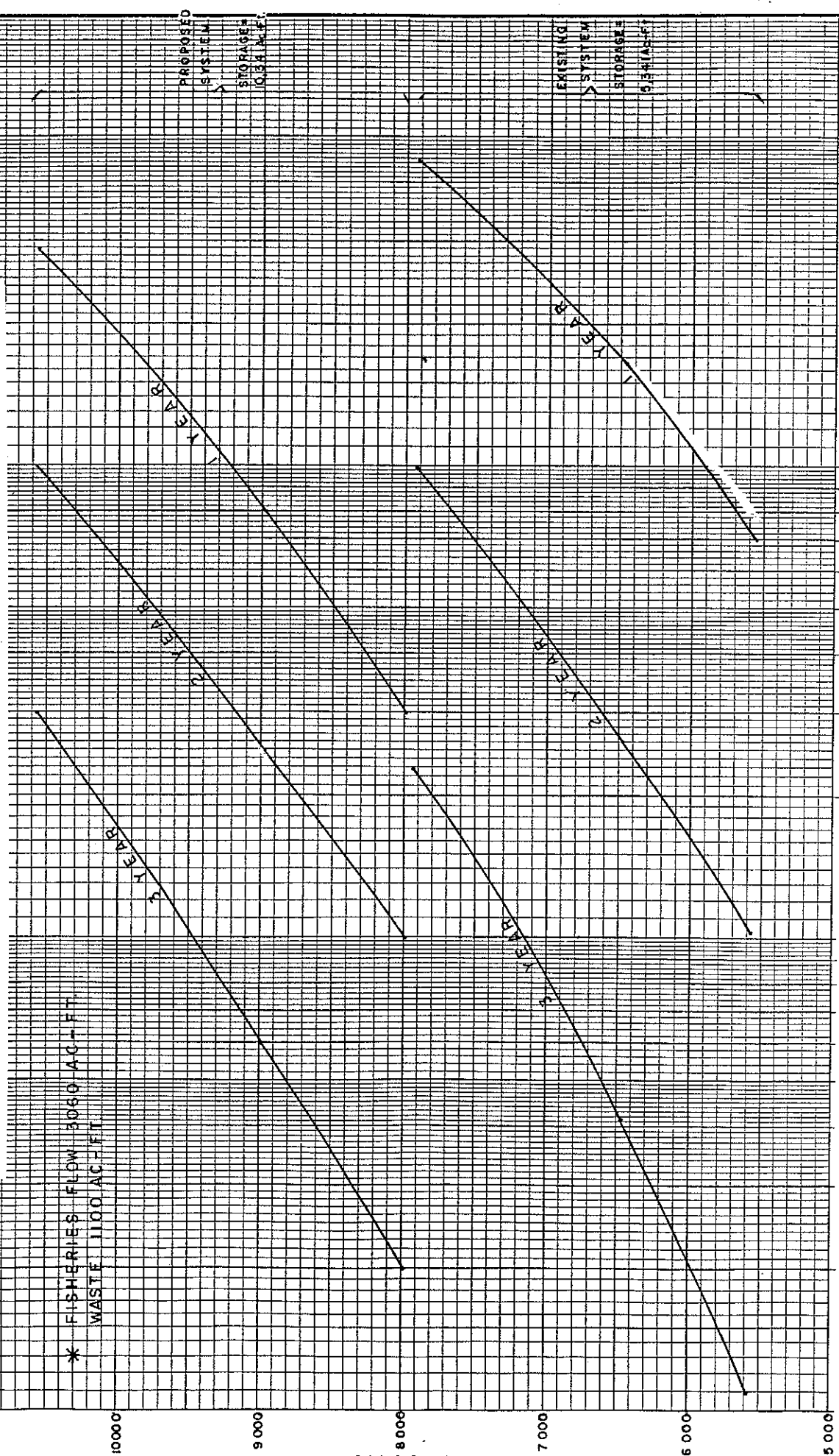
$$R = 1 - (1 - 0.01)^{30} = 1 - 0.99^{30} = 0.2602 \text{ or } 26\%$$

For the Powers Creek system, the risk of occurrence of the two and three year droughts associated with the same yield as for a single year drought are much less than for the single year. This is because the actual probability of the multi-year droughts is much less than the single year drought. Applying the above equation is not a strictly correct way of calculating the risk of the multi-year droughts, but it gives a conservative (larger) answer. For this system, the risk becomes lower as the drought duration becomes longer, (yield remaining constant), and the risk of the three-year droughts is very small. Thus, the sum of the risk of the 1, 2, and 3 year droughts is a usable approximation of the risk of experiencing, in a certain period of years, a drought which would use all the available system storage, for the corresponding yield level. A more detailed explanation of these calculations is presented in Appendix C.

POWERS CREEK ANNUAL IRRIGATION - DOMESTIC YIELD VERSUS DROUGHT PROBABILITY

\* FISHERIES FLOW 3060 AC-FT  
 \* WASTE 1100 AC-FT

\* YIELD (ACRE-FEET)



TO ACCOMPANY REPORT ON  
 WATER SUPPLY HYDROLOGY  
 OF THE  
 POWERS CREEK BASIN  
 AND THE WESTBANK IRRIGATION DISTRICT

Province of British Columbia  
 Ministry of Environment  
 WATER MANAGEMENT BRANCH



SCALE: AS SHOWN  
 DATE: JULY, 1981  
 ENGINEER: B. LETVAK  
 FILE No.: DWG. No. FIGURE 3

On the basis of the irrigation-domestic yield vs. drought probability relationships shown in Figure 3, and the calculations described above, the following estimates of risk were determined.

Risk in 30 yrs. of Design Drought<sup>1</sup> Occurrence

| <u>System</u> | <u>Irrigation-Domestic<br/>Yield<br/>acre-feet</u> | <u>Single Year<br/>Drought</u> | <u>Risk<sup>2</sup><br/>%</u> |
|---------------|--|--------------------------------|-------------------------------|
| Existing      | 5,920  | 1 in 100                       | 32%                           |
| Existing      | 5,700  | 1 in 125                       | 26%                           |
| Proposed      | 9,230  | 1 in 100                       | 39%                           |
| Proposed      | 8,975  | 1 in 125                       | 32%                           |
| Proposed      | 8,790  | 1 in 150                       | 27%                           |

- Notes: 1. Design drought - drought of any duration which causes the system to just run out of storage for the given yield.
2. Total risk of single and multi-year droughts resulting in the same yield.

## 7. DISCUSSION

When considering the results of the computations described previously, there are a number of points which must be kept in mind. First is the fact that the annual runoff data for the mean year and drought years for each sub-basin is estimated, not observed, and there is some uncertainty inherent in the estimates. Monthly distributions of runoff and demand (irrigation-domestic and fisheries) are assumed to be the same from year to year. Also, the annual demand is considered to be the same during each year of the flow sequences tested whereas in reality the annual demand varies from year to year in relation to summer precipitation and other factors. Furthermore, the demand can be limited during water short periods by rationing measures, though this is generally not popular with the water users. Finally, the system yield for irrigation and fisheries for any given analysis depends on the volume of waste, which was established at 1,100 acre-feet per year without the benefit of experience with the new

(1981) control works (note that some computations were done using 2,000 acre-feet waste).

All the above must be considered when choosing a recommended design drought and associated system yield from the cases analysed. There is also the trade-off between the annual system yield and the associated economic and other benefits, and the risk of water shortage.

The recommendations in the next section have attempted to include all the above factors, but also include a component of judgement as to what is a reasonable design level. The report contains data on more and less extreme design cases for comparison.

#### 8. CONCLUSIONS

The water supply capability of the Powers Creek system for irrigation-domestic use (mainly for Westbank Irrigation District) and for in-stream fisheries flows below the Westbank I.D. intake have been assessed in this study. The method involved the estimation of annual and monthly runoff for average and below average runoff years, and an analysis of monthly runoff, demand, and storage for a variety of hypothetical drought sequences. On the basis of the analysis, and keeping in mind the nature of the available information and the factors discussed above, the following conclusions are made.

For the existing (1981) system, which has a total storage of 5,341 acre-feet, the annual water supply capability for irrigation-domestic and fisheries in-stream flows is 5,920 acre-feet and 3,060 acre-feet respectively. This yield is associated with a single year design drought of 100 year return period, or corresponding multi-year droughts (which result in the same yield). The risk of occurrence of such a drought in any thirty year period was estimated to be 32%.

For the proposed system with an additional reservoir of 5,000 acre-feet on Powers Creek and a total system storage of 10,341 acre-feet, the irrigation-domestic and fisheries annual yields are 8,980 acre-feet and 3,060 acre feet, respectively. This yield is associated with a design drought of 125 year return period, or corresponding multi-year droughts. The risk of occurrence of such a drought in any thirty year period was estimated to be 32%.

The monitoring of flow in the creek below the intake structure and of water withdrawn from the creek by Westbank I.D. should continue, along with recording of storage levels in all system reservoirs. This will be of use for operational purposes on a continuous basis, and will eventually accumulate a long enough record to determine average runoff for the whole basin to compare with the estimates used in this study.

Appendix A

Annual Runoff Estimates  
for  
West Side Okanagan Valley

Date: January 6, 1980

File: 0256957

MEMO TO FILE

Re: Annual Runoff Estimates for West Side  
of Okanagan Valley

This memorandum describes a procedure for estimating annual runoff for headwater basins in the Okanagan Basin, west of Okanagan Lake, derived for use in a water supply study for the Powers Creek basin.

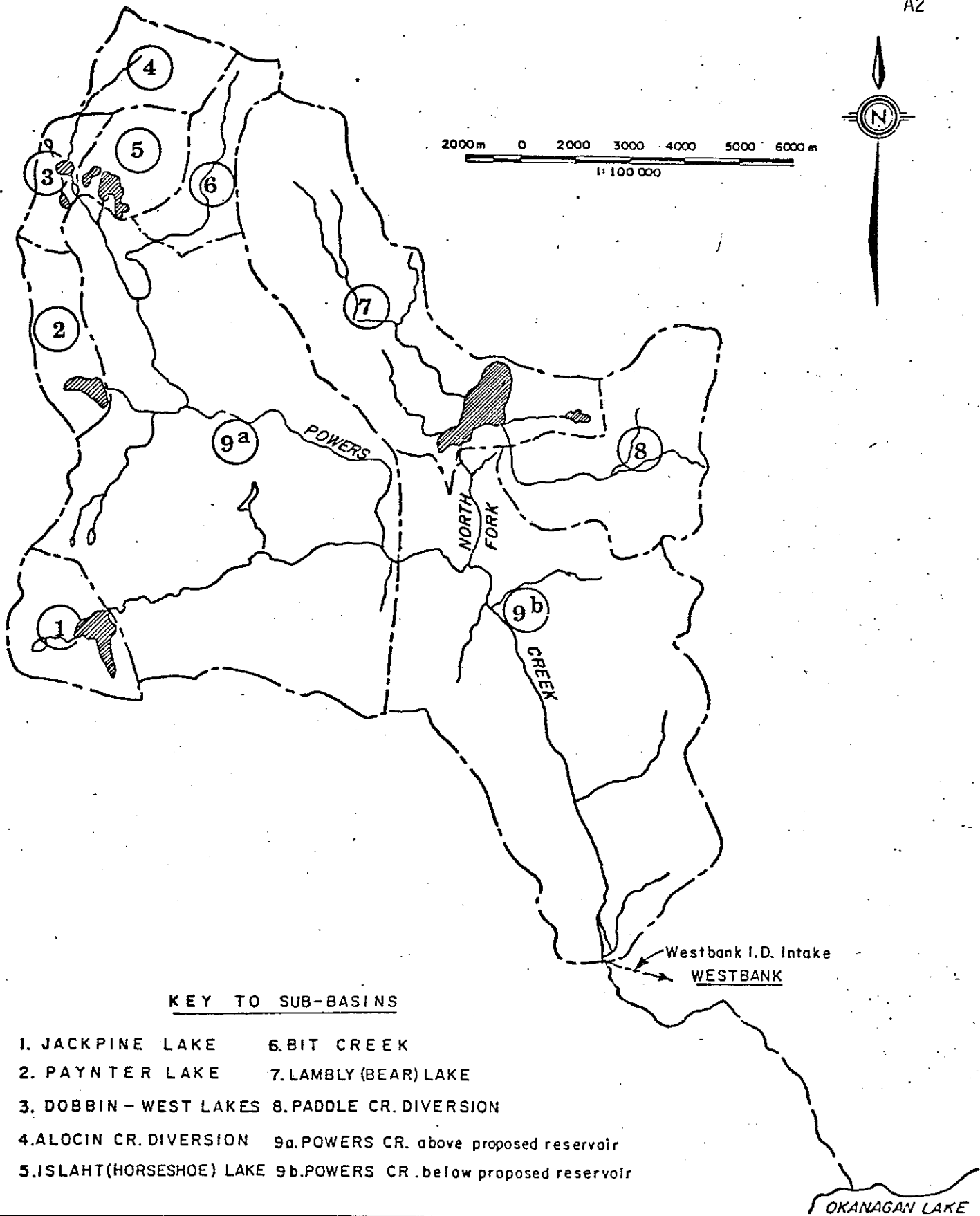
This method involves multiple regression analysis of measured annual runoff for 1977 versus physiographic characteristics of the drainage basins. The resulting equations can be used to estimate runoff for ungauged basins in the geographical area of the observed basins, and for which the physiographic parameters are within the range of the physiographic parameters for the observed basins. Runoff for a particular year is related to runoff for the mean year or other return periods by regional frequency analysis.

Figure 1 shows the study area and the basins for which flows are observed and used to calculate the regression equation. Figure 2 shows the sub-basins of Powers Creek for which flows are estimated. Table 1 shows the physiographic data for all the basins and the observed and estimated flows. The basin numbering system is the same on the maps and the table except the prefix P (for Powers Creek) is shown only on Table 1.

Data

Runoff (R) - the net annual runoff in inches is used.

$$\text{runoff} = \frac{(\text{outflow} + \text{storage change} + \text{diversions})}{\text{area}}$$



**KEY TO SUB-BASINS**

- 1. JACKPINE LAKE
- 2. PAYNTER LAKE
- 3. DOBBIN - WEST LAKES
- 4. ALOCIN CR. DIVERSION
- 5. ISLAHT (HORSESHOE) LAKE
- 6. BIT CREEK
- 7. LAMBLY (BEAR) LAKE
- 8. PADDLE CR. DIVERSION
- 9a. POWERS CR. above proposed reservoir
- 9b. POWERS CR. below proposed reservoir



Province of British Columbia  
 Ministry of Environment  
 INVENTORY AND ENGINEERING  
 BRANCH

OKANAGAN BASIN  
 WESTSIDE RUNOFF ESTIMATES  
 STUDY.

POWERS CREEK SUB-BASINS

B. LETVAK

ENGINEER

DATE  
 FEB. 1981

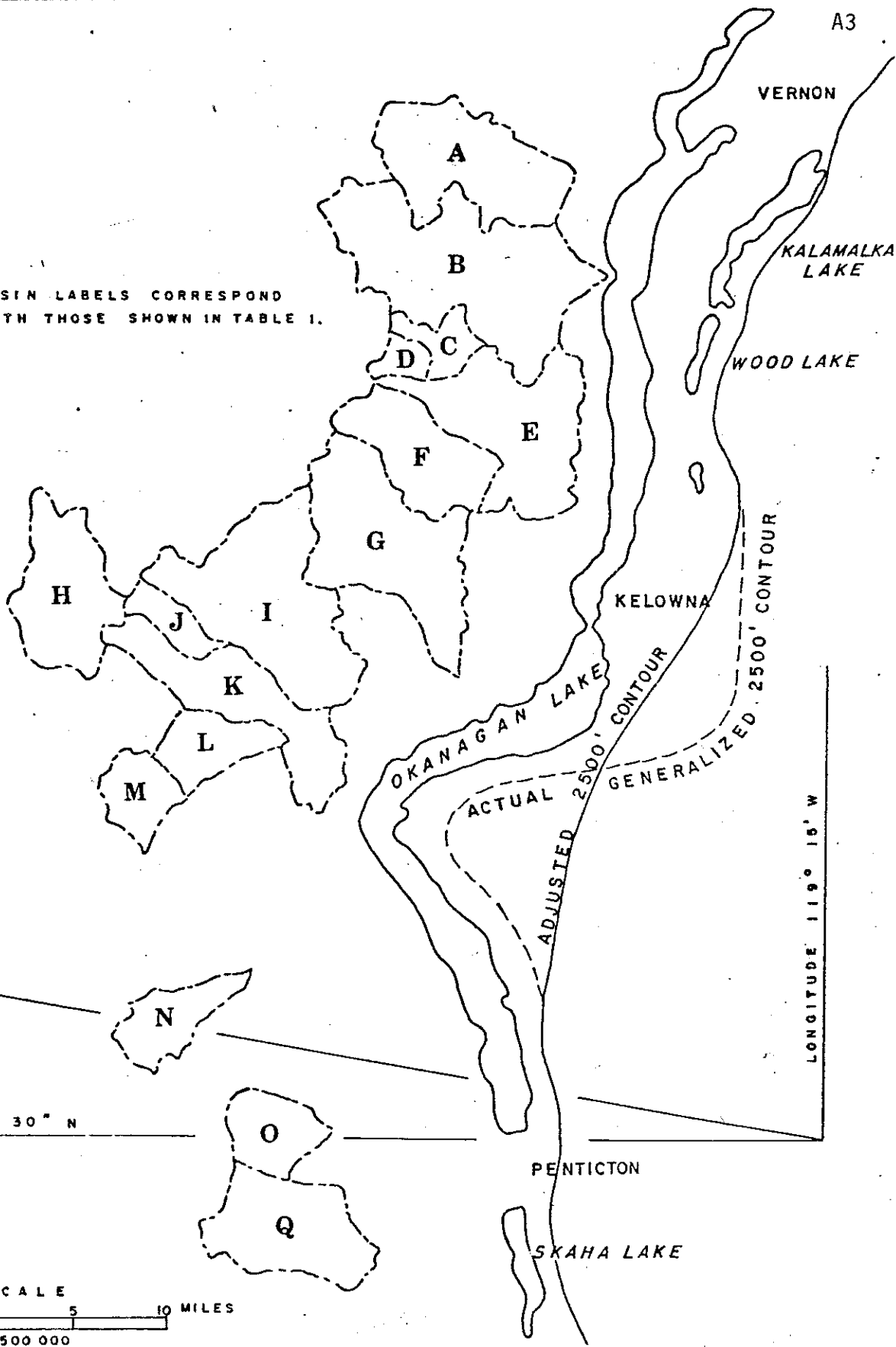
FILE No

DWG No

FIGURE 1



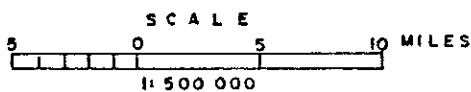
NOTE: BASIN LABELS CORRESPOND WITH THOSE SHOWN IN TABLE 1.



02 100° N

01 90° LATITUDE 49° 30' N

LONGITUDE 119° 15' W



Province of British Columbia  
Ministry of Environment  
INVENTORY AND ENGINEERING BRANCH

TO ACCOMPANY REPORT ON  
OKANAGAN BASIN  
WESTSIDE RUNOFF ESTIMATES STUDY.  
OBSERVED DRAINAGE BASINS

SCALE: AS SHOWN

DATE  
JAN 1981

B. LETVAK

ENGINEER

FILE No

DWG No

Figure 2

For a basin with no major lakes and diversions (or withdrawals), runoff is simply the outflow as measured at the stream gauge divided by the basin area. No attempt was made to correct the data for evaporation from or precipitation on the lakes. Previous studies in this regard indicate that the accuracy of estimating data for these corrections was not good enough to warrant their use, in view of the small change in the depth of runoff that would result.

Elevation (E) - the regression analysis used the difference of the median basin elevation (elevation above which 50% of basin area lies) and 2500 feet divided by 1000

$$E = \frac{x - 2500}{1000}$$

Latitude Index (L) - is the distance in miles from 49°30' North latitude to the basin centroid measured due north.

Distance to Barrier (D<sub>1</sub> and D<sub>2</sub>) - these parameters represent the distance in miles from the basin centroid to the adjusted 2500 foot contour on the east side of Okanagan Lake. They are measured at 90° and 100° respectively from true north at 119°15' West longitude. These bearings represent the general direction of flow of the air mass, based on prevailing winds at 850 millibars.

The 2500 foot contour line had been adjusted as shown on Figure 1 in order to make the East Side runoff estimates model more stable with respect to D<sub>1</sub> and D<sub>2</sub>.

Three other barriers were tested, all of which approximated the western divide of the Okanagan Basin. This was an attempt to account for the rain-shadow effect of the air mass warming adiabatically as it drops from the divide down towards the lake and hence having more capacity to retain moisture. The equations including the distance from these barriers were poor, possibly because the elevation along the lines varied so much over their length, thus making the distance from the line a poor representation of the effect on the air mass.

The physical rationale behind using the adjusted 2500 foot contour on the east side of the valley is not clearly established. The meteorologic effects on precipitation (and runoff) of the Okanagan Basin physiography as related to air mass flow have not been examined in great detail, since this would have been a large project in itself and the available data is inadequate. The east side of the valley does force the air back up after coming down the west slope and crossing the lake, and could conceivably affect the flow down the west slope. On the east side of the valley this 2500 foot contour is thought to be the elevation which 'triggers' precipitation (study by Dr. M. Danard), and distance from this line was used successfully in the model for the east side. This line approximates the general shape of the basin physiography. For the west side model, the variables of distance from this line ( $D_1$  or  $D_2$ ), are highly significant statistically when in combination with the others, and it can be said that they help to explain some of the spatial variation in runoff that the other variables do not account for.

#### Regression Analysis

Regression analysis involved the testing of various combinations of physiographic variables and mathematical transformations thereof, versus runoff for 1977 data. This was done by stepwise multiple regression of polynomials of the predictor variables:

- R vs. polynomials (up to 3rd order) of E, L,  $D_1$
- R vs. polynomials (up to 3rd order) of E, L,  $D_2$

The polynomial analysis was carried out in the realization that the interactions between physiographic variables are more complex than can be described by simple models, such as  $R \propto \log E$  or  $R \propto (E^2 \times L^2)$ .

The results presented in Table 1 are the average of estimates produced by the two equations. The 80% confidence intervals as shown in Tables 2(a) and 2(b), corresponding to each estimate, were produced along with each estimate. The 1977 runoff estimates from the equations for the Powers Creek sub-basins varied from 1.5 to 6.0 inches and the 80% confidence intervals range from  $\pm 0.494$  to  $\pm 0.645$  inches as shown on Tables

2(a) and 2(b). There was no apparent relationship between the absolute size of the estimate and its confidence interval, and therefore one can have more relative confidence in the larger estimates than the smaller ones. As a whole, the results are statistically good as indicated by the correlation coefficients and standard errors, although it would be prudent to view the estimate for any individual basin with some skepticism.

#### Frequency Analysis

The year analysed by regression analysis was not a mean runoff year; 1977 was considerably less than the mean. In order to relate this year to the mean (which is unknown), frequency analysis was carried out for six basins on the west side of the Okanagan Valley for the years 1965-78.

|             |                    |        |
|-------------|--------------------|--------|
| These were: | 1. Shorts Creek    | 8NM151 |
|             | 2. Esperon Creek   | 8NM139 |
|             | 3. Terrace Creek   | 8NM138 |
|             | 4. Trepanier Creek | 8NMO41 |
|             | 5. Shingle Creek   | 8NMO38 |
|             | 6. Shatford Creek  | 8NMO37 |

The results of the analyses were expressed as a percentage of mean annual runoff, and a curve was chosen which is deemed to be the regional frequency curve for headwater drainage basins. This curve was based on the six station total runoff analysis, the results of which were in keeping with the combined results for the individual analyses. There was variation between the curves determined for the individual stations and it was concluded that the differences are likely the result of random variation between the basins in conjunction with sampling the short periods of record. Therefore, the composite regional curve is likely a better estimate of the curve for any basin than any individual curve.

The percent of mean annual runoff for 1977 was computed for the six station total runoff, in order to estimate the mean for stations with inadequate length of record. The 1977 six station total runoff was 45.0%

of the mean. The composite regional frequency curve is shown in Figure 3.

### Runoff Estimates

The six station total frequency analysis indicates that the 1977 runoff is 45.0% of the mean annual runoff, but there was variation in this ratio between the individual basins. Therefore, estimates for the mean annual runoff of the sub-basins will be  $2.128 \times$  1977 runoff (this makes the ratio 1977/mean  $\sim 47\%$ ), to be slightly conservative.

To estimate the runoff for a year of given return period or probability, the mean annual runoff is scaled down by the ratio corresponding to that probability from the regional frequency curve. For example, the 10 year low runoff (10% probability of non-exceedence) is 54% of the mean annual runoff.

This depth of runoff estimate is applied to the total surface area of the basins, regardless of the presence of lakes. This is because it is not possible to estimate the volume of precipitation on and evaporation from the variable lake surface for a given return period year with suitable accuracy to make this correction. Furthermore, the difference in depth or volume of runoff for any basin with a lake, resulting from a correction for precipitation on and evaporation from the lake, would be less than the confidence intervals for the runoff estimate.

For Powers Creek, the observed runoff for the whole basin for 1977 was approximately equal to the sum of the estimated runoffs for its sub-basins, including P9 (rather than the sum of P9a and P9b) the large lower portion of Powers Creek. The sub-basin P9 had a larger runoff estimate than the combined runoffs of its two sub-divisions, P9a and P9b. Therefore, an adjustment was made to the runoff of P9a and P9b so that it would equal that of P9. The difference in runoff estimates,  $P9 - (P9a + P9b)$ , was allotted proportionally (by area) to sub-basins P9a and P9b.

The data for 1977 observed runoff and corresponding estimates of the mean, plus the data for estimated 1977 runoff for ungauged basins and the corresponding estimates of the mean years, are shown in Table 1.

Discussion

When the values of L and  $D_1$  or  $D_2$  are close to the mean values, low E (elevation) values may result in zero or negative values of estimated runoff. This is not physically reasonable since the model estimates the annual runoff, which cannot be less than zero. This then implies a lower limit of elevation below which the model should not be used to estimate runoff. The average of the median elevations for the observed basins is 4725 feet, with the lowest value of 3940 feet for lower Lambly Creek being the only value under 4000 feet. It is therefore suggested that 3900 feet is a reasonable value for the lower limit of median elevation to be used. More low elevation basins with observed flows would likely improve the model in this regard.

The following approach can be used in cases where the median elevation of a basin is below 3900 feet, though the results must be used with even more caution than those of higher elevation basins. This is to subdivide these low elevation basins, so estimates can be attained for their higher elevation tributaries and then spread out over the larger area of the whole basin. More reasonable (positive) estimates can sometimes be achieved in this manner.

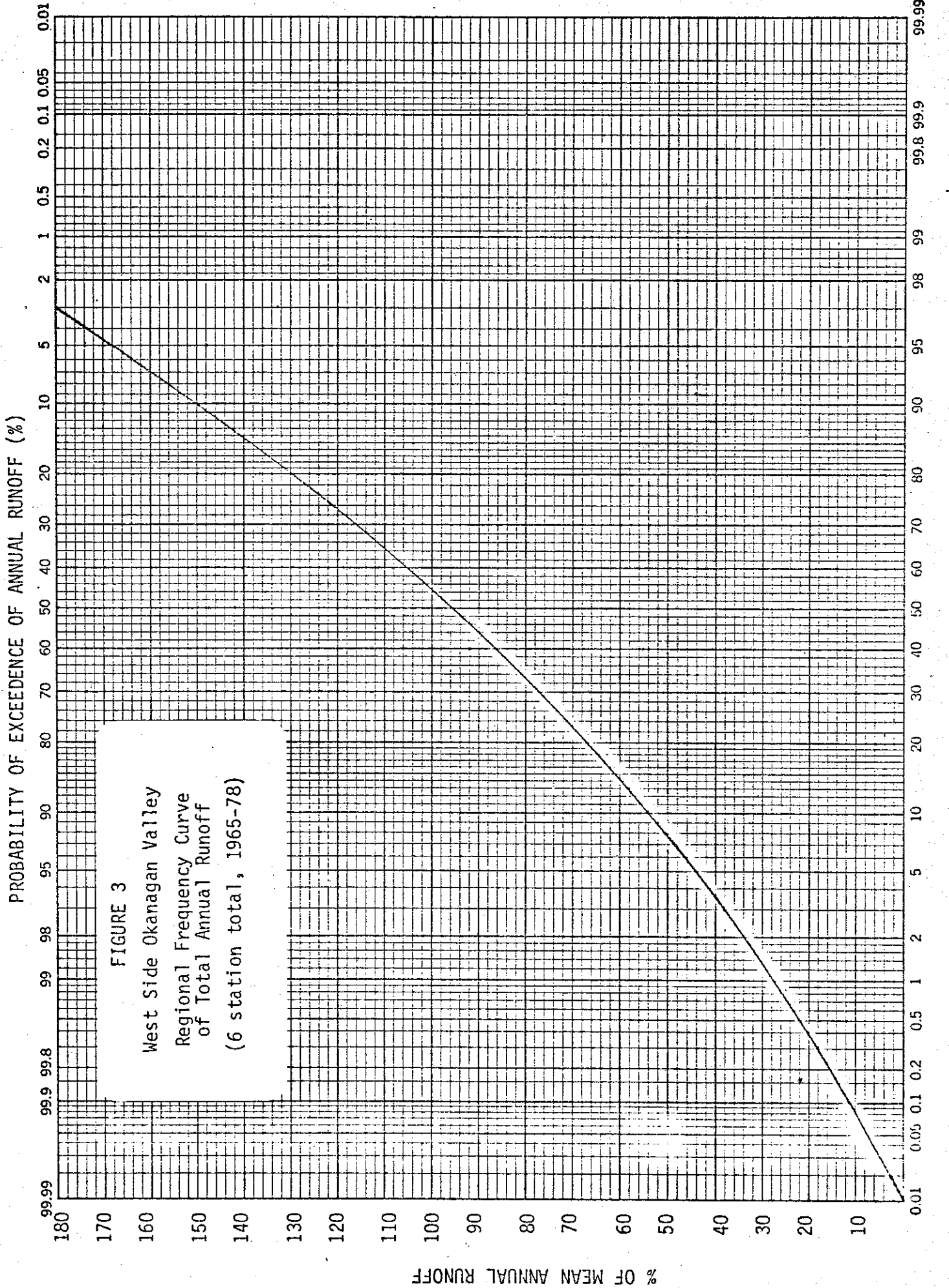
It may be possible to improve the results in the future, if data is available for more basins for any year. Beyond that, the frequency analysis will be more valid as a longer record is accumulated.



D. B. Letvak, P. Eng.  
Senior Hydraulic Engineer

DBL/BB/jlm

Attach.



% OF MEAN ANNUAL RUNOFF

TABLE 1. BASIN PHYSIOGRAPHIC AND RUNOFF DATA

| MAP #                           | BASINS                            | DRAINAGE AREA<br>sq.miles | MEDIAN<br>ELEV.(E)<br>feet | LATITUDE<br>INDEX(L)<br>miles | DISTANCE TO BARRIER |                   | 1977 RUNOFF       |        | MEAN ANNUAL RUNOFF<br>2.128x1977 R.O. |        |        |        |
|---------------------------------|-----------------------------------|---------------------------|----------------------------|-------------------------------|---------------------|-------------------|-------------------|--------|---------------------------------------|--------|--------|--------|
|                                 |                                   |                           |                            |                               | D1(90°)<br>miles    | D2(100°)<br>miles | inches            | ac-ft. | inches                                | ac-ft. |        |        |
| <u>Observed Basins:</u>         |                                   |                           |                            |                               |                     |                   | <u>OBSERVED:</u>  |        | <u>ESTIMATED:</u>                     |        |        |        |
| A                               | Whiteman Creek                    | 8NM174                    | 43.9                       | 4750                          | 49.32               | -19.48            | -17.02            | 3.31   | 7,760                                 | 7.04   | 16,513 |        |
| B                               | Shorts Creek                      | 8NM151                    | 73.0                       | 4650                          | 44.15               | -14.8             | -14.55            | 3.74   | 14,576                                | 7.96   | 31,018 |        |
| C                               | Terrace Creek                     | 8NM138                    | 7.0                        | 4690                          | 40.57               | -14.67            | -14.06            | 4.18   | 1,560                                 | 8.90   | 3,320  |        |
| D                               | Esperon Creek                     | 8NM139                    | 6.0                        | 5180                          | 39.58               | -16.28            | -16.03            | 5.72   | 1,830                                 | 12.17  | 3,894  |        |
| E                               | Lambly Creek (lower)              | 8NM166                    | 46.2                       | 3940                          | 36.25               | -10.23            | -11.1             | 1.48   | 3,640                                 | 3.15   | 7,746  |        |
| F                               | Lambly Creek (upper)              | 8NM165                    | 29.7                       | 4560                          | 34.77               | -15.29            | -16.15            | 4.63   | 7,340                                 | 9.85   | 1,562  |        |
| G                               | Powers Creek                      | 8NM059                    | 52.3                       | 4400                          | 30.09               | -17.14            | -16.28            | 3.67   | 10,215                                | 7.81   | 21,738 |        |
| H                               | Pennask Creek                     | 8LG016                    | 30.8                       | 5500                          | 27.62               | -32.43            | -29.6             | 6.70   | 11,000                                | 14.26  | 23,408 |        |
| I                               | Trépanier Creek                   | 8NM041                    | 61.0                       | 4300                          | 27.13               | -21.83            | -19.98            | 3.10   | 10,100                                | 6.60   | 21,493 |        |
| J                               | MacDonald Creek                   | 8NM218                    | 4.1                        | 5560                          | 27.00               | -27.5             | -25.16            | 5.20   | 1,137                                 | 11.07  | 2,420  |        |
| K                               | Peachland Creek                   | 8NM140                    | 37.7                       | 4050                          | 22.20               | -19.61            | -18.25            | 1.58   | 3,187                                 | 3.36   | 6,782  |        |
| L                               | Greata Creek                      | 8NM173                    | 16.0                       | 4190                          | 19.73               | -19.98            | -16.74            | 1.20   | 1,020                                 | 2.55   | 2,171  |        |
| M                               | Camp Creek                        | 8NM134                    | 14.6                       | 4750                          | 17.26               | -22.69            | -21.95            | 2.26   | 1,760                                 | 4.81   | 3,745  |        |
| N                               | Bull Creek                        | 8NM133                    | 18.5                       | 5000                          | 6.16                | -18.74            | -19.48            | 1.13   | 1,110                                 | 2.40   | 2,362  |        |
| O                               | Shingle Creek                     | 8NM038                    | 17.3                       | 5080                          | 2.47                | -14.18            | -14.3             | 2.39   | 2,209                                 | 5.09   | 4,701  |        |
| Q                               | Shatford Creek                    | 8NM037                    | 37.5                       | 5000                          | -4.68               | -13.07            | -13.81            | 2.10   | 4,200                                 | 4.47   | 8,938  |        |
| <u>Powers Creek Sub-basins:</u> |                                   |                           |                            |                               |                     |                   | <u>ESTIMATED:</u> |        | <u>ESTIMATED:</u>                     |        |        |        |
| P1                              | Jackpine Lake                     |                           | 1.8                        | 4400                          | 28.61               | -19.98            | -18.74            | 3.268  | 314                                   | 6.954  | 668    |        |
| P2                              | Paynter Lake                      |                           | 1.4                        | 4630                          | 32.06               | -22.20            | -20.22            | 3.904  | 291                                   | 8.308  | 620    |        |
| P3                              | Dobbin-West Lakes                 |                           | 0.8                        | 4950                          | 34.03               | -20.96            | -20.96            | 4.770  | 204                                   | 10.151 | 433    |        |
| P4                              | Alocin Diversion                  |                           | 1.4                        | 5290                          | 35.02               | -18.99            | -19.98            | 5.790  | 432                                   | 12.321 | 920    |        |
| P5                              | Isiaht Lake                       |                           | 1.3                        | 5120                          | 33.79               | -19.98            | -19.98            | 5.298  | 367                                   | 11.274 | 781    |        |
| P6                              | Sit Creek                         |                           | 1.6                        | 5340                          | 34.03               | -18.99            | -19.24            | 5.939  | 507                                   | 12.638 | 1,079  |        |
| P7                              | Lambly Lake                       |                           | 7.4                        | 4500                          | 32.31               | -17.26            | -17.02            | 4.054  | 1,600                                 | 8.627  | 3,405  |        |
| P8                              | Paddle Creek Diversion            |                           | 4.0                        | 4615                          | 30.58               | -14.06            | -13.56            | 3.990  | 851                                   | 8.491  | 1,811  |        |
| P9                              | Lower Powers Creek                |                           | 32.6                       | 4220                          | 28.73               | -16.15            | -15.17            | 3.075  | 5,345                                 | 6.544  | 11,374 |        |
| P9a                             | Powers Creek above proposed Res.* |                           | 16.4                       | 4380                          | 30.09               | -18.74            | -17.88            | 3.974  | 3,476                                 | 8.457  | 7,397  |        |
| P9b                             | Powers Creek below proposed Res.* |                           | 16.2                       | 3850                          | 27.50               | -13.69            | -12.70            | 2.163  | 1,869                                 | 4.603  | 3,977  |        |
| TOTAL POWERS CREEK              |                                   |                           |                            |                               |                     |                   |                   |        | 3.553                                 | 9,911  | 7.561  | 21,090 |

\*Runoff estimates adjusted as described in text.

Polynomial Equations with E, L, D<sub>1</sub>

|           |    |             |            |         |
|-----------|----|-------------|------------|---------|
| RSD       | =  | 0.9137      |            |         |
| FPROB.    | =  | 0.0000      |            |         |
| STD ERR Y | =  | 0.5787      |            |         |
| VAR       |    | COEFF       | STD ERR    | F-RATIO |
| CONST.    |    | -4.6883     | 0.8254     |         |
| E         |    | 2.0492      | 0.3686     | 30.9151 |
| L         |    | 0.0655      | 0.0100     | 42.5371 |
| D1        |    | -0.0857     | 0.0322     | 7.0757  |
| L         | #3 | -0.20710-03 | 0.46710-04 | 19.6543 |
|           |    |             |            | FPROB.  |
|           |    |             |            | 0.0002  |
|           |    |             |            | 0.0001  |
|           |    |             |            | 0.0214  |
|           |    |             |            | 0.0011  |

POTENTIAL INDEPENDENT VARIABLES:

|    |    | PARTIAL CORR. | TOLERANCE | FPROB  |
|----|----|---------------|-----------|--------|
| E  | #2 | 0.3836        | 0.6602    | 0.2167 |
| E  | #3 | 0.2238        | 0.5363    | 0.4900 |
| L  | #2 | 0.2886        | 0.4279    | 0.3656 |
| D1 | #2 | 0.1739        | 0.6718    | 0.5940 |
| D1 | #3 | 0.6775        | 0.8990    | 0.0151 |

UNSCRAMBLED REGRESSION EQUATION FOR VARIABLE R

| VAR   |      | COEFF        |
|-------|------|--------------|
| CONST |      | -17.5727     |
| E     |      | 2.1519       |
| L     |      | -0.82914E-01 |
| D1    |      | -2.1492      |
| L     | ** 2 | 0.11671E-01  |
| L     | ** 3 | -0.18749E-03 |
| D1    | ** 2 | -0.10592     |
| D1    | ** 3 | -0.16682E-02 |

OBSERVED RUNOFF\*

| NO. | OBSERVED | CALCULATED | RESIDUAL     | NORMALIZED RES |
|-----|----------|------------|--------------|----------------|
| 1.  | 3.3100   | 3.0818     | 0.22822      | 0.57062        |
| 2.  | 3.7400   | 4.0236     | -0.28364     | -0.70919       |
| 3.  | 4.1800   | 4.4673     | -0.28732     | -0.71838       |
| 4.  | 5.7200   | 5.6859     | 0.34088E-01  | 0.85230E-01    |
| 5.  | 1.4800   | 1.6135     | -0.13352     | -0.33384       |
| 6.  | 4.6300   | 4.2686     | 0.36136      | 0.90351        |
| 7.  | 1.6700   | 3.6016     | -0.68431E-01 | -0.17110       |
| 8.  | 6.7000   | 6.7499     | -0.49879E-01 | -0.12471       |
| 9.  | 3.1000   | 2.6952     | 0.40480      | 1.0121         |
| 10. | 5.2000   | 5.2892     | -0.89170E-01 | -0.22295       |
| 11. | 1.5800   | 1.6185     | -0.38522E-01 | -0.96315E-01   |
| 12. | 1.2000   | 1.4965     | -0.29655     | -0.74144       |
| 13. | 2.2600   | 2.0745     | 0.18551      | 0.46382        |
| 14. | 1.1300   | 1.7541     | -0.62412     | -1.5605        |
| 15. | 2.3900   | 1.7782     | 0.61178      | 1.5296         |
| 16. | 2.1000   | 2.1916     | -0.91589E-01 | -0.22900       |

AUTOCORRELATION COEFF. -0.486  
 DURBIN-WATSON D STATISTIC 2.895

ESTIMATED RUNOFF\* AND 80% CONFIDENCE INTERVALS

| POINT | ESTIMATED RUNOFF | 80% CONFIDENCE INTERVAL |
|-------|------------------|-------------------------|
| 1     | 3.271            | ± 0.5784                |
| 2     | 3.935            | ± 0.6042                |
| 3     | 4.882            | ± 0.5892                |
| 4     | 5.830            | ± 0.6311                |
| 5     | 5.321            | ± 0.6009                |
| 6     | 5.886            | ± 0.6447                |
| 7     | 4.032            | ± 0.5879                |
| 8     | 3.912            | ± 0.6270                |
| 9     | 3.045            | ± 0.6087                |
| 10    | 3.496            | ± 0.5833                |
| 11    | 1.832            | ± 0.6356                |

\* Listed in same order as Table 1.

Table 2(b)

Polynomial Equations with E, L, D<sub>2</sub>

|           |    |             |            |         |
|-----------|----|-------------|------------|---------|
| RSQ       | =  | 0.9129      |            |         |
| FPROB.    | =  | 0.0000      |            |         |
| STD ERR Y | =  | 0.5812      |            |         |
| VAR       |    | COEFF       | STD ERR    | F-RATIO |
| CONST.    |    | -4.9543     | 0.8545     |         |
| E         |    | 2.0269      | 0.3753     | 29.1697 |
| L         |    | 0.0680      | 0.0100     | 45.9854 |
| D2        |    | -0.1033     | 0.0393     | 6.9178  |
| L         | 13 | -0.2029D-03 | 0.4647D-04 | 19.0667 |
|           |    |             |            | FPROB.  |
|           |    |             |            | 0.0003  |
|           |    |             |            | 0.0000  |
|           |    |             |            | 0.0226  |
|           |    |             |            | 0.0012  |

POTENTIAL INDEPENDENT VARIABLES:

|    |    | PARTIAL CORR. | TOLERANCE | FPROB  |
|----|----|---------------|-----------|--------|
| E  | :2 | 0.3637        | 0.6726    | 0.2443 |
| E  | :3 | 0.2455        | 0.5626    | 0.4468 |
| L  | :2 | 0.2625        | 0.3646    | 0.4138 |
| D2 | :2 | 0.1570        | 0.7181    | 0.6087 |
| D2 | :3 | 0.6930        | 0.9343    | 0.0122 |

UNSCRAMBLED REGRESSION EQUATION FOR VARIABLE R

| VAR   |      | COEFF        |
|-------|------|--------------|
| CONST |      | -28.0992     |
| E     |      | 2.5746       |
| L     |      | -0.17617E-01 |
| D2    |      | -3.8103      |
| L     | ** 2 | 0.91812E-02  |
| L     | ** 3 | -0.16408E-03 |
| D2    | ** 2 | -0.19828     |
| D2    | ** 3 | -0.32717E-02 |

OBSERVED RUNOFF\*

| NO. | OBSERVED | CALCULATED | RESIDUAL     | NORMALIZED RES |
|-----|----------|------------|--------------|----------------|
| 1.  | 3.3100   | 3.0170     | 0.29300      | 0.84988        |
| 2.  | 3.7400   | 3.9751     | -0.23508     | -0.68189       |
| 3.  | 4.1800   | 4.9488     | -0.26882     | -0.77975       |
| 4.  | 5.7200   | 5.9177     | -0.19769     | -0.57344       |
| 5.  | 1.4800   | 1.5568     | -0.76839E-01 | -0.22288       |
| 6.  | 4.6300   | 4.3959     | 0.23408      | 0.67898        |
| 7.  | 3.6700   | 3.7014     | -0.31417E-01 | -0.91128E-01   |
| 8.  | 6.7000   | 6.5941     | 0.10585      | 0.30704        |
| 9.  | 3.1000   | 2.6096     | 0.49038      | 1.4224         |
| 10. | 5.2000   | 5.2257     | -0.25739E-01 | -0.74658E-01   |
| 11. | 1.5800   | 1.6147     | -0.34731E-01 | -0.10074       |
| 12. | 1.2000   | 1.5213     | -0.32127     | -0.93188       |
| 13. | 2.2600   | 1.9852     | 0.27479      | 0.79705        |
| 14. | 1.1300   | 1.7065     | -0.57650     | -1.6722        |
| 15. | 2.3900   | 2.0612     | 0.32864      | 0.95385        |
| 16. | 2.1000   | 2.0594     | 0.40597E-01  | 0.11776        |

AUTOCORRELATION COEFF. = -0.306  
 DURBIN-WATSON D STATISTIC = 2.494

ESTIMATED RUNOFF\* AND 80% CONFIDENCE INTERVALS

|    |       |          |
|----|-------|----------|
| 1  | 3.264 | ± 0.4960 |
| 2  | 3.874 | ± 0.4980 |
| 3  | 4.657 | ± 0.5177 |
| 4  | 5.751 | ± 0.5313 |
| 5  | 5.275 | ± 0.5165 |
| 6  | 5.992 | ± 0.5296 |
| 7  | 4.075 | ± 0.5040 |
| 8  | 4.067 | ± 0.4942 |
| 9  | 3.104 | ± 0.5193 |
| 10 | 3.494 | ± 0.5021 |
| 11 | 1.535 | ± 0.5311 |

\* Listed in same order as Table 1.

Appendix B

Powers Creek  
Runoff - Demand - Storage Calculations  
(selected computer runs)

EXISTING SYSTEM (STORAGE=5341 AC-FT)

SINGLE 1 IN 23 LOW RUNOFF YEAR

| DEMAND                            | SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAMBLBY      |          |               |
|-----------------------------------|------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|
|                                   |                  | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 600.          | 15.          | 7.       | 992.          | 9.           | 2.       | 384.          | 28.          | 8.       | 800.          | 115.         | 59.      | 2565.         |
| 335.                              | 226.             | 14.          | 3.       | 600.          | 15.          | 6.       | 992.          | 10.          | 2.       | 384.          | 28.          | 6.       | 800.          | 115.         | 55.      | 2565.         |
| 343.                              | 298.             | 18.          | 13.      | 600.          | 19.          | 15.      | 992.          | 11.          | 8.       | 384.          | 33.          | 24.      | 800.          | 151.         | 126.     | 2565.         |
| 501.                              | 986.             | 63.          | 63.      | 600.          | 64.          | 64.      | 992.          | 40.          | 40.      | 384.          | 121.         | 121.     | 800.          | 501.         | 501.     | 2565.         |
| 1409.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 901.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 806.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 804.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 809.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 819.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 826.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 327.          | 15.          | 7.       | 833.          | 9.           | 2.       | 224.          | 28.          | 8.       | 358.          | 115.         | 59.      | 1608.         |
| 335.                              | 226.             | 14.          | 3.       | 330.          | 15.          | 6.       | 839.          | 10.          | 2.       | 226.          | 28.          | 6.       | 364.          | 115.         | 55.      | 1663.         |
| 343.                              | 298.             | 18.          | 13.      | 344.          | 19.          | 15.      | 855.          | 11.          | 8.       | 234.          | 33.          | 24.      | 389.          | 151.         | 126.     | 1789.         |
| 501.                              | 986.             | 63.          | 63.      | 407.          | 64.          | 64.      | 919.          | 40.          | 40.      | 274.          | 121.         | 121.     | 510.          | 501.         | 501.     | 2290.         |
| 1409.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 901.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 806.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 804.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 809.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 819.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 826.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |
| LOW RUNOFF YEAR ( 42.56% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 82.              | 9.           | -16.     | 307.          | 6.           | -13.     | 813.          | 4.           | -13.     | 208.          | 12.          | -37.     | 314.          | 49.          | -86.     | 1463.         |
| 335.                              | 82.              | 9.           | -17.     | 290.          | 6.           | -14.     | 799.          | 4.           | -13.     | 195.          | 12.          | -39.     | 275.          | 49.          | -90.     | 1373.         |
| 343.                              | 109.             | 11.          | -13.     | 278.          | 8.           | -11.     | 788.          | 5.           | -12.     | 183.          | 14.          | -33.     | 242.          | 64.          | -65.     | 1303.         |
| 501.                              | 359.             | 37.          | 23.      | 301.          | 27.          | 16.      | 804.          | 17.          | 7.       | 190.          | 51.          | 23.      | 265.          | 213.         | 135.     | 1444.         |
| 1409.                             | 1534.            | 244.         | 244.     | 545.          | 117.         | 117.     | 921.          | 112.         | 112.     | 302.          | 336.         | 336.     | 601.          | 910.         | 910.     | 2354.         |
| 2228.                             | 819.             | 173.         | 32.      | 577.          | 62.          | -51.     | 870.          | 79.          | -19.     | 283.          | 237.         | -44.     | 557.          | 486.         | -289.    | 2065.         |
| 2362.                             | 247.             | 11.          | -200.    | 377.          | 19.          | -150.    | 720.          | 16.          | -132.    | 150.          | 48.          | -375.    | 181.          | 146.         | -1017.   | 1048.         |
| 1800.                             | 123.             | 5.           | -163.    | 214.          | 9.           | -125.    | 595.          | 7.           | -110.    | 40.           | 22.          | -181.    | 0.            | 73.          | -981.    | 68.           |
| 562.                              | 109.             | 4.           | -139.    | 75.           | 8.           | -106.    | 489.          | 6.           | -40.     | 0.            | 17.          | 0.       | 0.            | 64.          | -68.     | 0.            |
| 443.                              | 101.             | 11.          | -75.     | 0.            | 8.           | -166.    | 323.          | 6.           | 0.       | 0.            | 16.          | 0.       | 0.            | 60.          | 0.       | 0.            |
| 343.                              | 93.              | 11.          | 0.       | 0.            | 7.           | -158.    | 165.          | 5.           | 0.       | 0.            | 14.          | 0.       | 0.            | 55.          | 0.       | 0.            |
| 327.                              | 82.              | 9.           | 0.       | 0.            | 6.           | -165.    | 0.            | 4.           | 0.       | 0.            | 12.          | 0.       | 0.            | 49.          | 0.       | 0.            |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 4.            | 15.          | 7.       | 7.            | 9.           | 2.       | 2.            | 28.          | 8.       | 8.            | 115.         | 59.      | 59.           |
| 335.                              | 226.             | 14.          | 3.       | 7.            | 15.          | 6.       | 13.           | 10.          | 2.       | 4.            | 28.          | 6.       | 14.           | 115.         | 55.      | 114.          |
| 343.                              | 298.             | 18.          | 13.      | 21.           | 19.          | 15.      | 29.           | 11.          | 8.       | 12.           | 33.          | 24.      | 38.           | 151.         | 126.     | 241.          |
| 501.                              | 986.             | 63.          | 63.      | 83.           | 64.          | 64.      | 93.           | 40.          | 40.      | 52.           | 121.         | 121.     | 159.          | 501.         | 501.     | 742.          |
| 1409.                             | 4213.            | 410.         | 410.     | 494.          | 274.         | 274.     | 367.          | 263.         | 263.     | 315.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 513.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 422.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 327.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 325.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 330.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 340.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 347.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 327.          | 15.          | 7.       | 354.          | 9.           | 2.       | 224.          | 28.          | 8.       | 358.          | 115.         | 59.      | 1608.         |
| 335.                              | 226.             | 14.          | 3.       | 330.          | 15.          | 6.       | 360.          | 10.          | 2.       | 226.          | 28.          | 6.       | 364.          | 115.         | 55.      | 1663.         |
| 343.                              | 298.             | 18.          | 13.      | 344.          | 19.          | 15.      | 375.          | 11.          | 8.       | 234.          | 33.          | 24.      | 387.          | 151.         | 126.     | 1789.         |
| 501.                              | 986.             | 63.          | 63.      | 407.          | 64.          | 64.      | 439.          | 40.          | 40.      | 274.          | 121.         | 121.     | 510.          | 501.         | 501.     | 2290.         |
| 1409.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 713.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 859.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 769.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 674.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 672.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 675.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 687.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 693.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |

\* IRRIGATION DEMAND = 7919 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

EXISTING SYSTEM (STORAGE = 5341 AC-FT)

TWO 1 IN 10 LOW RUNOFF YEARS

| DEMAND                            | SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LANDLY       |          |               |
|-----------------------------------|------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|
|                                   |                  | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 600.          | 15.          | 7.       | 992.          | 9.           | 2.       | 384.          | 28.          | 8.       | 800.          | 115.         | 59.      | 2565.         |
| 335.                              | 226.             | 14.          | 3.       | 600.          | 15.          | 6.       | 992.          | 10.          | 2.       | 384.          | 28.          | 6.       | 800.          | 115.         | 55.      | 2565.         |
| 343.                              | 298.             | 18.          | 13.      | 600.          | 19.          | 15.      | 992.          | 11.          | 8.       | 384.          | 33.          | 24.      | 800.          | 151.         | 126.     | 2565.         |
| 501.                              | 986.             | 63.          | 63.      | 600.          | 64.          | 64.      | 992.          | 40.          | 40.      | 384.          | 121.         | 121.     | 800.          | 501.         | 501.     | 2565.         |
| 1409.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 901.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 804.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 804.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 809.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 819.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 826.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 327.          | 15.          | 7.       | 833.          | 9.           | 2.       | 224.          | 28.          | 8.       | 358.          | 115.         | 59.      | 1608.         |
| 335.                              | 226.             | 14.          | 3.       | 330.          | 15.          | 6.       | 839.          | 10.          | 2.       | 226.          | 28.          | 6.       | 364.          | 115.         | 55.      | 1663.         |
| 343.                              | 298.             | 18.          | 13.      | 344.          | 19.          | 15.      | 855.          | 11.          | 8.       | 234.          | 33.          | 24.      | 389.          | 151.         | 126.     | 1789.         |
| 501.                              | 986.             | 63.          | 63.      | 407.          | 64.          | 64.      | 919.          | 40.          | 40.      | 274.          | 121.         | 121.     | 510.          | 501.         | 501.     | 2290.         |
| 1409.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 901.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1893.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 806.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 804.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 809.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 819.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 826.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |
| LOW RUNOFF YEAR ( 54.00% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 111.             | 11.          | -11.     | 312.          | 8.           | -9.      | 817.          | 5.           | -10.     | 211.          | 15.          | -28.     | 322.          | 62.          | -57.     | 1492.         |
| 335.                              | 111.             | 11.          | -12.     | 301.          | 8.           | -10.     | 807.          | 5.           | -10.     | 201.          | 15.          | -30.     | 293.          | 62.          | -61.     | 1431.         |
| 343.                              | 146.             | 14.          | -6.      | 295.          | 10.          | -5.      | 802.          | 6.           | -8.      | 193.          | 18.          | -21.     | 271.          | 82.          | -27.     | 1404.         |
| 501.                              | 484.             | 48.          | 46.      | 340.          | 35.          | 33.      | 835.          | 22.          | 20.      | 214.          | 65.          | 62.      | 333.          | 271.         | 261.     | 1665.         |
| 1409.                             | 2067.            | 310.         | 310.     | 600.          | 148.         | 148.     | 983.          | 142.         | 142.     | 356.          | 426.         | 426.     | 789.          | 1155.        | 1155.    | 2565.         |
| 2228.                             | 1104.            | 219.         | 107.     | 600.          | 79.          | -11.     | 972.          | 100.         | 22.      | 377.          | 301.         | 77.      | 800.          | 617.         | -1.      | 2564.         |
| 2362.                             | 333.             | 14.          | -189.    | 411.          | 24.          | -139.    | 833.          | 20.          | -122.    | 255.          | 60.          | -345.    | 455.          | 186.         | -930.    | 1533.         |
| 1800.                             | 166.             | 6.           | -157.    | 254.          | 12.          | -119.    | 714.          | 9.           | -105.    | 150.          | 28.          | -299.    | 156.          | 93.          | -806.    | 828.          |
| 562.                              | 146.             | 5.           | -36.     | 218.          | 10.          | -23.     | 691.          | 8.           | -22.     | 129.          | 22.          | -61.     | 95.           | 72.          | -147.    | 681.          |
| 443.                              | 136.             | 15.          | -16.     | 202.          | 10.          | -15.     | 676.          | 7.           | -14.     | 114.          | 20.          | -41.     | 54.           | 76.          | -93.     | 588.          |
| 343.                              | 126.             | 14.          | -8.      | 194.          | 9.           | -8.      | 668.          | 6.           | -9.      | 105.          | 18.          | -26.     | 28.           | 70.          | -49.     | 539.          |
| 327.                              | 111.             | 11.          | -11.     | 183.          | 8.           | -9.      | 659.          | 5.           | -10.     | 95.           | 15.          | -28.     | 0.            | 62.          | -57.     | 483.          |
| LOW RUNOFF YEAR ( 54.00% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 111.             | 11.          | -11.     | 172.          | 8.           | -9.      | 650.          | 5.           | -10.     | 84.           | 15.          | -0.      | 0.            | 62.          | -85.     | 398.          |
| 335.                              | 111.             | 11.          | -12.     | 161.          | 8.           | -10.     | 640.          | 5.           | -10.     | 74.           | 15.          | 0.       | 0.            | 62.          | -91.     | 307.          |
| 343.                              | 146.             | 14.          | -6.      | 154.          | 10.          | -5.      | 635.          | 6.           | -8.      | 66.           | 18.          | 0.       | 0.            | 82.          | -48.     | 259.          |
| 501.                              | 484.             | 46.          | 46.      | 200.          | 33.          | 33.      | 668.          | 22.          | 20.      | 87.           | 65.          | 62.      | 62.           | 271.         | 261.     | 520.          |
| 1409.                             | 2067.            | 310.         | 310.     | 510.          | 148.         | 148.     | 816.          | 142.         | 142.     | 229.          | 426.         | 426.     | 488.          | 1155.        | 1155.    | 1675.         |
| 2228.                             | 1104.            | 219.         | 107.     | 600.          | 79.          | -11.     | 805.          | 100.         | 22.      | 251.          | 301.         | 77.      | 565.          | 617.         | -1.      | 1674.         |
| 2362.                             | 333.             | 14.          | -199.    | 411.          | 24.          | -139.    | 686.          | 20.          | -122.    | 129.          | 60.          | -345.    | 219.          | 186.         | -930.    | 743.          |
| 1800.                             | 166.             | 6.           | -223.    | 188.          | 12.          | -171.    | 495.          | 9.           | -129.    | 0.            | 28.          | -219.    | 0.            | 93.          | -743.    | 0.            |
| 562.                              | 146.             | 5.           | -163.    | 25.           | 10.          | -125.    | 370.          | 8.           | 0.       | 0.            | 22.          | 0.       | 0.            | 82.          | 0.       | 0.            |
| 443.                              | 136.             | 15.          | -25.     | 0.            | 10.          | -125.    | 370.          | 7.           | 0.       | 0.            | 20.          | 0.       | 0.            | 76.          | 0.       | 0.            |
| 343.                              | 126.             | 14.          | 0.       | 0.            | 9.           | -100.    | 115.          | 6.           | 0.       | 0.            | 18.          | 0.       | 0.            | 70.          | 0.       | 0.            |
| 327.                              | 111.             | 11.          | 0.       | 0.            | 8.           | -115.    | 0.            | 5.           | 0.       | 0.            | 15.          | 0.       | 0.            | 62.          | 0.       | 0.            |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 4.            | 15.          | 7.       | 3.            | 9.           | 2.       | 2.            | 28.          | 8.       | 8.            | 115.         | 59.      | 59.           |
| 335.                              | 226.             | 14.          | 3.       | 7.            | 15.          | 6.       | 13.           | 10.          | 2.       | 4.            | 28.          | 6.       | 14.           | 115.         | 55.      | 114.          |
| 343.                              | 298.             | 18.          | 13.      | 21.           | 19.          | 15.      | 29.           | 11.          | 8.       | 12.           | 33.          | 24.      | 38.           | 131.         | 126.     | 241.          |
| 501.                              | 986.             | 63.          | 63.      | 83.           | 64.          | 64.      | 93.           | 40.          | 40.      | 52.           | 121.         | 121.     | 159.          | 501.         | 501.     | 742.          |
| 1409.                             | 4213.            | 410.         | 410.     | 494.          | 274.         | 274.     | 367.          | 263.         | 263.     | 315.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 513.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 422.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 327.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 325.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 330.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 340.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 347.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 327.          | 15.          | 7.       | 354.          | 9.           | 2.       | 224.          | 28.          | 8.       | 358.          | 115.         | 59.      | 1608.         |
| 335.                              | 226.             | 14.          | 3.       | 330.          | 15.          | 6.       | 360.          | 10.          | 2.       | 226.          | 28.          | 6.       | 364.          | 115.         | 55.      | 1663.         |
| 343.                              | 298.             | 18.          | 13.      | 344.          | 19.          | 15.      | 375.          | 11.          | 8.       | 234.          | 33.          | 24.      | 389.          | 151.         | 126.     | 1789.         |
| 501.                              | 986.             | 63.          | 63.      | 407.          | 64.          | 64.      | 439.          | 40.          | 40.      | 274.          | 121.         | 121.     | 510.          | 501.         | 501.     | 2290.         |
| 1409.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 713.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 859.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 769.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1893.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 674.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 672.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 676.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 687.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 693.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |

\* IRRIGATION DEMAND = 7919 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100/YEAR

EXISTING SYSTEM (STORAGE = 5341 AC-FT)

THREE 1 IN 8 LOW RUNOFF YEARS

| DEMAND                            | SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAMBLBY      |          |               |
|-----------------------------------|------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|
|                                   |                  | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 600.          | 15.          | 7.       | 992.          | 9.           | 2.       | 384.          | 28.          | 8.       | 800.          | 115.         | 59.      | 2565.         |
| 335.                              | 226.             | 14.          | 3.       | 600.          | 15.          | 6.       | 992.          | 10.          | 2.       | 384.          | 28.          | 6.       | 800.          | 115.         | 55.      | 2565.         |
| 343.                              | 298.             | 18.          | 13.      | 600.          | 19.          | 15.      | 992.          | 11.          | 8.       | 384.          | 33.          | 24.      | 800.          | 151.         | 124.     | 2565.         |
| 501.                              | 986.             | 63.          | 63.      | 600.          | 64.          | 64.      | 992.          | 40.          | 40.      | 384.          | 121.         | 121.     | 800.          | 501.         | 501.     | 2565.         |
| 1409.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 901.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 806.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 804.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 809.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 819.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 826.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 327.          | 15.          | 7.       | 833.          | 9.           | 2.       | 224.          | 28.          | 8.       | 358.          | 115.         | 59.      | 1608.         |
| 335.                              | 226.             | 14.          | 3.       | 330.          | 15.          | 6.       | 839.          | 10.          | 2.       | 226.          | 28.          | 6.       | 364.          | 115.         | 55.      | 1663.         |
| 343.                              | 298.             | 18.          | 13.      | 344.          | 19.          | 15.      | 855.          | 11.          | 8.       | 234.          | 33.          | 24.      | 389.          | 151.         | 124.     | 1789.         |
| 501.                              | 986.             | 63.          | 63.      | 407.          | 64.          | 64.      | 919.          | 40.          | 40.      | 274.          | 121.         | 121.     | 510.          | 501.         | 501.     | 2290.         |
| 1409.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 901.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 806.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 804.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 809.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 819.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 826.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |
| LOW RUNOFF YEAR ( 58.11% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 121.             | 12.          | -9.      | 314.          | 9.           | -8.      | 818.          | 5.           | -9.      | 212.          | 16.          | -25.     | 326.          | 67.          | -46.     | 1502.         |
| 335.                              | 121.             | 12.          | -10.     | 304.          | 9.           | -8.      | 810.          | 6.           | -9.      | 203.          | 16.          | -26.     | 299.          | 67.          | -51.     | 1452.         |
| 343.                              | 160.             | 15.          | -4.      | 301.          | 11.          | -4.      | 806.          | 6.           | -6.      | 197.          | 19.          | -17.     | 282.          | 88.          | -13.     | 1439.         |
| 501.                              | 529.             | 51.          | 51.      | 352.          | 37.          | 37.      | 843.          | 23.          | 23.      | 220.          | 70.          | 70.      | 352.          | 291.         | 291.     | 1730.         |
| 1409.                             | 2259.            | 333.         | 333.     | 600.          | 159.         | 159.     | 992.          | 153.         | 153.     | 373.          | 458.         | 458.     | 800.          | 1243.        | 1243.    | 2565.         |
| 2228.                             | 1207.            | 236.         | 134.     | 600.          | 85.          | 3.       | 992.          | 108.         | 37.      | 384.          | 324.         | 120.     | 800.          | 664.         | 102.     | 2565.         |
| 2362.                             | 364.             | 15.          | -185.    | 415.          | 26.          | -134.    | 858.          | 22.          | -118.    | 266.          | 65.          | -335.    | 445.          | 200.         | -899.    | 1666.         |
| 1800.                             | 182.             | 7.           | -155.    | 260.          | 13.          | -117.    | 741.          | 10.          | -103.    | 142.          | 30.          | -293.    | 172.          | 100.         | -790.    | 876.          |
| 562.                              | 160.             | 6.           | -34.     | 226.          | 11.          | -21.     | 720.          | 8.           | -20.     | 142.          | 24.          | -37.     | 115.          | 89.          | -133.    | 742.          |
| 443.                              | 149.             | 16.          | -14.     | 212.          | 10.          | -13.     | 707.          | 8.           | -13.     | 129.          | 22.          | -37.     | 78.           | 82.          | -80.     | 643.          |
| 343.                              | 138.             | 15.          | -6.      | 206.          | 10.          | -7.      | 700.          | 6.           | -8.      | 121.          | 19.          | -22.     | 56.           | 76.          | -37.     | 625.          |
| 327.                              | 121.             | 12.          | -9.      | 197.          | 9.           | -8.      | 693.          | 5.           | -9.      | 112.          | 16.          | -25.     | 31.           | 67.          | -46.     | 579.          |
| LOW RUNOFF YEAR ( 58.11% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 121.             | 12.          | -9.      | 188.          | 9.           | -8.      | 685.          | 5.           | -9.      | 103.          | 16.          | -25.     | 6.            | 67.          | -46.     | 532.          |
| 335.                              | 121.             | 12.          | -10.     | 179.          | 9.           | -8.      | 676.          | 6.           | -9.      | 94.           | 16.          | -26.     | 0.            | 67.          | -51.     | 462.          |
| 343.                              | 160.             | 15.          | -4.      | 175.          | 11.          | -4.      | 673.          | 6.           | -6.      | 87.           | 19.          | -17.     | 0.            | 89.          | -30.     | 431.          |
| 501.                              | 529.             | 51.          | 51.      | 226.          | 37.          | 37.      | 710.          | 23.          | 23.      | 111.          | 70.          | 70.      | 70.           | 291.         | 291.     | 722.          |
| 1409.                             | 2259.            | 333.         | 333.     | 559.          | 159.         | 159.     | 869.          | 153.         | 153.     | 263.          | 458.         | 458.     | 529.          | 1243.        | 1243.    | 1965.         |
| 2228.                             | 1207.            | 236.         | 134.     | 600.          | 85.          | 3.       | 872.          | 108.         | 37.      | 300.          | 324.         | 120.     | 649.          | 600.         | 102.     | 2068.         |
| 2362.                             | 364.             | 15.          | -185.    | 415.          | 26.          | -134.    | 738.          | 22.          | -118.    | 182.          | 65.          | -335.    | 314.          | 200.         | -899.    | 1168.         |
| 1800.                             | 182.             | 7.           | -155.    | 260.          | 13.          | -117.    | 621.          | 10.          | -103.    | 78.           | 30.          | -293.    | 21.           | 100.         | -790.    | 358.          |
| 562.                              | 160.             | 6.           | -34.     | 226.          | 11.          | -21.     | 600.          | 8.           | -20.     | 58.           | 24.          | -21.     | 0.            | 88.          | -169.    | 209.          |
| 443.                              | 149.             | 16.          | -14.     | 212.          | 10.          | -13.     | 587.          | 8.           | -13.     | 45.           | 22.          | 0.       | 0.            | 82.          | -117.    | 92.           |
| 343.                              | 138.             | 15.          | -6.      | 206.          | 10.          | -7.      | 581.          | 6.           | -8.      | 37.           | 19.          | 0.       | 0.            | 76.          | -59.     | 33.           |
| 327.                              | 121.             | 12.          | -24.     | 182.          | 9.           | -20.     | 561.          | 5.           | -20.     | 17.           | 16.          | 0.       | 0.            | 67.          | -33.     | 0.            |
| LOW RUNOFF YEAR ( 58.11% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 121.             | 12.          | -44.     | 138.          | 9.           | -36.     | 525.          | 5.           | -17.     | 0.            | 16.          | 0.       | 0.            | 67.          | 0.       | 0.            |
| 335.                              | 121.             | 12.          | -58.     | 80.           | 9.           | -47.     | 478.          | 6.           | 0.       | 0.            | 16.          | 0.       | 0.            | 67.          | 0.       | 0.            |
| 343.                              | 160.             | 15.          | -24.     | 56.           | 11.          | -20.     | 458.          | 6.           | 0.       | 0.            | 19.          | 0.       | 0.            | 89.          | 0.       | 0.            |
| 501.                              | 529.             | 51.          | 51.      | 107.          | 37.          | 37.      | 495.          | 23.          | 23.      | 25.           | 70.          | 70.      | 70.           | 291.         | 291.     | 291.          |
| 1409.                             | 2259.            | 333.         | 333.     | 440.          | 159.         | 159.     | 654.          | 153.         | 153.     | 176.          | 458.         | 458.     | 529.          | 1243.        | 1243.    | 1534.         |
| 2228.                             | 1207.            | 236.         | 134.     | 574.          | 85.          | 3.       | 658.          | 108.         | 37.      | 215.          | 324.         | 120.     | 649.          | 664.         | 102.     | 1636.         |
| 2362.                             | 364.             | 15.          | -185.    | 399.          | 26.          | -134.    | 523.          | 22.          | -118.    | 94.           | 65.          | -335.    | 314.          | 200.         | -899.    | 737.          |
| 1800.                             | 182.             | 7.           | -178.    | 211.          | 13.          | -135.    | 388.          | 10.          | -94.     | 0.            | 30.          | -314.    | 0.            | 100.         | -737.    | 0.            |
| 562.                              | 160.             | 6.           | -151.    | 60.           | 11.          | -114.    | 274.          | 8.           | 0.       | 0.            | 24.          | 0.       | 0.            | 88.          | 0.       | 0.            |
| 443.                              | 149.             | 16.          | -60.     | 0.            | 10.          | -97.     | 177.          | 8.           | 0.       | 0.            | 22.          | 0.       | 0.            | 82.          | 0.       | 0.            |
| 343.                              | 138.             | 15.          | 0.       | 0.            | 10.          | -80.     | 97.           | 6.           | 0.       | 0.            | 19.          | 0.       | 0.            | 76.          | 0.       | 0.            |
| 327.                              | 121.             | 12.          | 0.       | 0.            | 9.           | -97.     | 0.            | 5.           | 0.       | 0.            | 16.          | 0.       | 0.            | 67.          | 0.       | 0.            |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 4.            | 15.          | 7.       | 7.            | 9.           | 2.       | 2.            | 28.          | 8.       | 8.            | 115.         | 59.      | 59.           |
| 335.                              | 226.             | 14.          | 3.       | 7.            | 15.          | 6.       | 13.           | 10.          | 2.       | 4.            | 28.          | 6.       | 14.           | 115.         | 55.      | 114.          |
| 343.                              | 298.             | 18.          | 13.      | 21.           | 19.          | 15.      | 29.           | 11.          | 8.       | 12.           | 33.          | 24.      | 38.           | 151.         | 124.     | 241.          |
| 501.                              | 986.             | 63.          | 63.      | 83.           | 64.          | 64.      | 93.           | 40.          | 40.      | 52.           | 121.         | 121.     | 159.          | 501.         | 501.     | 742.          |
| 1409.                             | 4213.            | 410.         | 410.     | 494.          | 274.         | 274.     | 367.          | 263.         | 263.     | 315.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 513.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 422.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 327.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 325.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 330.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 340.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 347.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 327.                              | 226.             | 14.          | 4.       | 327.          | 15.          | 7.       | 354.          | 9.           | 2.       | 224.          | 28.          | 8.       | 358.          | 115.         | 59.      | 1608.         |
| 335.                              | 226.             | 14.          | 3.       | 330.          | 15.          | 6.       | 360.          | 10.          | 2.       | 226.          | 28.          | 6.       | 364.          | 115.         | 55.      | 1663.         |
| 343.                              | 298.             | 18.          | 13.      | 344.          | 19.          | 15.      | 375.          | 11.          | 8.       | 234.          | 33.          | 24.      | 389.          | 151.         | 124.     | 1789.         |
| 501.                              | 986.             | 63.          | 63.      | 407.          | 64.          | 64.      | 439.          | 40.          | 40.      | 274.          | 121.         | 121.     | 510.          | 501.         | 501.     | 2290.         |
| 1409.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 713.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 2228.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 859.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2362.                             | 678.             | 26.          | -142.    | 458.          | 44.          | -91.     | 769.          | 37.          | -81.     | 303.          | 112.         | -225.    | 575.          | 344.         | -582.    | 1983.         |
| 1800.                             | 339.             | 12.          | -134.    | 323.          | 22.          | -95.     | 674.          | 17.          | -85.     | 218.          | 52.          | -240.    | 335.          | 172.         | -632.    | 1351.         |
| 562.                              | 298.             | 10.          | -16.     | 307.          | 19.          | -2.      | 672.          | 14.          | -4.      | 213.          | 41.          | -12.     | 323.          | 151.         | 6.       | 1357.         |
| 443.                              | 277.             | 19.          | 3.       | 310.          | 18.          | 5.       | 674.          | 13.          | 1.       | 215.          | 37.          | 4.       | 327.          | 141.         | 50.      | 1407.         |
| 343.                              | 257.             | 18.          | 9.       | 319.          | 17.          | 10.      | 687.          | 11.          | 5.       | 220.          | 33.          | 16.      | 343.          | 130.         | 83.      | 1490.         |
| 327.                              | 225.             | 14.          | 4.       | 323.          | 15.          | 7.       | 693.          | 9.           | 2.       | 222.          | 28.          | 8.       | 351.          | 115.         | 59.      | 1549.         |

\* IRRIGATION DEMAND = 7919 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

EXISTING SYSTEM (STORAGE = 5341 AC-FT)

SINGLE 1 IN 65 LOW RUNOFF YEAR

| DEMAND SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAHBLY       |          |               |       |
|-------------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|-------|
|                         | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |       |
| MEAN RUNOFF YEAR        |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                    | 226.         | 14.      | 6.            | 406.         | 15.      | 8.            | 896.         | 9.       | 3.            | 279.         | 28.      | 11.           | 517.         | 115.     | 68.           | 2044. |
| 318.                    | 226.         | 14.      | 5.            | 411.         | 15.      | 8.            | 904.         | 10.      | 4.            | 283.         | 28.      | 10.           | 524.         | 115.     | 64.           | 2108. |
| 324.                    | 298.         | 18.      | 15.           | 427.         | 19.      | 17.           | 921.         | 11.      | 9.            | 292.         | 33.      | 28.           | 554.         | 151.     | 137.          | 2245. |
| 454.                    | 986.         | 63.      | 63.           | 489.         | 64.      | 64.           | 935.         | 40.      | 40.           | 332.         | 121.     | 121.          | 675.         | 501.     | 501.          | 2565. |
| 1208.                   | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                   | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                   | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                   | 339.         | 12.      | -104.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 467.         | 172.     | -476.         | 1719. |
| 514.                    | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                    | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                    | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                    | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |

| DEMAND SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAHBLY       |          |               |       |
|-------------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|-------|
|                         | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |       |
| MEAN RUNOFF YEAR        |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                    | 226.         | 14.      | 6.            | 406.         | 15.      | 8.            | 896.         | 9.       | 3.            | 279.         | 28.      | 11.           | 517.         | 115.     | 68.           | 2044. |
| 318.                    | 226.         | 14.      | 5.            | 411.         | 15.      | 8.            | 904.         | 10.      | 4.            | 283.         | 28.      | 10.           | 524.         | 115.     | 64.           | 2108. |
| 324.                    | 298.         | 18.      | 15.           | 427.         | 19.      | 17.           | 921.         | 11.      | 9.            | 292.         | 33.      | 28.           | 554.         | 151.     | 137.          | 2245. |
| 454.                    | 986.         | 63.      | 63.           | 489.         | 64.      | 64.           | 935.         | 40.      | 40.           | 332.         | 121.     | 121.          | 675.         | 501.     | 501.          | 2565. |
| 1208.                   | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                   | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                   | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                   | 339.         | 12.      | -104.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 467.         | 172.     | -476.         | 1719. |
| 514.                    | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                    | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                    | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                    | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |

| DEMAND SUB-BASIN INFLOW           | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAHBLY       |          |               |       |
|-----------------------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|-------|
|                                   | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |       |
| LOW RUNOFF YEAR ( 31.42% OF MEAN) |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 54.          | 6.       | -19.          | 381.         | 5.       | -14.          | 872.         | 3.       | -15.          | 261.         | 9.       | -43.          | 463.         | 36.      | -105.         | 1871. |
| 318.                              | 54.          | 6.       | -20.          | 381.         | 5.       | -16.          | 856.         | 3.       | -15.          | 244.         | 9.       | -44.          | 419.         | 36.      | -109.         | 1762. |
| 324.                              | 72.          | 8.       | -17.          | 344.         | 6.       | -14.          | 842.         | 3.       | -14.          | 233.         | 10.      | -40.          | 379.         | 47.      | -91.          | 1671. |
| 454.                              | 237.         | 28.      | 6.            | 350.         | 20.      | 3.            | 845.         | 13.      | -3.           | 229.         | 38.      | -5.           | 374.         | 157.     | 38.           | 1709. |
| 1208.                             | 1014.        | 180.     | 161.          | 511.         | 86.      | 71.           | 915.         | 83.      | 69.           | 298.         | 248.     | 209.          | 583.         | 672.     | 566.          | 2275. |
| 1867.                             | 542.         | 128.     | -5.           | 506.         | 46.      | -60.          | 855.         | 58.      | -34.          | 264.         | 175.     | -90.          | 494.         | 359.     | -370.         | 1905. |
| 1977.                             | 163.         | 8.       | -173.         | 333.         | 14.      | -131.         | 724.         | 12.      | -115.         | 148.         | 35.      | -328.         | 166.         | 108.     | -839.         | 1016. |
| 1517.                             | 82.          | 4.       | -140.         | 193.         | 7.       | -108.         | 610.         | 5.       | -95.          | 53.          | 16.      | -166.         | 0.           | 54.      | -840.         | 174.  |
| 514.                              | 72.          | 3.       | -79.          | 114.         | 6.       | -60.          | 556.         | 4.       | -53.          | 0.           | 13.      | 0.            | 0.           | 47.      | -176.         | 0.    |
| 417.                              | 67.          | 8.       | -114.         | 0.           | 6.       | -162.         | 394.         | 4.       | 0.            | 0.           | 12.      | 0.            | 0.           | 44.      | 0.            | 0.    |
| 324.                              | 62.          | 8.       | 0.            | 0.           | 3.       | -195.         | 199.         | 3.       | 0.            | 0.           | 10.      | 0.            | 0.           | 41.      | 0.            | 0.    |
| 311.                              | 54.          | 6.       | 0.            | 0.           | 5.       | -198.         | 1.           | 3.       | 0.            | 0.           | 9.       | 0.            | 0.           | 36.      | 0.            | 0.    |

| DEMAND SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAHBLY       |          |               |       |
|-------------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|-------|
|                         | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |       |
| MEAN RUNOFF YEAR        |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                    | 226.         | 14.      | 6.            | 406.         | 15.      | 8.            | 896.         | 9.       | 3.            | 279.         | 28.      | 11.           | 517.         | 115.     | 68.           | 2044. |
| 318.                    | 226.         | 14.      | 5.            | 411.         | 15.      | 8.            | 904.         | 10.      | 4.            | 283.         | 28.      | 10.           | 524.         | 115.     | 64.           | 2108. |
| 324.                    | 298.         | 18.      | 15.           | 427.         | 19.      | 17.           | 921.         | 11.      | 9.            | 292.         | 33.      | 28.           | 554.         | 151.     | 137.          | 2245. |
| 454.                    | 986.         | 63.      | 63.           | 489.         | 64.      | 64.           | 935.         | 40.      | 40.           | 332.         | 121.     | 121.          | 675.         | 501.     | 501.          | 2565. |
| 1208.                   | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                   | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                   | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                   | 339.         | 12.      | -104.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 467.         | 172.     | -476.         | 1719. |
| 514.                    | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                    | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                    | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                    | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |

| DEMAND SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAHBLY       |          |               |       |
|-------------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|-------|
|                         | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |       |
| MEAN RUNOFF YEAR        |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                    | 226.         | 14.      | 6.            | 406.         | 15.      | 8.            | 896.         | 9.       | 3.            | 279.         | 28.      | 11.           | 517.         | 115.     | 68.           | 2044. |
| 318.                    | 226.         | 14.      | 5.            | 411.         | 15.      | 8.            | 904.         | 10.      | 4.            | 283.         | 28.      | 10.           | 524.         | 115.     | 64.           | 2108. |
| 324.                    | 298.         | 18.      | 15.           | 427.         | 19.      | 17.           | 921.         | 11.      | 9.            | 292.         | 33.      | 28.           | 554.         | 151.     | 137.          | 2245. |
| 454.                    | 986.         | 63.      | 63.           | 489.         | 64.      | 64.           | 935.         | 40.      | 40.           | 332.         | 121.     | 121.          | 675.         | 501.     | 501.          | 2565. |
| 1208.                   | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                   | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                   | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                   | 339.         | 12.      | -104.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 467.         | 172.     | -476.         | 1719. |
| 514.                    | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                    | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                    | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                    | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |

\* IRRIGATION DEMAND = 6481 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

EXISTING SYSTEM (STORAGE = 5341 AC-FT)

TWO 1 IN 20 LOW RUNOFF YEARS

| DEMAND SUB-BASIN INFLOW           | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAMBLY       |          |               |       |
|-----------------------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|-------|
|                                   | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |       |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 226.         | 14.      | 6.            | 600.         | 15.      | 8.            | 992.         | 9.       | 3.            | 384.         | 28.      | 11.           | 800.         | 115.     | 68.           | 2565. |
| 318.                              | 226.         | 14.      | 5.            | 600.         | 15.      | 8.            | 992.         | 10.      | 4.            | 384.         | 28.      | 10.           | 800.         | 115.     | 64.           | 2565. |
| 324.                              | 298.         | 18.      | 15.           | 600.         | 19.      | 17.           | 992.         | 11.      | 9.            | 384.         | 33.      | 28.           | 800.         | 151.     | 137.          | 2565. |
| 454.                              | 986.         | 63.      | 63.           | 600.         | 64.      | 64.           | 992.         | 40.      | 40.           | 384.         | 121.     | 121.          | 800.         | 501.     | 501.          | 2565. |
| 1208.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                             | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                             | 339.         | 12.      | -106.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 469.         | 172.     | -476.         | 1719. |
| 514.                              | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                              | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                              | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                              | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 226.         | 14.      | 6.            | 406.         | 15.      | 8.            | 896.         | 9.       | 3.            | 279.         | 28.      | 11.           | 517.         | 115.     | 68.           | 2044. |
| 318.                              | 226.         | 14.      | 5.            | 411.         | 15.      | 8.            | 904.         | 10.      | 4.            | 283.         | 28.      | 10.           | 526.         | 115.     | 64.           | 2108. |
| 324.                              | 298.         | 18.      | 15.           | 427.         | 19.      | 17.           | 921.         | 11.      | 9.            | 292.         | 33.      | 28.           | 554.         | 151.     | 137.          | 2245. |
| 454.                              | 986.         | 63.      | 63.           | 489.         | 64.      | 64.           | 985.         | 40.      | 40.           | 332.         | 121.     | 121.          | 675.         | 501.     | 501.          | 2565. |
| 1208.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                             | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 932.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                             | 339.         | 12.      | -106.         | 390.         | 22.      | -72.          | 860.         | 17.      | -65.          | 265.         | 52.      | -184.         | 469.         | 172.     | -476.         | 1719. |
| 514.                              | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 862.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                              | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 868.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                              | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 880.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                              | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 888.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |
| LOW RUNOFF YEAR ( 44.20% OF MEAN) |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 86.          | 9.       | -14.          | 387.         | 7.       | -11.          | 877.         | 4.       | -12.          | 264.         | 12.      | -33.          | 473.         | 51.      | -73.          | 1903. |
| 318.                              | 86.          | 9.       | -14.          | 373.         | 7.       | -12.          | 865.         | 4.       | -12.          | 252.         | 12.      | -34.          | 439.         | 51.      | -76.          | 1827. |
| 324.                              | 114.         | 11.      | -10.          | 363.         | 8.       | -8.           | 856.         | 5.       | -10.          | 243.         | 15.      | -37.          | 412.         | 67.      | -49.          | 1778. |
| 454.                              | 377.         | 39.      | 31.           | 394.         | 28.      | 22.           | 879.         | 18.      | 12.           | 355.         | 53.      | 38.           | 450.         | 221.     | 179.          | 1957. |
| 1208.                             | 1610.        | 254.     | 254.          | 600.         | 121.     | 121.          | 992.         | 116.     | 116.          | 371.         | 349.     | 349.          | 799.         | 945.     | 945.          | 2565. |
| 1867.                             | 860.         | 179.     | 79.           | 600.         | 65.      | -16.          | 976.         | 82.      | 12.           | 383.         | 247.     | 45.           | 800.         | 505.     | -49.          | 2516. |
| 1977.                             | 259.         | 11.      | -160.         | 440.         | 19.      | -118.         | 858.         | 16.      | -104.         | 279.         | 50.      | -294.         | 506.         | 152.     | -793.         | 1724. |
| 1517.                             | 129.         | 5.       | -133.         | 306.         | 10.      | -101.         | 757.         | 8.       | -90.          | 189.         | 23.      | -254.         | 252.         | 79.      | -687.         | 1037. |
| 514.                              | 114.         | 4.       | -36.          | 271.         | 8.       | -24.          | 733.         | 6.       | -22.          | 168.         | 18.      | -62.          | 190.         | 67.      | -153.         | 883.  |
| 417.                              | 106.         | 12.      | -19.          | 252.         | 8.       | -17.          | 716.         | 6.       | -18.          | 152.         | 16.      | -46.          | 144.         | 62.      | -109.         | 775.  |
| 324.                              | 98.          | 11.      | -12.          | 240.         | 8.       | -11.          | 706.         | 5.       | -11.          | 141.         | 15.      | -31.          | 113.         | 57.      | -67.          | 708.  |
| 311.                              | 86.          | 9.       | -14.          | 226.         | 7.       | -11.          | 694.         | 4.       | -12.          | 129.         | 12.      | -33.          | 81.          | 51.      | -73.          | 635.  |
| LOW RUNOFF YEAR ( 44.20% OF MEAN) |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 86.          | 9.       | -14.          | 213.         | 7.       | -11.          | 683.         | 4.       | -12.          | 117.         | 12.      | -33.          | 48.          | 51.      | -73.          | 562.  |
| 318.                              | 86.          | 9.       | -14.          | 198.         | 7.       | -12.          | 671.         | 4.       | -12.          | 105.         | 12.      | -34.          | 14.          | 51.      | -76.          | 486.  |
| 324.                              | 114.         | 11.      | -10.          | 188.         | 8.       | -8.           | 663.         | 5.       | -10.          | 96.          | 15.      | -14.          | 0.           | 67.      | -62.          | 423.  |
| 454.                              | 377.         | 39.      | 31.           | 220.         | 28.      | 22.           | 685.         | 18.      | 12.           | 108.         | 53.      | 38.           | 38.          | 221.     | 179.          | 603.  |
| 1208.                             | 1610.        | 254.     | 254.          | 473.         | 121.     | 121.          | 866.         | 116.     | 116.          | 224.         | 349.     | 349.          | 387.         | 945.     | 945.          | 1543. |
| 1867.                             | 860.         | 179.     | 79.           | 552.         | 65.      | -16.          | 790.         | 82.      | 12.           | 236.         | 247.     | 45.           | 432.         | 505.     | -49.          | 1499. |
| 1977.                             | 259.         | 11.      | -160.         | 392.         | 19.      | -118.         | 672.         | 16.      | -104.         | 132.         | 50.      | -294.         | 138.         | 152.     | -793.         | 707.  |
| 1517.                             | 129.         | 5.       | -172.         | 220.         | 10.      | -132.         | 540.         | 8.       | -117.         | 15.          | 23.      | -138.         | 0.           | 76.      | -707.         | 0.    |
| 514.                              | 114.         | 4.       | -159.         | 61.          | 8.       | -122.         | 418.         | 6.       | -15.          | 0.           | 18.      | 0.            | 0.           | 67.      | 0.            | 0.    |
| 417.                              | 106.         | 12.      | -61.          | 0.           | 8.       | -145.         | 272.         | 6.       | 0.            | 0.           | 16.      | 0.            | 0.           | 62.      | 0.            | 0.    |
| 324.                              | 98.          | 11.      | 0.            | 0.           | 8.       | -131.         | 142.         | 5.       | 0.            | 0.           | 15.      | 0.            | 0.           | 57.      | 0.            | 0.    |
| 311.                              | 86.          | 9.       | 0.            | 0.           | 7.       | -142.         | 0.           | 4.       | 0.            | 0.           | 12.      | 0.            | 0.           | 51.      | 0.            | 0.    |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 226.         | 14.      | 6.            | 6.           | 15.      | 8.            | 8.           | 9.       | 3.            | 3.           | 28.      | 11.           | 11.          | 115.     | 68.           | 68.   |
| 318.                              | 226.         | 14.      | 5.            | 11.          | 15.      | 8.            | 15.          | 10.      | 4.            | 7.           | 28.      | 10.           | 21.          | 115.     | 64.           | 133.  |
| 324.                              | 298.         | 18.      | 15.           | 26.          | 19.      | 17.           | 32.          | 11.      | 9.            | 16.          | 33.      | 28.           | 48.          | 151.     | 137.          | 269.  |
| 454.                              | 986.         | 63.      | 63.           | 89.          | 64.      | 64.           | 96.          | 40.      | 40.           | 56.          | 121.     | 121.          | 169.         | 501.     | 501.          | 770.  |
| 1208.                             | 4213.        | 410.     | 410.          | 499.         | 274.     | 274.          | 370.         | 263.     | 263.          | 319.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 516.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                             | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 457.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                             | 339.         | 12.      | -106.         | 390.         | 22.      | -72.          | 384.         | 17.      | -65.          | 265.         | 52.      | -184.         | 469.         | 172.     | -476.         | 1719. |
| 514.                              | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 386.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                              | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 393.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                              | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 404.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                              | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 413.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 311.                              | 226.         | 14.      | 6.            | 406.         | 15.      | 8.            | 421.         | 9.       | 3.            | 279.         | 28.      | 11.           | 517.         | 115.     | 68.           | 2044. |
| 318.                              | 226.         | 14.      | 5.            | 411.         | 15.      | 8.            | 428.         | 10.      | 4.            | 283.         | 28.      | 10.           | 526.         | 115.     | 64.           | 2108. |
| 324.                              | 298.         | 18.      | 15.           | 427.         | 19.      | 17.           | 445.         | 11.      | 9.            | 292.         | 33.      | 28.           | 554.         | 151.     | 137.          | 2245. |
| 454.                              | 986.         | 63.      | 63.           | 489.         | 64.      | 64.           | 509.         | 40.      | 40.           | 332.         | 121.     | 121.          | 675.         | 501.     | 501.          | 2565. |
| 1208.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 783.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1867.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 929.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1977.                             | 678.         | 26.      | -104.         | 496.         | 44.      | -60.          | 869.         | 37.      | -54.          | 330.         | 112.     | -148.         | 652.         | 344.     | -370.         | 2195. |
| 1517.                             | 339.         | 12.      | -106.         | 390.         | 22.      | -72.          | 797.         | 17.      | -65.          | 265.         | 52.      | -184.         | 469.         | 172.     | -476.         | 1719. |
| 514.                              | 298.         | 10.      | -12.          | 379.         | 19.      | 2.            | 799.         | 14.      | -1.           | 264.         | 41.      | -2.           | 467.         | 151.     | 32.           | 1751. |
| 417.                              | 277.         | 19.      | 5.            | 384.         | 18.      | 7.            | 806.         | 13.      | 3.            | 267.         | 37.      | 9.            | 476.         | 141.     | 64.           | 1815. |
| 324.                              | 257.         | 18.      | 11.           | 395.         | 17.      | 12.           | 817.         | 11.      | 6.            | 273.         | 33.      | 19.           | 495.         | 130.     | 93.           | 1908. |
| 311.                              | 225.         | 14.      | 6.            | 401.         | 15.      | 8.            | 825.         | 9.       | 3.            | 276.         | 28.      | 11.           | 506.         | 115.     | 68.           | 1976. |

\* IRRIGATION DEMAND = 6481 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

THREE 1 IN 14 LOW RUNOFF YEARS

| DOBBIN-WEST                       |                  |              | JACKPINE |               |              | PAYNTER  |               |              | ISLAHT   |               |              | LANHLY   |               |              |          |               |
|-----------------------------------|------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|
| DEMAND                            | SUB-BASIN INFLOW | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 311.                              | 226.             | 14.          | 6.       | 600.          | 15.          | 8.       | 992.          | 9.           | 3.       | 384.          | 28.          | 11.      | 800.          | 115.         | 68.      | 2565.         |
| 318.                              | 226.             | 14.          | 5.       | 600.          | 15.          | 8.       | 992.          | 10.          | 4.       | 384.          | 28.          | 10.      | 800.          | 115.         | 64.      | 2565.         |
| 324.                              | 298.             | 18.          | 15.      | 600.          | 19.          | 17.      | 992.          | 11.          | 9.       | 384.          | 33.          | 28.      | 800.          | 151.         | 137.     | 2565.         |
| 454.                              | 986.             | 63.          | 63.      | 600.          | 64.          | 64.      | 992.          | 40.          | 40.      | 384.          | 121.         | 121.     | 800.          | 501.         | 501.     | 2565.         |
| 1208.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1867.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1977.                             | 678.             | 26.          | -104.    | 496.          | 44.          | -60.     | 932.          | 37.          | -54.     | 330.          | 112.         | -148.    | 652.          | 344.         | -370.    | 2195.         |
| 1517.                             | 339.             | 12.          | -106.    | 390.          | 22.          | -72.     | 860.          | 17.          | -65.     | 265.          | 52.          | -184.    | 469.          | 172.         | -476.    | 1719.         |
| 514.                              | 298.             | 10.          | -12.     | 379.          | 19.          | 2.       | 862.          | 14.          | -1.      | 264.          | 41.          | -2.      | 467.          | 151.         | 32.      | 1751.         |
| 417.                              | 277.             | 19.          | 5.       | 384.          | 18.          | 7.       | 868.          | 13.          | 3.       | 267.          | 37.          | 9.       | 476.          | 141.         | 64.      | 1815.         |
| 324.                              | 257.             | 18.          | 11.      | 395.          | 17.          | 12.      | 880.          | 11.          | 6.       | 273.          | 33.          | 19.      | 495.          | 130.         | 93.      | 1908.         |
| 311.                              | 225.             | 14.          | 6.       | 401.          | 15.          | 8.       | 888.          | 9.           | 3.       | 276.          | 28.          | 11.      | 506.          | 115.         | 68.      | 1976.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 311.                              | 226.             | 14.          | 6.       | 406.          | 15.          | 8.       | 896.          | 9.           | 3.       | 279.          | 28.          | 11.      | 517.          | 115.         | 68.      | 2044.         |
| 318.                              | 226.             | 14.          | 5.       | 411.          | 15.          | 8.       | 904.          | 10.          | 4.       | 283.          | 28.          | 10.      | 526.          | 115.         | 64.      | 2108.         |
| 324.                              | 298.             | 18.          | 15.      | 427.          | 19.          | 17.      | 921.          | 11.          | 9.       | 292.          | 33.          | 28.      | 554.          | 151.         | 137.     | 2245.         |
| 454.                              | 986.             | 63.          | 63.      | 489.          | 64.          | 64.      | 985.          | 40.          | 40.      | 332.          | 121.         | 121.     | 675.          | 501.         | 501.     | 2565.         |
| 1208.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1867.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1977.                             | 678.             | 26.          | -104.    | 496.          | 44.          | -60.     | 932.          | 37.          | -54.     | 330.          | 112.         | -148.    | 652.          | 344.         | -370.    | 2195.         |
| 1517.                             | 339.             | 12.          | -106.    | 390.          | 22.          | -72.     | 860.          | 17.          | -65.     | 265.          | 52.          | -184.    | 469.          | 172.         | -476.    | 1719.         |
| 514.                              | 298.             | 10.          | -12.     | 379.          | 19.          | 2.       | 862.          | 14.          | -1.      | 264.          | 41.          | -2.      | 467.          | 151.         | 32.      | 1751.         |
| 417.                              | 277.             | 19.          | 5.       | 384.          | 18.          | 7.       | 868.          | 13.          | 3.       | 267.          | 37.          | 9.       | 476.          | 141.         | 64.      | 1815.         |
| 324.                              | 257.             | 18.          | 11.      | 395.          | 17.          | 12.      | 880.          | 11.          | 6.       | 273.          | 33.          | 19.      | 495.          | 130.         | 93.      | 1908.         |
| 311.                              | 225.             | 14.          | 6.       | 401.          | 15.          | 8.       | 888.          | 9.           | 3.       | 276.          | 28.          | 11.      | 506.          | 115.         | 68.      | 1976.         |
| LOW RUNOFF YEAR ( 48.96% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 311.                              | 98.              | 10.          | -12.     | 389.          | 7.           | -10.     | 878.          | 4.           | -11.     | 265.          | 14.          | -29.     | 477.          | 56.          | -61.     | 1915.         |
| 318.                              | 98.              | 10.          | -12.     | 377.          | 7.           | -10.     | 868.          | 5.           | -10.     | 255.          | 14.          | -30.     | 447.          | 56.          | -64.     | 1851.         |
| 324.                              | 130.             | 12.          | -7.      | 370.          | 9.           | -6.      | 852.          | 5.           | -8.      | 247.          | 16.          | -23.     | 424.          | 74.          | -33.     | 1818.         |
| 454.                              | 429.             | 43.          | 41.      | 411.          | 31.          | 29.      | 891.          | 20.          | 18.      | 355.          | 59.          | 54.      | 478.          | 245.         | 232.     | 2049.         |
| 1208.                             | 1832.            | 281.         | 281.     | 600.          | 134.         | 134.     | 992.          | 129.         | 129.     | 384.          | 386.         | 386.     | 800.          | 1047.        | 1047.    | 2565.         |
| 1867.                             | 979.             | 199.         | 110.     | 600.          | 71.          | 0.       | 992.          | 91.          | 29.      | 384.          | 273.         | 96.      | 800.          | 559.         | 71.      | 2565.         |
| 1977.                             | 295.             | 13.          | -155.    | 445.          | 22.          | -113.    | 879.          | 18.          | -100.    | 284.          | 55.          | -282.    | 518.          | 168.         | -757.    | 1808.         |
| 1517.                             | 147.             | 6.           | -131.    | 313.          | 11.          | -99.     | 789.          | 8.           | -88.     | 197.          | 25.          | -248.    | 270.          | 84.          | -669.    | 1140.         |
| 514.                              | 130.             | 5.           | -34.     | 250.          | 9.           | -21.     | 750.          | 7.           | -20.     | 177.          | 20.          | -57.     | 213.          | 74.          | -137.    | 1002.         |
| 417.                              | 121.             | 13.          | -16.     | 264.          | 9.           | -15.     | 744.          | 6.           | -14.     | 162.          | 18.          | -41.     | 172.          | 69.          | -94.     | 908.          |
| 324.                              | 112.             | 12.          | -9.      | 255.          | 8.           | -9.      | 735.          | 5.           | -9.      | 153.          | 16.          | -26.     | 146.          | 64.          | -53.     | 855.          |
| 311.                              | 98.              | 10.          | -12.     | 243.          | 7.           | -10.     | 726.          | 4.           | -11.     | 142.          | 14.          | -29.     | 117.          | 56.          | -61.     | 794.          |
| LOW RUNOFF YEAR ( 48.96% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 311.                              | 98.              | 10.          | -12.     | 232.          | 7.           | -10.     | 716.          | 4.           | -11.     | 132.          | 14.          | -29.     | 88.           | 56.          | -61.     | 733.          |
| 318.                              | 98.              | 10.          | -12.     | 219.          | 7.           | -10.     | 706.          | 5.           | -10.     | 121.          | 14.          | -30.     | 58.           | 56.          | -64.     | 669.          |
| 324.                              | 130.             | 12.          | -7.      | 212.          | 9.           | -6.      | 699.          | 5.           | -8.      | 113.          | 16.          | -23.     | 35.           | 74.          | -33.     | 636.          |
| 454.                              | 429.             | 43.          | 41.      | 253.          | 31.          | 29.      | 729.          | 20.          | 18.      | 131.          | 59.          | 54.      | 89.           | 245.         | 232.     | 867.          |
| 1208.                             | 1832.            | 281.         | 281.     | 534.          | 134.         | 134.     | 853.          | 129.         | 129.     | 260.          | 386.         | 386.     | 476.          | 1047.        | 1047.    | 1915.         |
| 1867.                             | 979.             | 199.         | 110.     | 600.          | 71.          | 0.       | 863.          | 91.          | 29.      | 289.          | 273.         | 96.      | 571.          | 559.         | 71.      | 1985.         |
| 1977.                             | 295.             | 13.          | -155.    | 445.          | 22.          | -113.    | 750.          | 18.          | -100.    | 189.          | 55.          | -282.    | 290.          | 168.         | -757.    | 1229.         |
| 1517.                             | 147.             | 6.           | -131.    | 313.          | 11.          | -99.     | 652.          | 8.           | -88.     | 102.          | 25.          | -248.    | 41.           | 84.          | -669.    | 560.          |
| 514.                              | 130.             | 5.           | -34.     | 280.          | 9.           | -21.     | 630.          | 7.           | -20.     | 92.           | 20.          | -41.     | 0.            | 74.          | -153.    | 407.          |
| 417.                              | 121.             | 13.          | -16.     | 264.          | 9.           | -15.     | 613.          | 6.           | -14.     | 67.           | 18.          | 0.       | 0.            | 69.          | -135.    | 272.          |
| 324.                              | 112.             | 12.          | -9.      | 255.          | 8.           | -9.      | 607.          | 5.           | -9.      | 58.           | 16.          | 0.       | 0.            | 64.          | -80.     | 192.          |
| 311.                              | 98.              | 10.          | -12.     | 243.          | 7.           | -10.     | 597.          | 4.           | -11.     | 47.           | 14.          | 0.       | 0.            | 56.          | -90.     | 103.          |
| LOW RUNOFF YEAR ( 48.96% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 311.                              | 98.              | 10.          | -12.     | 232.          | 7.           | -10.     | 587.          | 4.           | -11.     | 37.           | 14.          | 0.       | 0.            | 56.          | -70.     | 13.           |
| 318.                              | 98.              | 10.          | -12.     | 187.          | 7.           | -10.     | 551.          | 5.           | -10.     | 3.            | 14.          | 0.       | 0.            | 56.          | -13.     | 0.            |
| 324.                              | 130.             | 12.          | -7.      | 146.          | 9.           | -6.      | 518.          | 5.           | -8.      | 0.            | 16.          | 0.       | 0.            | 74.          | 0.       | 0.            |
| 454.                              | 429.             | 43.          | 41.      | 186.          | 31.          | 29.      | 547.          | 20.          | 18.      | 18.           | 59.          | 54.      | 54.           | 245.         | 232.     | 232.          |
| 1208.                             | 1832.            | 281.         | 281.     | 467.          | 134.         | 134.     | 681.          | 129.         | 129.     | 147.          | 386.         | 386.     | 441.          | 1047.        | 1047.    | 1229.         |
| 1867.                             | 979.             | 199.         | 110.     | 600.          | 71.          | 0.       | 693.          | 91.          | 29.      | 176.          | 273.         | 96.      | 533.          | 559.         | 71.      | 1330.         |
| 1977.                             | 295.             | 13.          | -155.    | 422.          | 22.          | -113.    | 569.          | 18.          | -100.    | 78.           | 55.          | -282.    | 255.          | 168.         | -757.    | 593.          |
| 1517.                             | 147.             | 6.           | -131.    | 246.          | 11.          | -99.     | 434.          | 8.           | -76.     | 0.            | 25.          | -255.    | 0.            | 84.          | -593.    | 0.            |
| 514.                              | 130.             | 5.           | -34.     | 93.           | 9.           | -21.     | 317.          | 7.           | 0.       | 0.            | 20.          | 0.       | 0.            | 74.          | 0.       | 0.            |
| 417.                              | 121.             | 13.          | -16.     | 0.            | 9.           | -117.    | 230.          | 6.           | 0.       | 0.            | 18.          | 0.       | 0.            | 69.          | 0.       | 0.            |
| 324.                              | 112.             | 12.          | -9.      | 0.            | 8.           | -87.     | 123.          | 5.           | 0.       | 0.            | 16.          | 0.       | 0.            | 64.          | 0.       | 0.            |
| 311.                              | 98.              | 10.          | -12.     | 0.            | 7.           | -121.    | 1.            | 4.           | 0.       | 0.            | 14.          | 0.       | 0.            | 56.          | 0.       | 0.            |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 311.                              | 226.             | 14.          | 6.       | 6.            | 15.          | 8.       | 10.           | 9.           | 3.       | 3.            | 28.          | 11.      | 11.           | 115.         | 68.      | 68.           |
| 318.                              | 226.             | 14.          | 5.       | 11.           | 15.          | 8.       | 17.           | 10.          | 4.       | 7.            | 28.          | 10.      | 21.           | 115.         | 64.      | 133.          |
| 324.                              | 298.             | 18.          | 15.      | 26.           | 19.          | 17.      | 34.           | 11.          | 9.       | 16.           | 33.          | 28.      | 48.           | 151.         | 137.     | 269.          |
| 454.                              | 986.             | 63.          | 63.      | 89.           | 64.          | 64.      | 98.           | 40.          | 40.      | 56.           | 121.         | 121.     | 169.          | 501.         | 501.     | 770.          |
| 1208.                             | 4213.            | 410.         | 410.     | 499.          | 274.         | 274.     | 372.          | 263.         | 263.     | 319.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1867.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 518.          | 186.         | 186.     | 394.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1977.                             | 678.             | 26.          | -104.    | 496.          | 44.          | -60.     | 458.          | 37.          | -54.     | 330.          | 112.         | -148.    | 652.          | 344.         | -370.    | 2195.         |
| 1517.                             | 339.             | 12.          | -106.    | 390.          | 22.          | -72.     | 388.          | 17.          | -65.     | 265.          | 52.          | -184.    | 469.          | 172.         | -476.    | 1719.         |
| 514.                              | 298.             | 10.          | -12.     | 379.          | 19.          | 2.       | 388.          | 14.          | -1.      | 264.          | 41.          | -2.      | 467.          | 151.         | 32.      | 1751.         |
| 417.                              | 277.             | 19.          | 5.       | 384.          | 18.          | 7.       | 395.          | 13.          | 3.       | 267.          | 37.          | 9.       | 476.          | 141.         | 64.      | 1815.         |
| 324.                              | 257.             | 18.          | 11.      | 395.          | 17.          | 12.      | 406.          | 11.          | 6.       | 273.          | 33.          | 19.      | 495.          | 130.         | 93.      | 1908.         |
| 311.                              | 225.             | 14.          | 6.       | 401.          | 15.          | 8.       | 414.          | 9.           | 3.       | 276.          | 28.          | 11.      | 506.          | 115.         | 68.      | 1976.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 311.                              | 226.             | 14.          | 6.       | 406.          | 15.          | 8.       | 422.          | 9.           | 3.       | 279.          | 28.          | 11.      | 517.          | 115.         | 68.      | 2044.         |
| 318.                              | 226.             | 14.          | 5.       | 411.          | 15.          | 8.       | 430.          | 10.          | 4.       | 283.          | 28.          | 10.      | 526.          | 115.         | 64.      | 2108.         |
| 324.                              | 298.             | 18.          | 15.      | 427.          | 19.          | 17.      | 447.          | 11.          | 9.       | 292.          | 33.          | 28.      | 554.          | 151.         | 137.     | 2245.         |
| 454.                              | 986.             | 63.          | 63.      | 489.          | 64.          | 64.      | 511.          | 40.          | 40.      | 332.          | 121.         | 121.     | 675.          | 501.         | 501.     | 2565.         |
| 1208.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 785.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1867.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 931.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1977.                             | 678.             | 26.          | -104.    | 496.          | 44.          | -60.     | 871.          | 37.          | -54.     | 330.          | 112.         | -148.    | 652.          | 344.         | -370.    | 2195.         |
| 1517.                             | 339.             | 12.          | -106.    | 390.          | 22.          | -72.     | 799.          | 17.          | -65.     | 265.          | 52.          | -184.    | 469.          | 172.         | -476.    | 1719.         |
| 514.                              | 298.             | 10.          | -12.     | 379.          | 19.          | 2.       | 801.          | 14.          | -1.      | 264.          | 41.          | -2.      | 467.          | 151.         | 32.      | 1751.         |
| 417.                              | 277.             | 19.          | 5.       | 384.          | 18.          | 7.       | 807.          | 13.          | 3.       | 267.          | 37.          | 9.       | 476.          | 141.         | 64.      | 1815.         |
| 324.                              | 257.             | 18.          | 11.      | 395.          | 17.          | 12.      | 819.          | 11.          | 6.       | 273.          | 33.          | 19.      | 495.          | 130.         | 93.      | 1908.         |
| 311.                              | 225.             | 14.          | 6.       | 401.          | 15.          | 8.       | 827.          | 9.           | 3.       | 276.          | 28.          | 11.      | 506.          | 115.         | 68.      | 1976.         |

\* IRRIGATION DEMAND = 6481 AC-FT/YEAR  
 FISHERIES DEMAND = 3040 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

EXISTING SYSTEM ( STORAGE = 5341 AC-FT)

SINGLE 1 IN 143 LOW RUNOFF YEAR

| DEMAND                            | SUR-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAMBLY       |          |               |
|-----------------------------------|------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|
|                                   |                  | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 226.             | 14.          | 7.       | 600.          | 15.          | 9.       | 992.          | 9.           | 4.       | 384.          | 28.          | 13.      | 800.          | 115.         | 73.      | 2545.         |
| 307.                              | 226.             | 14.          | 6.       | 600.          | 15.          | 9.       | 992.          | 10.          | 4.       | 384.          | 28.          | 12.      | 800.          | 115.         | 70.      | 2545.         |
| 313.                              | 298.             | 18.          | 16.      | 600.          | 19.          | 18.      | 992.          | 11.          | 10.      | 384.          | 33.          | 30.      | 800.          | 151.         | 143.     | 2545.         |
| 424.                              | 986.             | 63.          | 63.      | 600.          | 64.          | 64.      | 992.          | 40.          | 40.      | 384.          | 121.         | 121.     | 800.          | 501.         | 501.     | 2545.         |
| 1083.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2545.         |
| 1642.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2545.         |
| 1737.                             | 678.             | 26.          | -80.     | 520.          | 44.          | -41.     | 951.          | 37.          | -37.     | 347.          | 112.         | -100.    | 700.          | 344.         | -239.    | 2326.         |
| 1341.                             | 339.             | 12.          | -88.     | 432.          | 22.          | -58.     | 893.          | 17.          | -53.     | 294.          | 52.          | -148.    | 552.          | 172.         | -379.    | 1947.         |
| 485.                              | 298.             | 10.          | -9.      | 423.          | 19.          | 4.       | 897.          | 14.          | 1.       | 295.          | 41.          | 4.       | 555.          | 151.         | 48.      | 1996.         |
| 401.                              | 277.             | 19.          | 7.       | 430.          | 18.          | 8.       | 905.          | 13.          | 4.       | 299.          | 37.          | 12.      | 568.          | 141.         | 73.      | 2069.         |
| 313.                              | 257.             | 18.          | 12.      | 443.          | 17.          | 13.      | 918.          | 11.          | 7.       | 306.          | 33.          | 22.      | 590.          | 130.         | 99.      | 2168.         |
| 301.                              | 225.             | 14.          | 6.       | 449.          | 15.          | 9.       | 927.          | 9.           | 4.       | 310.          | 28.          | 13.      | 602.          | 115.         | 73.      | 2241.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 226.             | 14.          | 7.       | 456.          | 15.          | 9.       | 936.          | 9.           | 4.       | 313.          | 28.          | 13.      | 615.          | 115.         | 73.      | 2315.         |
| 307.                              | 226.             | 14.          | 6.       | 462.          | 15.          | 9.       | 944.          | 10.          | 4.       | 318.          | 28.          | 12.      | 627.          | 115.         | 70.      | 2385.         |
| 313.                              | 298.             | 18.          | 16.      | 478.          | 19.          | 18.      | 962.          | 11.          | 10.      | 328.          | 33.          | 30.      | 657.          | 151.         | 143.     | 2528.         |
| 424.                              | 986.             | 63.          | 63.      | 541.          | 64.          | 64.      | 992.          | 40.          | 40.      | 368.          | 121.         | 121.     | 778.          | 501.         | 501.     | 2565.         |
| 1083.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2555.         |
| 1642.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1737.                             | 678.             | 26.          | -80.     | 520.          | 44.          | -41.     | 951.          | 37.          | -37.     | 347.          | 112.         | -100.    | 700.          | 344.         | -239.    | 2326.         |
| 1341.                             | 339.             | 12.          | -88.     | 432.          | 22.          | -58.     | 893.          | 17.          | -53.     | 294.          | 52.          | -148.    | 552.          | 172.         | -379.    | 1947.         |
| 485.                              | 298.             | 10.          | -9.      | 423.          | 19.          | 4.       | 897.          | 14.          | 1.       | 295.          | 41.          | 4.       | 555.          | 151.         | 48.      | 1996.         |
| 401.                              | 277.             | 19.          | 7.       | 430.          | 18.          | 8.       | 905.          | 13.          | 4.       | 299.          | 37.          | 12.      | 568.          | 141.         | 73.      | 2069.         |
| 313.                              | 257.             | 18.          | 12.      | 443.          | 17.          | 13.      | 918.          | 11.          | 7.       | 306.          | 33.          | 22.      | 590.          | 130.         | 99.      | 2168.         |
| 301.                              | 225.             | 14.          | 6.       | 449.          | 15.          | 9.       | 927.          | 9.           | 4.       | 310.          | 28.          | 13.      | 602.          | 115.         | 73.      | 2241.         |
| LOW RUNOFF YEAR ( 24.86% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 38.              | 5.           | -21.     | 428.          | 4.           | -17.     | 909.          | 2.           | -16.     | 294.          | 7.           | -46.     | 557.          | 29.          | -116.    | 2125.         |
| 307.                              | 38.              | 5.           | -22.     | 406.          | 4.           | -18.     | 892.          | 2.           | -16.     | 277.          | 7.           | -47.     | 510.          | 29.          | -119.    | 2005.         |
| 313.                              | 50.              | 6.           | -20.     | 386.          | 5.           | -16.     | 875.          | 3.           | -16.     | 262.          | 8.           | -44.     | 465.          | 38.          | -107.    | 1899.         |
| 424.                              | 166.             | 22.          | -4.      | 382.          | 16.          | -5.      | 871.          | 10.          | -8.      | 253.          | 30.          | -22.     | 444.          | 125.         | -18.     | 1881.         |
| 1083.                             | 708.             | 143.         | 105.     | 487.          | 68.          | 38.      | 909.          | 65.          | 39.      | 293.          | 196.         | 121.     | 565.          | 532.         | 326.     | 2207.         |
| 1642.                             | 378.             | 101.         | -25.     | 462.          | 34.          | -65.     | 844.          | 46.          | -42.     | 250.          | 139.         | -114.    | 451.          | 284.         | -411.    | 1796.         |
| 1737.                             | 114.             | 6.           | -156.    | 304.          | 11.          | -119.    | 725.          | 9.           | -104.    | 146.          | 28.          | -297.    | 154.          | 86.          | -807.    | 988.          |
| 1341.                             | 57.              | 3.           | -125.    | 180.          | 5.           | -97.     | 628.          | 4.           | -86.     | 60.           | 13.          | -154.    | 0.            | 43.          | -753.    | 235.          |
| 485.                              | 50.              | 2.           | -58.     | 122.          | 5.           | -44.     | 584.          | 3.           | -39.     | 21.           | 10.          | 0.       | 0.            | 38.          | -235.    | 0.            |
| 401.                              | 47.              | 7.           | -122.    | 0.            | 4.           | -152.    | 432.          | 3.           | -21.     | 0.            | 9.           | 0.       | 0.            | 35.          | 0.       | 0.            |
| 313.                              | 43.              | 6.           | 0.       | 0.            | 4.           | -216.    | 217.          | 3.           | 0.       | 0.            | 8.           | 0.       | 0.            | 32.          | 0.       | 0.            |
| 301.                              | 38.              | 5.           | 0.       | 0.            | 4.           | -217.    | -0.           | 2.           | 0.       | 0.            | 7.           | 0.       | 0.            | 29.          | 0.       | 0.            |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 226.             | 14.          | 7.       | 7.            | 15.          | 9.       | 9.            | 9.           | 4.       | 4.            | 28.          | 13.      | 13.           | 115.         | 73.      | 73.           |
| 307.                              | 226.             | 14.          | 6.       | 13.           | 15.          | 9.       | 17.           | 10.          | 4.       | 8.            | 28.          | 12.      | 25.           | 115.         | 70.      | 144.          |
| 313.                              | 298.             | 18.          | 16.      | 29.           | 19.          | 18.      | 35.           | 11.          | 10.      | 18.           | 33.          | 30.      | 55.           | 151.         | 143.     | 287.          |
| 424.                              | 986.             | 63.          | 63.      | 92.           | 64.          | 64.      | 99.           | 40.          | 40.      | 58.           | 121.         | 121.     | 176.          | 501.         | 501.     | 789.          |
| 1083.                             | 4213.            | 410.         | 410.     | 502.          | 274.         | 274.     | 373.          | 263.         | 263.     | 321.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2545.         |
| 1642.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 519.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1737.                             | 678.             | 26.          | -80.     | 520.          | 44.          | -41.     | 478.          | 37.          | -37.     | 347.          | 112.         | -100.    | 700.          | 344.         | -239.    | 2326.         |
| 1341.                             | 339.             | 12.          | -88.     | 432.          | 22.          | -58.     | 420.          | 17.          | -53.     | 294.          | 52.          | -148.    | 552.          | 172.         | -379.    | 1947.         |
| 485.                              | 298.             | 10.          | -9.      | 423.          | 19.          | 4.       | 424.          | 14.          | 1.       | 295.          | 41.          | 4.       | 555.          | 151.         | 48.      | 1996.         |
| 401.                              | 277.             | 19.          | 7.       | 430.          | 18.          | 8.       | 432.          | 13.          | 4.       | 299.          | 37.          | 12.      | 568.          | 141.         | 73.      | 2069.         |
| 313.                              | 257.             | 18.          | 12.      | 443.          | 17.          | 13.      | 445.          | 11.          | 7.       | 306.          | 33.          | 22.      | 590.          | 130.         | 99.      | 2168.         |
| 301.                              | 225.             | 14.          | 6.       | 449.          | 15.          | 9.       | 454.          | 9.           | 4.       | 310.          | 28.          | 13.      | 602.          | 115.         | 73.      | 2241.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 226.             | 14.          | 7.       | 456.          | 15.          | 9.       | 463.          | 9.           | 4.       | 313.          | 28.          | 13.      | 615.          | 115.         | 73.      | 2315.         |
| 307.                              | 226.             | 14.          | 6.       | 462.          | 15.          | 9.       | 471.          | 10.          | 4.       | 318.          | 28.          | 12.      | 627.          | 115.         | 70.      | 2385.         |
| 313.                              | 298.             | 18.          | 16.      | 478.          | 19.          | 18.      | 489.          | 11.          | 10.      | 328.          | 33.          | 30.      | 657.          | 151.         | 143.     | 2528.         |
| 424.                              | 986.             | 63.          | 63.      | 541.          | 64.          | 64.      | 553.          | 40.          | 40.      | 368.          | 121.         | 121.     | 778.          | 501.         | 501.     | 2565.         |
| 1083.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 827.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2555.         |
| 1642.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 973.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1737.                             | 678.             | 26.          | -80.     | 520.          | 44.          | -41.     | 932.          | 37.          | -37.     | 347.          | 112.         | -100.    | 700.          | 344.         | -239.    | 2326.         |
| 1341.                             | 339.             | 12.          | -88.     | 432.          | 22.          | -58.     | 874.          | 17.          | -53.     | 294.          | 52.          | -148.    | 552.          | 172.         | -379.    | 1947.         |
| 485.                              | 298.             | 10.          | -9.      | 423.          | 19.          | 4.       | 878.          | 14.          | 1.       | 295.          | 41.          | 4.       | 555.          | 151.         | 48.      | 1996.         |
| 401.                              | 277.             | 19.          | 7.       | 430.          | 18.          | 8.       | 886.          | 13.          | 4.       | 299.          | 37.          | 12.      | 568.          | 141.         | 73.      | 2069.         |
| 313.                              | 257.             | 18.          | 12.      | 443.          | 17.          | 13.      | 899.          | 11.          | 7.       | 306.          | 33.          | 22.      | 590.          | 130.         | 99.      | 2168.         |
| 301.                              | 225.             | 14.          | 6.       | 449.          | 15.          | 9.       | 908.          | 9.           | 4.       | 310.          | 28.          | 13.      | 602.          | 115.         | 73.      | 2241.         |

\* IRRIGATION DEMAND = 5588 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

EXISTING SYSTEM (STORAGE = 5341 AC-FT)

TWO 1 IN 34 LOW RUNOFF YEARS

| DOBBIN-WEST                       |           |       |         | JACKPINE |       |         | PAYNTER |       |         | ISLAHT |       |         | LAMBLY |       |         |       |
|-----------------------------------|-----------|-------|---------|----------|-------|---------|---------|-------|---------|--------|-------|---------|--------|-------|---------|-------|
| DEMAND                            | SUR-BASIN | RES 1 | RES 1   | RES 1    | RES 2 | RES 2   | RES 2   | RES 3 | RES 3   | RES 3  | RES 4 | RES 4   | RES 4  | RES 5 | RES 5   | RES 5 |
| INFLOW                            | INFLOW    | AS    | STORAGE | INFLOW   | AS    | STORAGE | INFLOW  | AS    | STORAGE | INFLOW | AS    | STORAGE | INFLOW | AS    | STORAGE |       |
| MEAN RUNOFF YEAR                  |           |       |         |          |       |         |         |       |         |        |       |         |        |       |         |       |
| 301.                              | 226.      | 14.   | 7.      | 600.     | 15.   | 9.      | 992.    | 9.    | 4.      | 384.   | 28.   | 13.     | 800.   | 115.  | 73.     | 2565. |
| 307.                              | 226.      | 14.   | 6.      | 600.     | 15.   | 9.      | 992.    | 10.   | 4.      | 384.   | 28.   | 12.     | 800.   | 115.  | 70.     | 2565. |
| 313.                              | 298.      | 18.   | 16.     | 600.     | 19.   | 18.     | 992.    | 11.   | 10.     | 384.   | 33.   | 30.     | 800.   | 151.  | 143.    | 2565. |
| 424.                              | 986.      | 63.   | 63.     | 600.     | 64.   | 64.     | 992.    | 40.   | 40.     | 384.   | 121.  | 121.    | 800.   | 501.  | 501.    | 2565. |
| 1083.                             | 4213.     | 410.  | 410.    | 600.     | 274.  | 274.    | 992.    | 263.  | 263.    | 384.   | 789.  | 789.    | 800.   | 2139. | 2139.   | 2565. |
| 1642.                             | 2250.     | 290.  | 290.    | 600.     | 146.  | 146.    | 992.    | 186.  | 186.    | 384.   | 558.  | 558.    | 800.   | 1142. | 1142.   | 2565. |
| 1737.                             | 678.      | 26.   | -80.    | 520.     | 44.   | -41.    | 951.    | 37.   | -37.    | 347.   | 112.  | -100.   | 700.   | 344.  | -239.   | 2326. |
| 1341.                             | 339.      | 12.   | -88.    | 432.     | 22.   | -58.    | 893.    | 17.   | -53.    | 294.   | 52.   | -148.   | 552.   | 172.  | -379.   | 1947. |
| 485.                              | 298.      | 10.   | -9.     | 423.     | 19.   | 4.      | 897.    | 14.   | 1.      | 295.   | 41.   | 4.      | 555.   | 151.  | 48.     | 1996. |
| 401.                              | 277.      | 19.   | 7.      | 430.     | 18.   | 8.      | 905.    | 13.   | 4.      | 299.   | 37.   | 12.     | 568.   | 141.  | 73.     | 2069. |
| 313.                              | 257.      | 18.   | 12.     | 443.     | 17.   | 13.     | 918.    | 11.   | 7.      | 306.   | 33.   | 22.     | 590.   | 130.  | 99.     | 2168. |
| 301.                              | 225.      | 14.   | 6.      | 449.     | 15.   | 9.      | 927.    | 9.    | 4.      | 310.   | 28.   | 13.     | 602.   | 115.  | 73.     | 2241. |
| MEAN RUNOFF YEAR                  |           |       |         |          |       |         |         |       |         |        |       |         |        |       |         |       |
| 301.                              | 226.      | 14.   | 7.      | 456.     | 15.   | 9.      | 936.    | 9.    | 4.      | 313.   | 28.   | 13.     | 615.   | 115.  | 73.     | 2315. |
| 307.                              | 226.      | 14.   | 6.      | 462.     | 15.   | 9.      | 944.    | 10.   | 4.      | 318.   | 28.   | 12.     | 627.   | 115.  | 70.     | 2385. |
| 313.                              | 298.      | 18.   | 16.     | 478.     | 19.   | 18.     | 962.    | 11.   | 10.     | 328.   | 33.   | 30.     | 657.   | 151.  | 143.    | 2528. |
| 424.                              | 986.      | 63.   | 63.     | 541.     | 64.   | 64.     | 992.    | 40.   | 40.     | 368.   | 121.  | 121.    | 778.   | 501.  | 501.    | 2565. |
| 1083.                             | 4213.     | 410.  | 410.    | 600.     | 274.  | 274.    | 992.    | 263.  | 263.    | 384.   | 789.  | 789.    | 800.   | 2139. | 2139.   | 2565. |
| 1642.                             | 2250.     | 290.  | 290.    | 600.     | 146.  | 146.    | 992.    | 186.  | 186.    | 384.   | 558.  | 558.    | 800.   | 1142. | 1142.   | 2565. |
| 1737.                             | 678.      | 26.   | -80.    | 520.     | 44.   | -41.    | 951.    | 37.   | -37.    | 347.   | 112.  | -100.   | 700.   | 344.  | -239.   | 2326. |
| 1341.                             | 339.      | 12.   | -88.    | 432.     | 22.   | -58.    | 893.    | 17.   | -53.    | 294.   | 52.   | -148.   | 552.   | 172.  | -379.   | 1947. |
| 485.                              | 298.      | 10.   | -9.     | 423.     | 19.   | 4.      | 897.    | 14.   | 1.      | 295.   | 41.   | 4.      | 555.   | 151.  | 48.     | 1996. |
| 401.                              | 277.      | 19.   | 7.      | 430.     | 18.   | 8.      | 905.    | 13.   | 4.      | 299.   | 37.   | 12.     | 568.   | 141.  | 73.     | 2069. |
| 313.                              | 257.      | 18.   | 12.     | 443.     | 17.   | 13.     | 918.    | 11.   | 7.      | 306.   | 33.   | 22.     | 590.   | 130.  | 99.     | 2168. |
| 301.                              | 225.      | 14.   | 6.      | 449.     | 15.   | 9.      | 927.    | 9.    | 4.      | 310.   | 28.   | 13.     | 602.   | 115.  | 73.     | 2241. |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) |           |       |         |          |       |         |         |       |         |        |       |         |        |       |         |       |
| 301.                              | 71.       | 8.    | -15.    | 434.     | 6.    | -13.    | 914.    | 3.    | -13.    | 297.   | 11.   | -35.    | 567.   | 44.   | -83.    | 2158. |
| 307.                              | 71.       | 8.    | -16.    | 418.     | 6.    | -13.    | 901.    | 4.    | -13.    | 284.   | 11.   | -36.    | 531.   | 44.   | -86.    | 2073. |
| 313.                              | 94.       | 10.   | -12.    | 405.     | 7.    | -10.    | 891.    | 4.    | -11.    | 273.   | 13.   | -31.    | 499.   | 58.   | -62.    | 2010. |
| 424.                              | 312.      | 34.   | 22.     | 428.     | 24.   | 15.     | 906.    | 15.   | 7.      | 281.   | 46.   | 24.     | 523.   | 191.  | 129.    | 2140. |
| 1083.                             | 1331.     | 219.  | 219.    | 600.     | 105.  | 105.    | 992.    | 100.  | 100.    | 384.   | 301.  | 301.    | 800.   | 817.  | 817.    | 2565. |
| 1642.                             | 711.      | 155.  | 62.     | 600.     | 56.   | -19.    | 973.    | 71.   | 6.      | 384.   | 213.  | 27.     | 600.   | 436.  | -76.    | 2489. |
| 1737.                             | 214.      | 10.   | -142.   | 458.     | 17.   | -105.   | 868.    | 14.   | -92.    | 292.   | 43.   | -262.   | 538.   | 131.  | -706.   | 1782. |
| 1341.                             | 107.      | 5.    | -119.   | 339.     | 8.    | -90.    | 778.    | 6.    | -80.    | 212.   | 20.   | -227.   | 311.   | 66.   | -613.   | 1169. |
| 485.                              | 94.       | 4.    | -35.    | 304.     | 7.    | -24.    | 754.    | 5.    | -22.    | 190.   | 16.   | -62.    | 249.   | 58.   | -157.   | 1012. |
| 401.                              | 88.       | 10.   | -21.    | 283.     | 7.    | -18.    | 736.    | 5.    | -17.    | 173.   | 14.   | -49.    | 200.   | 54.   | -118.   | 894.  |
| 313.                              | 81.       | 10.   | -14.    | 269.     | 6.    | -12.    | 724.    | 4.    | -12.    | 161.   | 13.   | -34.    | 167.   | 50.   | -78.    | 816.  |
| 301.                              | 71.       | 8.    | -15.    | 254.     | 6.    | -13.    | 711.    | 3.    | -13.    | 148.   | 11.   | -35.    | 131.   | 44.   | -83.    | 734.  |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) |           |       |         |          |       |         |         |       |         |        |       |         |        |       |         |       |
| 301.                              | 71.       | 8.    | -15.    | 238.     | 6.    | -13.    | 698.    | 3.    | -13.    | 135.   | 11.   | -35.    | 96.    | 44.   | -83.    | 651.  |
| 307.                              | 71.       | 8.    | -16.    | 222.     | 6.    | -13.    | 685.    | 4.    | -13.    | 123.   | 11.   | -36.    | 60.    | 44.   | -86.    | 565.  |
| 313.                              | 94.       | 10.   | -12.    | 210.     | 7.    | -10.    | 675.    | 4.    | -11.    | 112.   | 13.   | -31.    | 28.    | 58.   | -62.    | 503.  |
| 424.                              | 312.      | 34.   | 22.     | 232.     | 24.   | 15.     | 690.    | 15.   | 7.      | 119.   | 46.   | 24.     | 52.    | 191.  | 129.    | 632.  |
| 1083.                             | 1331.     | 219.  | 219.    | 452.     | 105.  | 105.    | 795.    | 100.  | 100.    | 219.   | 301.  | 301.    | 354.   | 817.  | 817.    | 1450. |
| 1642.                             | 711.      | 155.  | 62.     | 514.     | 56.   | -19.    | 776.    | 71.   | 6.      | 225.   | 213.  | 27.     | 380.   | 436.  | -76.    | 1373. |
| 1737.                             | 214.      | 10.   | -142.   | 371.     | 17.   | -105.   | 671.    | 14.   | -92.    | 133.   | 43.   | -262.   | 118.   | 131.  | -706.   | 667.  |
| 1341.                             | 107.      | 5.    | -141.   | 231.     | 8.    | -108.   | 564.    | 6.    | -95.    | 38.    | 20.   | -118.   | 0.     | 66.   | -667.   | 0.    |
| 485.                              | 94.       | 4.    | -148.   | 82.      | 7.    | -115.   | 449.    | 5.    | -38.    | 0.     | 16.   | 0.      | 0.     | 58.   | 0.      | 0.    |
| 401.                              | 88.       | 10.   | -82.    | 0.       | 7.    | -141.   | 308.    | 5.    | 0.      | 0.     | 14.   | 0.      | 0.     | 54.   | 0.      | 0.    |
| 313.                              | 81.       | 10.   | 0.      | 0.       | 6.    | -149.   | 159.    | 4.    | 0.      | 0.     | 13.   | 0.      | 0.     | 50.   | 0.      | 0.    |
| 301.                              | 71.       | 8.    | 0.      | 0.       | 6.    | -159.   | 1.      | 3.    | 0.      | 0.     | 11.   | 0.      | 0.     | 44.   | 0.      | 0.    |
| MEAN RUNOFF YEAR                  |           |       |         |          |       |         |         |       |         |        |       |         |        |       |         |       |
| 301.                              | 226.      | 14.   | 7.      | 7.       | 15.   | 9.      | 9.      | 9.    | 4.      | 4.     | 28.   | 13.     | 13.    | 115.  | 73.     | 73.   |
| 307.                              | 226.      | 14.   | 6.      | 13.      | 15.   | 9.      | 18.     | 10.   | 4.      | 8.     | 28.   | 12.     | 25.    | 115.  | 70.     | 144.  |
| 313.                              | 298.      | 18.   | 16.     | 29.      | 19.   | 18.     | 36.     | 11.   | 10.     | 18.    | 33.   | 30.     | 55.    | 151.  | 143.    | 287.  |
| 424.                              | 986.      | 63.   | 63.     | 92.      | 64.   | 64.     | 100.    | 40.   | 40.     | 58.    | 121.  | 121.    | 176.   | 501.  | 501.    | 798.  |
| 1083.                             | 4213.     | 410.  | 410.    | 502.     | 274.  | 274.    | 374.    | 263.  | 263.    | 321.   | 789.  | 789.    | 800.   | 2139. | 2139.   | 2565. |
| 1642.                             | 2250.     | 290.  | 290.    | 600.     | 146.  | 146.    | 520.    | 186.  | 186.    | 384.   | 558.  | 558.    | 800.   | 1142. | 1142.   | 2565. |
| 1737.                             | 678.      | 26.   | -80.    | 520.     | 44.   | -41.    | 479.    | 37.   | -37.    | 347.   | 112.  | -100.   | 700.   | 344.  | -239.   | 2326. |
| 1341.                             | 339.      | 12.   | -88.    | 432.     | 22.   | -58.    | 421.    | 17.   | -53.    | 294.   | 52.   | -148.   | 552.   | 172.  | -379.   | 1947. |
| 485.                              | 298.      | 10.   | -9.     | 423.     | 19.   | 4.      | 425.    | 14.   | 1.      | 295.   | 41.   | 4.      | 555.   | 151.  | 48.     | 1996. |
| 401.                              | 277.      | 19.   | 7.      | 430.     | 18.   | 8.      | 433.    | 13.   | 4.      | 299.   | 37.   | 12.     | 568.   | 141.  | 73.     | 2069. |
| 313.                              | 257.      | 18.   | 12.     | 443.     | 17.   | 13.     | 446.    | 11.   | 7.      | 306.   | 33.   | 22.     | 590.   | 130.  | 99.     | 2168. |
| 301.                              | 225.      | 14.   | 6.      | 449.     | 15.   | 9.      | 455.    | 9.    | 4.      | 310.   | 28.   | 13.     | 602.   | 115.  | 73.     | 2241. |
| MEAN RUNOFF YEAR                  |           |       |         |          |       |         |         |       |         |        |       |         |        |       |         |       |
| 301.                              | 226.      | 14.   | 7.      | 456.     | 15.   | 9.      | 464.    | 9.    | 4.      | 313.   | 28.   | 13.     | 615.   | 115.  | 73.     | 2315. |
| 307.                              | 226.      | 14.   | 6.      | 462.     | 15.   | 9.      | 472.    | 10.   | 4.      | 318.   | 28.   | 12.     | 627.   | 115.  | 70.     | 2385. |
| 313.                              | 298.      | 18.   | 16.     | 478.     | 19.   | 18.     | 490.    | 11.   | 10.     | 328.   | 33.   | 30.     | 657.   | 151.  | 143.    | 2528. |
| 424.                              | 986.      | 63.   | 63.     | 541.     | 64.   | 64.     | 554.    | 40.   | 40.     | 368.   | 121.  | 121.    | 778.   | 501.  | 501.    | 2565. |
| 1083.                             | 4213.     | 410.  | 410.    | 600.     | 274.  | 274.    | 828.    | 263.  | 263.    | 384.   | 789.  | 789.    | 800.   | 2139. | 2139.   | 2565. |
| 1642.                             | 2250.     | 290.  | 290.    | 600.     | 146.  | 146.    | 974.    | 186.  | 186.    | 394.   | 558.  | 558.    | 800.   | 1142. | 1142.   | 2565. |
| 1737.                             | 678.      | 26.   | -80.    | 520.     | 44.   | -41.    | 933.    | 37.   | -37.    | 347.   | 112.  | -100.   | 700.   | 344.  | -239.   | 2326. |
| 1341.                             | 339.      | 12.   | -88.    | 432.     | 22.   | -58.    | 875.    | 17.   | -53.    | 294.   | 52.   | -148.   | 552.   | 172.  | -379.   | 1947. |
| 485.                              | 298.      | 10.   | -9.     | 423.     | 19.   | 4.      | 879.    | 14.   | 1.      | 295.   | 41.   | 4.      | 555.   | 151.  | 48.     | 1976. |
| 401.                              | 277.      | 19.   | 7.      | 430.     | 18.   | 8.      | 887.    | 13.   | 4.      | 299.   | 37.   | 12.     | 568.   | 141.  | 73.     | 2059. |
| 313.                              | 257.      | 18.   | 12.     | 443.     | 17.   | 13.     | 900.    | 11.   | 7.      | 306.   | 33.   | 22.     | 590.   | 130.  | 99.     | 2168. |
| 301.                              | 225.      | 14.   | 6.      | 449.     | 15.   | 9.      | 909.    | 9.    | 4.      | 310.   | 28.   | 13.     | 602.   | 115.  | 73.     | 2241. |

\* IRRIGATION DEMAND = 5588 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

THREE 1 IN 21 LOW RUNOFF YEARS

| DEMAND                            | SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAHBLY       |          |               |
|-----------------------------------|------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|
|                                   |                  | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 226.             | 14.          | 7.       | 600.          | 15.          | 9.       | 992.          | 9.           | 4.       | 384.          | 28.          | 13.      | 800.          | 115.         | 73.      | 2565.         |
| 307.                              | 226.             | 14.          | 6.       | 600.          | 15.          | 9.       | 992.          | 10.          | 4.       | 384.          | 28.          | 12.      | 800.          | 115.         | 70.      | 2565.         |
| 313.                              | 298.             | 18.          | 16.      | 600.          | 19.          | 18.      | 992.          | 11.          | 10.      | 384.          | 33.          | 30.      | 800.          | 151.         | 143.     | 2565.         |
| 424.                              | 986.             | 63.          | 63.      | 600.          | 64.          | 64.      | 992.          | 40.          | 40.      | 384.          | 121.         | 121.     | 800.          | 501.         | 501.     | 2565.         |
| 1083.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1642.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1737.                             | 678.             | 26.          | -80.     | 520.          | 44.          | -41.     | 951.          | 37.          | -37.     | 347.          | 112.         | -100.    | 700.          | 344.         | -239.    | 2326.         |
| 1341.                             | 339.             | 12.          | -88.     | 432.          | 22.          | -58.     | 893.          | 17.          | -53.     | 294.          | 52.          | -148.    | 552.          | 172.         | -379.    | 1947.         |
| 485.                              | 298.             | 10.          | -9.      | 423.          | 19.          | 4.       | 897.          | 14.          | 1.       | 295.          | 41.          | 4.       | 555.          | 151.         | 48.      | 1996.         |
| 401.                              | 277.             | 19.          | 7.       | 430.          | 18.          | 8.       | 905.          | 13.          | 4.       | 299.          | 37.          | 12.      | 568.          | 141.         | 73.      | 2069.         |
| 313.                              | 257.             | 18.          | 12.      | 443.          | 17.          | 13.      | 918.          | 11.          | 7.       | 306.          | 33.          | 22.      | 590.          | 130.         | 99.      | 2168.         |
| 301.                              | 225.             | 14.          | 6.       | 449.          | 15.          | 9.       | 927.          | 9.           | 4.       | 310.          | 28.          | 13.      | 602.          | 115.         | 73.      | 2241.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 226.             | 14.          | 7.       | 456.          | 15.          | 9.       | 936.          | 9.           | 4.       | 313.          | 28.          | 13.      | 615.          | 115.         | 73.      | 2315.         |
| 307.                              | 226.             | 14.          | 6.       | 462.          | 15.          | 9.       | 944.          | 10.          | 4.       | 318.          | 28.          | 12.      | 627.          | 115.         | 70.      | 2385.         |
| 313.                              | 298.             | 18.          | 16.      | 478.          | 19.          | 18.      | 962.          | 11.          | 10.      | 328.          | 33.          | 30.      | 657.          | 151.         | 143.     | 2528.         |
| 424.                              | 986.             | 63.          | 63.      | 541.          | 64.          | 64.      | 992.          | 40.          | 40.      | 368.          | 121.         | 121.     | 778.          | 501.         | 501.     | 2565.         |
| 1083.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1642.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1737.                             | 678.             | 26.          | -80.     | 520.          | 44.          | -41.     | 951.          | 37.          | -37.     | 347.          | 112.         | -100.    | 700.          | 344.         | -239.    | 2326.         |
| 1341.                             | 339.             | 12.          | -88.     | 432.          | 22.          | -58.     | 893.          | 17.          | -53.     | 294.          | 52.          | -148.    | 552.          | 172.         | -379.    | 1947.         |
| 485.                              | 298.             | 10.          | -9.      | 423.          | 19.          | 4.       | 897.          | 14.          | 1.       | 295.          | 41.          | 4.       | 555.          | 151.         | 48.      | 1996.         |
| 401.                              | 277.             | 19.          | 7.       | 430.          | 18.          | 8.       | 905.          | 13.          | 4.       | 299.          | 37.          | 12.      | 568.          | 141.         | 73.      | 2069.         |
| 313.                              | 257.             | 18.          | 12.      | 443.          | 17.          | 13.      | 918.          | 11.          | 7.       | 306.          | 33.          | 22.      | 590.          | 130.         | 99.      | 2168.         |
| 301.                              | 225.             | 14.          | 6.       | 449.          | 15.          | 9.       | 927.          | 9.           | 4.       | 310.          | 28.          | 13.      | 602.          | 115.         | 73.      | 2241.         |
| LOW RUNOFF YEAR ( 43.37% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 84.              | 9.           | -13.     | 436.          | 7.           | -11.     | 916.          | 4.           | -11.     | 298.          | 12.          | -31.     | 571.          | 50.          | -70.     | 2172.         |
| 307.                              | 84.              | 9.           | -14.     | 422.          | 7.           | -11.     | 905.          | 4.           | -11.     | 287.          | 12.          | -32.     | 539.          | 50.          | -73.     | 2099.         |
| 313.                              | 111.             | 11.          | -9.      | 413.          | 8.           | -8.      | 897.          | 5.           | -9.      | 278.          | 14.          | -26.     | 513.          | 65.          | -45.     | 2054.         |
| 424.                              | 368.             | 38.          | 33.      | 446.          | 28.          | 23.      | 920.          | 17.          | 13.      | 291.          | 52.          | 41.      | 554.          | 217.         | 186.     | 2240.         |
| 1083.                             | 1572.            | 249.         | 249.     | 600.          | 119.         | 119.     | 992.          | 114.         | 114.     | 384.          | 342.         | 342.     | 800.          | 928.         | 928.     | 2565.         |
| 1642.                             | 839.             | 176.         | 96.      | 600.          | 63.          | -1.      | 991.          | 81.          | 24.      | 384.          | 242.         | 81.      | 800.          | 495.         | 54.      | 2565.         |
| 1737.                             | 253.             | 11.          | -137.    | 463.          | 19.          | -100.    | 891.          | 16.          | -88.     | 296.          | 49.          | -248.    | 552.          | 149.         | -667.    | 1898.         |
| 1341.                             | 126.             | 5.           | -116.    | 347.          | 10.          | -88.     | 804.          | 7.           | -78.     | 219.          | 23.          | -220.    | 331.          | 75.          | -593.    | 1304.         |
| 485.                              | 111.             | 4.           | -33.     | 314.          | 8.           | -22.     | 782.          | 6.           | -20.     | 198.          | 18.          | -57.     | 274.          | 65.          | -140.    | 1165.         |
| 401.                              | 103.             | 12.          | -18.     | 296.          | 8.           | -16.     | 766.          | 6.           | -15.     | 183.          | 16.          | -43.     | 231.          | 61.          | -102.    | 1062.         |
| 313.                              | 96.              | 11.          | -11.     | 285.          | 7.           | -10.     | 756.          | 5.           | -10.     | 173.          | 14.          | -29.     | 202.          | 56.          | -63.     | 999.          |
| 301.                              | 84.              | 9.           | -13.     | 272.          | 7.           | -11.     | 745.          | 4.           | -11.     | 162.          | 12.          | -31.     | 171.          | 50.          | -70.     | 930.          |
| LOW RUNOFF YEAR ( 43.37% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 84.              | 9.           | -13.     | 259.          | 7.           | -11.     | 734.          | 4.           | -11.     | 150.          | 12.          | -31.     | 139.          | 50.          | -70.     | 860.          |
| 307.                              | 84.              | 9.           | -14.     | 245.          | 7.           | -11.     | 723.          | 4.           | -11.     | 139.          | 12.          | -32.     | 107.          | 50.          | -73.     | 788.          |
| 313.                              | 111.             | 11.          | -9.      | 236.          | 8.           | -8.      | 715.          | 5.           | -9.      | 130.          | 14.          | -26.     | 81.           | 65.          | -45.     | 742.          |
| 424.                              | 368.             | 38.          | 33.      | 268.          | 28.          | 23.      | 737.          | 17.          | 13.      | 271.          | 52.          | 41.      | 122.          | 217.         | 186.     | 929.          |
| 1083.                             | 1572.            | 249.         | 249.     | 517.          | 119.         | 119.     | 857.          | 114.         | 114.     | 257.          | 342.         | 342.     | 464.          | 928.         | 928.     | 1556.         |
| 1642.                             | 839.             | 176.         | 96.      | 600.          | 63.          | -1.      | 856.          | 81.          | 24.      | 282.          | 242.         | 81.      | 546.          | 495.         | 54.      | 1910.         |
| 1737.                             | 253.             | 11.          | -137.    | 463.          | 19.          | -100.    | 757.          | 16.          | -88.     | 194.          | 49.          | -248.    | 298.          | 149.         | -667.    | 1243.         |
| 1341.                             | 126.             | 5.           | -116.    | 347.          | 10.          | -68.     | 669.          | 7.           | -78.     | 116.          | 23.          | -220.    | 77.           | 75.          | -593.    | 649.          |
| 485.                              | 111.             | 4.           | -33.     | 314.          | 8.           | -22.     | 648.          | 6.           | -20.     | 96.           | 18.          | -57.     | 20.           | 65.          | -149.    | 510.          |
| 401.                              | 103.             | 12.          | -18.     | 296.          | 8.           | -16.     | 632.          | 6.           | -15.     | 81.           | 16.          | -20.     | 0.            | 61.          | -125.    | 384.          |
| 313.                              | 96.              | 11.          | -11.     | 285.          | 7.           | -10.     | 622.          | 5.           | -10.     | 70.           | 14.          | -29.     | 0.            | 56.          | -92.     | 292.          |
| 301.                              | 84.              | 9.           | -13.     | 272.          | 7.           | -11.     | 611.          | 4.           | -11.     | 59.           | 12.          | 0.       | 0.            | 50.          | -101.    | 191.          |
| LOW RUNOFF YEAR ( 43.37% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 84.              | 9.           | -13.     | 259.          | 7.           | -11.     | 600.          | 4.           | -11.     | 48.           | 12.          | 0.       | 0.            | 50.          | -101.    | 91.           |
| 307.                              | 84.              | 9.           | -14.     | 239.          | 7.           | -11.     | 584.          | 4.           | -11.     | 33.           | 12.          | 0.       | 0.            | 50.          | -91.     | 0.            |
| 313.                              | 111.             | 11.          | -9.      | 202.          | 8.           | -8.      | 553.          | 5.           | -9.      | 3.            | 14.          | 0.       | 0.            | 65.          | 0.       | 0.            |
| 424.                              | 368.             | 38.          | 33.      | 234.          | 28.          | 23.      | 577.          | 17.          | 13.      | 17.           | 52.          | 41.      | 41.           | 217.         | 186.     | 185.          |
| 1083.                             | 1572.            | 249.         | 249.     | 483.          | 119.         | 119.     | 695.          | 114.         | 114.     | 131.          | 342.         | 342.     | 383.          | 928.         | 928.     | 1114.         |
| 1642.                             | 839.             | 176.         | 96.      | 579.          | 63.          | -1.      | 694.          | 81.          | 24.      | 155.          | 242.         | 81.      | 465.          | 495.         | 54.      | 1168.         |
| 1737.                             | 253.             | 11.          | -137.    | 442.          | 19.          | -100.    | 595.          | 16.          | -88.     | 67.           | 49.          | -248.    | 218.          | 149.         | -667.    | 500.          |
| 1341.                             | 126.             | 5.           | -116.    | 266.          | 10.          | -135.    | 450.          | 7.           | -87.     | 0.            | 23.          | -218.    | 0.            | 75.          | -500.    | 0.            |
| 485.                              | 111.             | 4.           | -153.    | 112.          | 8.           | -118.    | 342.          | 6.           | 0.       | 0.            | 18.          | 0.       | 0.            | 65.          | 0.       | 0.            |
| 401.                              | 103.             | 12.          | -107.    | 5.            | 8.           | -88.     | 254.          | 6.           | 0.       | 0.            | 16.          | 0.       | 0.            | 61.          | 0.       | 0.            |
| 313.                              | 96.              | 11.          | -5.      | 0.            | 7.           | -118.    | 136.          | 5.           | 0.       | 0.            | 14.          | 0.       | 0.            | 56.          | 0.       | 0.            |
| 301.                              | 84.              | 9.           | 0.       | 0.            | 7.           | -136.    | -0.           | 4.           | 0.       | 0.            | 12.          | 0.       | 0.            | 50.          | 0.       | 0.            |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 226.             | 14.          | 7.       | 7.            | 15.          | 9.       | 9.            | 9.           | 4.       | 4.            | 28.          | 13.      | 13.           | 115.         | 73.      | 73.           |
| 307.                              | 226.             | 14.          | 6.       | 13.           | 15.          | 9.       | 17.           | 10.          | 4.       | 8.            | 28.          | 12.      | 25.           | 115.         | 70.      | 144.          |
| 313.                              | 298.             | 18.          | 16.      | 29.           | 19.          | 18.      | 35.           | 11.          | 10.      | 18.           | 33.          | 30.      | 55.           | 151.         | 143.     | 287.          |
| 424.                              | 986.             | 63.          | 63.      | 92.           | 64.          | 64.      | 99.           | 40.          | 40.      | 58.           | 121.         | 121.     | 178.          | 501.         | 501.     | 788.          |
| 1083.                             | 4213.            | 410.         | 410.     | 502.          | 274.         | 274.     | 373.          | 263.         | 263.     | 321.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1642.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 519.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1737.                             | 678.             | 26.          | -80.     | 520.          | 44.          | -41.     | 478.          | 37.          | -37.     | 347.          | 112.         | -100.    | 700.          | 344.         | -239.    | 2326.         |
| 1341.                             | 339.             | 12.          | -88.     | 432.          | 22.          | -58.     | 420.          | 17.          | -53.     | 294.          | 52.          | -148.    | 552.          | 172.         | -379.    | 1947.         |
| 485.                              | 298.             | 10.          | -9.      | 423.          | 19.          | 4.       | 424.          | 14.          | 1.       | 295.          | 41.          | 4.       | 555.          | 151.         | 48.      | 1996.         |
| 401.                              | 277.             | 19.          | 7.       | 430.          | 18.          | 8.       | 433.          | 13.          | 4.       | 299.          | 37.          | 12.      | 568.          | 141.         | 73.      | 2069.         |
| 313.                              | 257.             | 18.          | 12.      | 443.          | 17.          | 13.      | 445.          | 11.          | 7.       | 306.          | 33.          | 22.      | 590.          | 130.         | 99.      | 2168.         |
| 301.                              | 225.             | 14.          | 6.       | 449.          | 15.          | 9.       | 454.          | 9.           | 4.       | 310.          | 28.          | 13.      | 602.          | 115.         | 73.      | 2241.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 301.                              | 226.             | 14.          | 7.       | 456.          | 15.          | 9.       | 463.          | 9.           | 4.       | 313.          | 28.          | 13.      | 615.          | 115.         | 73.      | 2315.         |
| 307.                              | 226.             | 14.          | 6.       | 462.          | 15.          | 9.       | 471.          | 10.          | 4.       | 318.          | 28.          | 12.      | 627.          | 115.         | 70.      | 2385.         |
| 313.                              | 298.             | 18.          | 16.      | 478.          | 19.          | 18.      | 489.          | 11.          | 10.      | 328.          | 33.          | 30.      | 657.          | 151.         | 143.     | 2528.         |
| 424.                              | 986.             | 63.          | 63.      | 541.          | 64.          | 64.      | 553.          | 40.          | 40.      | 368.          | 121.         | 121.     | 778.          | 501.         | 501.     | 2565.         |
| 1083.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 827.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1642.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 973.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1737.                             | 678.             | 26.          | -80.     | 520.          | 44.          | -41.     | 932.          | 37.          | -37.     | 347.          | 112.         | -100.    | 700.          | 344.         | -239.    | 2326.         |
| 1341.                             | 339.             | 12.          | -88.     | 432.          | 22.          | -58.     | 874.          | 17.          | -53.     | 294.          | 52.          | -148.    | 552.          | 172.         | -379.    | 1947.         |
| 485.                              | 298.             | 10.          | -9.      | 423.          | 19.          | 4.       | 878.          | 14.          | 1.       | 295.          | 41.          | 4.       | 555.          | 151.         | 48.      | 1996.         |
| 401.                              | 277.             | 19.          | 7.       | 430.          | 18.          | 8.       | 887.          | 13.          | 4.       | 299.          | 37.          | 12.      | 568.          | 141.         | 73.      | 2069.         |
| 313.                              | 257.             | 18.          | 12.      | 443.          | 17.          | 13.      | 899.          | 11.          | 7.       | 306.          | 33.          | 22.      | 590.          | 130.         | 99.      | 2168.         |
| 301.                              | 225.             | 14.          | 6.       | 449.          | 15.          | 9.       | 908.          | 9.           | 4.       | 310.          | 28.          | 13.      | 602.          | 115.         | 73.      | 2241.         |

\* IRRIGATION DEMAND = 5588 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

TWO 1 IN 34 LOW RUNOFF YEARS

| DEMAND SUB-BASIN INFLOW           | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | TSLAHT       |          |               | LAHBLY       |          |               |       |
|-----------------------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|-------|
|                                   | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |       |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 232.                              | 226.         | 14.      | 14.           | 600.         | 15.      | 15.           | 992.         | 9.       | 9.            | 384.         | 28.      | 27.           | 800.         | 115.     | 112.          | 2565. |
| 238.                              | 226.         | 14.      | 13.           | 600.         | 15.      | 14.           | 992.         | 10.      | 9.            | 384.         | 28.      | 25.           | 800.         | 115.     | 103.          | 2565. |
| 245.                              | 298.         | 18.      | 18.           | 600.         | 19.      | 19.           | 992.         | 11.      | 11.           | 384.         | 33.      | 33.           | 800.         | 151.     | 151.          | 2565. |
| 376.                              | 986.         | 63.      | 63.           | 600.         | 64.      | 64.           | 992.         | 40.      | 40.           | 384.         | 121.     | 121.          | 800.         | 501.     | 501.          | 2565. |
| 1115.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1801.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1912.                             | 678.         | 26.      | -97.          | 503.         | 44.      | -55.          | 937.         | 37.      | -49.          | 335.         | 112.     | -135.         | 665.         | 344.     | -335.         | 2230. |
| 1448.                             | 339.         | 12.      | -97.          | 404.         | 22.      | -67.          | 871.         | 17.      | -61.          | 274.         | 52.      | -170.         | 495.         | 172.     | -438.         | 1792. |
| 416.                              | 298.         | 10.      | -2.           | 402.         | 19.      | 10.           | 880.         | 14.      | 6.            | 280.         | 41.      | 17.           | 513.         | 151.     | 86.           | 1879. |
| 318.                              | 277.         | 19.      | 15.           | 417.         | 18.      | 15.           | 895.         | 13.      | 10.           | 290.         | 37.      | 29.           | 542.         | 141.     | 119.          | 1997. |
| 245.                              | 257.         | 18.      | 18.           | 435.         | 17.      | 17.           | 912.         | 11.      | 11.           | 301.         | 33.      | 33.           | 575.         | 130.     | 130.          | 2127. |
| 232.                              | 225.         | 14.      | 13.           | 449.         | 15.      | 14.           | 926.         | 9.       | 9.            | 309.         | 28.      | 27.           | 601.         | 115.     | 111.          | 2239. |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 232.                              | 226.         | 14.      | 14.           | 462.         | 15.      | 15.           | 941.         | 9.       | 9.            | 318.         | 28.      | 27.           | 628.         | 115.     | 112.          | 2350. |
| 238.                              | 226.         | 14.      | 13.           | 475.         | 15.      | 14.           | 955.         | 10.      | 9.            | 327.         | 28.      | 25.           | 654.         | 115.     | 108.          | 2458. |
| 245.                              | 298.         | 18.      | 18.           | 493.         | 19.      | 19.           | 974.         | 11.      | 11.           | 338.         | 33.      | 33.           | 687.         | 151.     | 151.          | 2565. |
| 376.                              | 986.         | 63.      | 63.           | 556.         | 64.      | 64.           | 992.         | 40.      | 40.           | 378.         | 121.     | 121.          | 800.         | 501.     | 501.          | 2565. |
| 1115.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 992.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1801.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1912.                             | 678.         | 26.      | -97.          | 503.         | 44.      | -55.          | 937.         | 37.      | -49.          | 335.         | 112.     | -135.         | 665.         | 344.     | -335.         | 2230. |
| 1448.                             | 339.         | 12.      | -99.          | 404.         | 22.      | -67.          | 871.         | 17.      | -61.          | 274.         | 52.      | -170.         | 495.         | 172.     | -438.         | 1792. |
| 416.                              | 298.         | 10.      | -2.           | 402.         | 19.      | 10.           | 880.         | 14.      | 6.            | 280.         | 41.      | 17.           | 513.         | 151.     | 86.           | 1879. |
| 318.                              | 277.         | 19.      | 15.           | 417.         | 18.      | 15.           | 895.         | 13.      | 10.           | 290.         | 37.      | 29.           | 542.         | 141.     | 119.          | 1997. |
| 245.                              | 257.         | 18.      | 18.           | 435.         | 17.      | 17.           | 912.         | 11.      | 11.           | 301.         | 33.      | 33.           | 575.         | 130.     | 130.          | 2127. |
| 232.                              | 225.         | 14.      | 13.           | 449.         | 15.      | 14.           | 926.         | 9.       | 9.            | 309.         | 28.      | 27.           | 601.         | 115.     | 111.          | 2239. |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 232.                              | 71.          | 8.       | -8.           | 440.         | 6.       | -7.           | 919.         | 3.       | -8.           | 302.         | 11.      | -21.          | 580.         | 44.      | -44.          | 2194. |
| 238.                              | 71.          | 8.       | -9.           | 431.         | 6.       | -8.           | 912.         | 4.       | -8.           | 294.         | 11.      | -23.          | 557.         | 44.      | -48.          | 2146. |
| 245.                              | 94.          | 10.      | -6.           | 426.         | 7.       | -5.           | 907.         | 4.       | -6.           | 287.         | 13.      | -18.          | 540.         | 58.      | -25.          | 2121. |
| 376.                              | 312.         | 34.      | 27.           | 453.         | 24.      | 19.           | 926.         | 15.      | 11.           | 298.         | 46.      | 33.           | 573.         | 191.     | 156.          | 2277. |
| 1115.                             | 1331.        | 219.     | 219.          | 600.         | 105.     | 105.          | 992.         | 100.     | 100.          | 384.         | 301.     | 301.          | 800.         | 817.     | 817.          | 2565. |
| 1801.                             | 711.         | 155.     | 46.           | 600.         | 56.      | -31.          | 961.         | 71.      | -5.           | 379.         | 213.     | -5.           | 795.         | 436.     | -163.         | 2402. |
| 1912.                             | 214.         | 10.      | -160.         | 440.         | 17.      | -119.         | 842.         | 14.      | -105.         | 274.         | 43.      | -297.         | 498.         | 131.     | -802.         | 1599. |
| 1448.                             | 107.         | 5.       | -130.         | 311.         | 8.       | -99.          | 743.         | 6.       | -87.          | 187.         | 20.      | -248.         | 250.         | 66.      | -672.         | 927.  |
| 416.                              | 94.          | 4.       | -28.          | 282.         | 7.       | -18.          | 724.         | 5.       | -17.          | 169.         | 14.      | -49.          | 201.         | 58.      | -119.         | 808.  |
| 318.                              | 88.          | 10.      | -13.          | 270.         | 7.       | -12.          | 713.         | 5.       | -11.          | 158.         | 14.      | -32.          | 169.         | 54.      | -73.          | 735.  |
| 245.                              | 81.          | 10.      | -7.           | 263.         | 6.       | -7.           | 706.         | 4.       | -7.           | 151.         | 13.      | -20.          | 149.         | 50.      | -40.          | 695.  |
| 232.                              | 71.          | 8.       | -8.           | 254.         | 6.       | -7.           | 699.         | 3.       | -8.           | 143.         | 11.      | -21.          | 128.         | 44.      | -44.          | 650.  |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 232.                              | 71.          | 8.       | -8.           | 246.         | 6.       | -7.           | 692.         | 3.       | -8.           | 135.         | 11.      | -21.          | 106.         | 44.      | -44.          | 606.  |
| 238.                              | 71.          | 8.       | -9.           | 237.         | 6.       | -8.           | 684.         | 4.       | -8.           | 128.         | 11.      | -23.          | 84.          | 44.      | -48.          | 558.  |
| 245.                              | 94.          | 10.      | -6.           | 231.         | 7.       | -5.           | 679.         | 4.       | -6.           | 121.         | 13.      | -18.          | 66.          | 58.      | -25.          | 533.  |
| 376.                              | 312.         | 34.      | 27.           | 259.         | 24.      | 19.           | 699.         | 15.      | 11.           | 298.         | 46.      | 33.           | 100.         | 191.     | 156.          | 689.  |
| 1115.                             | 1331.        | 219.     | 219.          | 478.         | 105.     | 105.          | 803.         | 100.     | 100.          | 332.         | 301.     | 301.          | 401.         | 817.     | 817.          | 1506. |
| 1801.                             | 711.         | 155.     | 46.           | 524.         | 56.      | -31.          | 772.         | 71.      | -5.           | 227.         | 213.     | -5.           | 396.         | 436.     | -163.         | 1343. |
| 1912.                             | 214.         | 10.      | -160.         | 364.         | 17.      | -119.         | 653.         | 14.      | -105.         | 122.         | 43.      | -297.         | 99.          | 131.     | -802.         | 540.  |
| 1448.                             | 107.         | 5.       | -266.         | 98.          | 8.       | -208.         | 445.         | 6.       | -122.         | 0.           | 20.      | -99.          | 0.           | 66.      | -540.         | 0.    |
| 416.                              | 94.          | 4.       | -98.          | 0.           | 7.       | -134.         | 311.         | 5.       | 0.            | 0.           | 16.      | 0.            | 0.           | 58.      | 0.            | 0.    |
| 318.                              | 88.          | 10.      | 0.            | 0.           | 7.       | -140.         | 171.         | 5.       | 0.            | 0.           | 14.      | 0.            | 0.           | 54.      | 0.            | 0.    |
| 245.                              | 81.          | 10.      | 0.            | 0.           | 6.       | -81.          | 89.          | 4.       | 0.            | 0.           | 13.      | 0.            | 0.           | 50.      | 0.            | 0.    |
| 232.                              | 71.          | 8.       | 0.            | 0.           | 6.       | -89.          | 0.           | 3.       | 0.            | 0.           | 11.      | 0.            | 0.           | 44.      | 0.            | 0.    |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 232.                              | 224.         | 14.      | 14.           | 14.          | 15.      | 15.           | 15.          | 9.       | 9.            | 9.           | 28.      | 27.           | 27.          | 115.     | 112.          | 112.  |
| 238.                              | 224.         | 14.      | 13.           | 26.          | 15.      | 14.           | 29.          | 10.      | 9.            | 18.          | 28.      | 25.           | 52.          | 115.     | 109.          | 220.  |
| 245.                              | 298.         | 18.      | 18.           | 44.          | 19.      | 19.           | 48.          | 11.      | 11.           | 29.          | 33.      | 33.           | 85.          | 151.     | 151.          | 371.  |
| 376.                              | 986.         | 63.      | 63.           | 107.         | 64.      | 64.           | 112.         | 40.      | 40.           | 69.          | 121.     | 121.          | 206.         | 501.     | 501.          | 872.  |
| 1115.                             | 4213.        | 410.     | 410.          | 517.         | 274.     | 274.          | 386.         | 263.     | 263.          | 332.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1801.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 532.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1912.                             | 678.         | 26.      | -97.          | 503.         | 44.      | -55.          | 477.         | 37.      | -49.          | 335.         | 112.     | -135.         | 665.         | 344.     | -335.         | 2230. |
| 1448.                             | 339.         | 12.      | -99.          | 404.         | 22.      | -67.          | 410.         | 17.      | -61.          | 274.         | 52.      | -170.         | 495.         | 172.     | -438.         | 1792. |
| 416.                              | 298.         | 10.      | -2.           | 402.         | 19.      | 10.           | 420.         | 14.      | 6.            | 280.         | 41.      | 17.           | 513.         | 151.     | 86.           | 1879. |
| 318.                              | 277.         | 19.      | 15.           | 417.         | 18.      | 15.           | 435.         | 13.      | 10.           | 290.         | 37.      | 29.           | 542.         | 141.     | 119.          | 1997. |
| 245.                              | 257.         | 18.      | 18.           | 435.         | 17.      | 17.           | 452.         | 11.      | 11.           | 301.         | 33.      | 33.           | 575.         | 130.     | 130.          | 2127. |
| 232.                              | 225.         | 14.      | 13.           | 449.         | 15.      | 14.           | 466.         | 9.       | 9.            | 309.         | 28.      | 27.           | 601.         | 115.     | 111.          | 2239. |
| MEAN RUNOFF YEAR                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |       |
| 232.                              | 226.         | 14.      | 14.           | 462.         | 15.      | 15.           | 481.         | 9.       | 9.            | 318.         | 28.      | 27.           | 628.         | 115.     | 112.          | 2350. |
| 238.                              | 226.         | 14.      | 13.           | 475.         | 15.      | 14.           | 495.         | 10.      | 9.            | 327.         | 28.      | 25.           | 654.         | 115.     | 108.          | 2458. |
| 245.                              | 298.         | 18.      | 18.           | 493.         | 19.      | 19.           | 514.         | 11.      | 11.           | 338.         | 33.      | 33.           | 687.         | 151.     | 151.          | 2565. |
| 376.                              | 986.         | 63.      | 63.           | 556.         | 64.      | 64.           | 578.         | 40.      | 40.           | 378.         | 121.     | 121.          | 800.         | 501.     | 501.          | 2565. |
| 1115.                             | 4213.        | 410.     | 410.          | 600.         | 274.     | 274.          | 852.         | 263.     | 263.          | 384.         | 789.     | 789.          | 800.         | 2139.    | 2139.         | 2565. |
| 1801.                             | 2250.        | 290.     | 290.          | 600.         | 146.     | 146.          | 992.         | 186.     | 186.          | 384.         | 558.     | 558.          | 800.         | 1142.    | 1142.         | 2565. |
| 1912.                             | 678.         | 26.      | -97.          | 503.         | 44.      | -55.          | 937.         | 37.      | -49.          | 335.         | 112.     | -135.         | 665.         | 344.     | -335.         | 2230. |
| 1448.                             | 339.         | 12.      | -99.          | 404.         | 22.      | -67.          | 871.         | 17.      | -61.          | 274.         | 52.      | -170.         | 495.         | 172.     | -438.         | 1792. |
| 416.                              | 298.         | 10.      | -2.           | 402.         | 19.      | 10.           | 880.         | 14.      | 6.            | 280.         | 41.      | 17.           | 513.         | 151.     | 86.           | 1879. |
| 318.                              | 277.         | 19.      | 15.           | 417.         | 18.      | 15.           | 895.         | 13.      | 10.           | 290.         | 37.      | 29.           | 542.         | 141.     | 119.          | 1997. |
| 245.                              | 257.         | 18.      | 18.           | 435.         | 17.      | 17.           | 912.         | 11.      | 11.           | 301.         | 33.      | 33.           | 575.         | 130.     | 130.          | 2127. |
| 232.                              | 225.         | 14.      | 13.           | 449.         | 15.      | 14.           | 926.         | 9.       | 9.            | 309.         | 28.      | 27.           | 601.         | 115.     | 111.          | 2239. |

\* IRRIGATION DEMAND = 6538 AC-FT/YEAR  
 FISHERIES DEMAND = 2040 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

EXISTING SYSTEM (STORAGE = 5341 AC-FT)

TWO 1 IN 34 LOW RUNOFF YEARS

| DEMAND                            | SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYHTER      |          |               | ISLAHT       |          |               | LANHLY       |          |               |
|-----------------------------------|------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|
|                                   |                  | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 162.                              | 226.             | 14.          | 14.      | 600.          | 15.          | 15.      | 992.          | 9.           | 9.       | 384.          | 28.          | 28.      | 800.          | 115.         | 115.     | 2565.         |
| 170.                              | 226.             | 14.          | 14.      | 600.          | 15.          | 15.      | 992.          | 10.          | 10.      | 384.          | 28.          | 28.      | 800.          | 115.         | 115.     | 2565.         |
| 177.                              | 298.             | 18.          | 18.      | 600.          | 19.          | 19.      | 992.          | 11.          | 11.      | 384.          | 33.          | 33.      | 800.          | 151.         | 151.     | 2565.         |
| 326.                              | 986.             | 63.          | 63.      | 600.          | 64.          | 64.      | 992.          | 40.          | 40.      | 384.          | 121.         | 121.     | 800.          | 501.         | 501.     | 2565.         |
| 1146.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1954.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2081.                             | 678.             | 26.          | -114.    | 486.          | 44.          | -68.     | 924.          | 37.          | -61.     | 323.          | 112.         | -169.    | 631.          | 344.         | -428.    | 2137.         |
| 1551.                             | 339.             | 12.          | -109.    | 376.          | 22.          | -75.     | 849.          | 17.          | -68.     | 255.          | 52.          | -190.    | 441.          | 172.         | -495.    | 1643.         |
| 347.                              | 298.             | 10.          | 5.       | 382.          | 19.          | 15.      | 864.          | 14.          | 11.      | 266.          | 41.          | 31.      | 472.          | 151.         | 124.     | 1767.         |
| 234.                              | 277.             | 19.          | 19.      | 401.          | 18.          | 18.      | 882.          | 13.          | 13.      | 279.          | 37.          | 37.      | 509.          | 141.         | 141.     | 1908.         |
| 177.                              | 257.             | 18.          | 18.      | 419.          | 17.          | 17.      | 899.          | 11.          | 11.      | 290.          | 33.          | 33.      | 542.          | 130.         | 130.     | 2038.         |
| 162.                              | 225.             | 14.          | 14.      | 433.          | 15.          | 15.      | 914.          | 9.           | 9.       | 299.          | 28.          | 28.      | 570.          | 115.         | 115.     | 2153.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 162.                              | 226.             | 14.          | 14.      | 447.          | 15.          | 15.      | 929.          | 9.           | 9.       | 308.          | 28.          | 28.      | 598.          | 115.         | 115.     | 2268.         |
| 170.                              | 226.             | 14.          | 14.      | 461.          | 15.          | 15.      | 944.          | 10.          | 10.      | 318.          | 28.          | 28.      | 626.          | 115.         | 115.     | 2383.         |
| 177.                              | 298.             | 18.          | 18.      | 479.          | 19.          | 19.      | 963.          | 11.          | 11.      | 329.          | 33.          | 33.      | 659.          | 151.         | 151.     | 2534.         |
| 326.                              | 986.             | 63.          | 63.      | 542.          | 64.          | 64.      | 992.          | 40.          | 40.      | 369.          | 121.         | 121.     | 780.          | 501.         | 501.     | 2565.         |
| 1146.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1954.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2081.                             | 678.             | 26.          | -114.    | 486.          | 44.          | -68.     | 924.          | 37.          | -61.     | 323.          | 112.         | -169.    | 631.          | 344.         | -428.    | 2137.         |
| 1551.                             | 339.             | 12.          | -109.    | 376.          | 22.          | -75.     | 849.          | 17.          | -68.     | 255.          | 52.          | -190.    | 441.          | 172.         | -495.    | 1643.         |
| 347.                              | 298.             | 10.          | 5.       | 382.          | 19.          | 15.      | 864.          | 14.          | 11.      | 266.          | 41.          | 31.      | 472.          | 151.         | 124.     | 1767.         |
| 234.                              | 277.             | 19.          | 19.      | 401.          | 18.          | 18.      | 882.          | 13.          | 13.      | 279.          | 37.          | 37.      | 509.          | 141.         | 141.     | 1908.         |
| 177.                              | 257.             | 18.          | 18.      | 419.          | 17.          | 17.      | 899.          | 11.          | 11.      | 290.          | 33.          | 33.      | 542.          | 130.         | 130.     | 2038.         |
| 162.                              | 225.             | 14.          | 14.      | 433.          | 15.          | 15.      | 914.          | 9.           | 9.       | 299.          | 28.          | 28.      | 570.          | 115.         | 115.     | 2153.         |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 162.                              | 71.              | 8.           | -1.      | 432.          | 6.           | -2.      | 912.          | 3.           | -3.      | 296.          | 11.          | -7.      | 563.          | 44.          | -6.      | 2147.         |
| 170.                              | 71.              | 8.           | -2.      | 429.          | 6.           | -2.      | 910.          | 4.           | -3.      | 293.          | 11.          | -9.      | 554.          | 44.          | -10.     | 2137.         |
| 177.                              | 94.              | 10.          | 1.       | 431.          | 7.           | 1.       | 911.          | 4.           | -2.      | 291.          | 13.          | -4.      | 550.          | 58.          | 12.      | 2149.         |
| 326.                              | 312.             | 34.          | 32.      | 463.          | 24.          | 23.      | 934.          | 15.          | 14.      | 305.          | 46.          | 43.      | 593.          | 191.         | 183.     | 2332.         |
| 1146.                             | 1331.            | 219.         | 219.     | 600.          | 105.         | 105.     | 992.          | 100.         | 100.     | 384.          | 301.         | 301.     | 800.          | 817.         | 817.     | 2565.         |
| 1954.                             | 711.             | 155.         | 31.      | 600.          | 56.          | -44.     | 948.          | 71.          | -16.     | 368.          | 213.         | -36.     | 764.          | 436.         | -248.    | 2317.         |
| 2081.                             | 214.             | 10.          | -177.    | 423.          | 17.          | -133.    | 816.          | 14.          | -117.    | 251.          | 43.          | -331.    | 434.          | 131.         | -896.    | 1422.         |
| 1551.                             | 107.             | 5.           | -140.    | 283.          | 8.           | -107.    | 709.          | 6.           | -95.     | 157.          | 20.          | -269.    | 165.          | 66.          | -729.    | 693.          |
| 347.                              | 94.              | 4.           | -21.     | 262.          | 7.           | -13.     | 696.          | 5.           | -12.     | 145.          | 16.          | -35.     | 130.          | 58.          | -81.     | 612.          |
| 234.                              | 88.              | 10.          | -4.      | 258.          | 7.           | -5.      | 691.          | 5.           | -5.      | 139.          | 14.          | -15.     | 115.          | 54.          | -27.     | 585.          |
| 177.                              | 81.              | 10.          | -0.      | 258.          | 6.           | -1.      | 690.          | 4.           | -3.      | 137.          | 13.          | -7.      | 108.          | 50.          | -3.      | 582.          |
| 162.                              | 71.              | 8.           | -1.      | 256.          | 6.           | -2.      | 688.          | 3.           | -3.      | 134.          | 11.          | -7.      | 101.          | 44.          | -6.      | 576.          |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 162.                              | 71.              | 8.           | -1.      | 255.          | 6.           | -2.      | 687.          | 3.           | -3.      | 131.          | 11.          | -7.      | 93.           | 44.          | -6.      | 570.          |
| 170.                              | 71.              | 8.           | -2.      | 252.          | 6.           | -2.      | 684.          | 4.           | -3.      | 128.          | 11.          | -9.      | 84.           | 44.          | -10.     | 560.          |
| 177.                              | 94.              | 10.          | 1.       | 254.          | 7.           | 1.       | 685.          | 4.           | -2.      | 126.          | 13.          | -4.      | 80.           | 58.          | 12.      | 572.          |
| 326.                              | 312.             | 34.          | 32.      | 286.          | 24.          | 23.      | 708.          | 15.          | 14.      | 140.          | 46.          | 43.      | 124.          | 191.         | 183.     | 755.          |
| 1146.                             | 1331.            | 219.         | 219.     | 505.          | 105.         | 105.     | 813.          | 100.         | 100.     | 241.          | 301.         | 301.     | 425.          | 817.         | 817.     | 1572.         |
| 1954.                             | 711.             | 155.         | 31.      | 536.          | 56.          | -44.     | 769.          | 71.          | -16.     | 225.          | 213.         | -36.     | 389.          | 436.         | -248.    | 1324.         |
| 2081.                             | 214.             | 10.          | -177.    | 359.          | 17.          | -133.    | 637.          | 14.          | -117.    | 108.          | 43.          | -331.    | 59.           | 131.         | -896.    | 429.          |
| 1551.                             | 107.             | 5.           | -359.    | 0.            | 8.           | -384.    | 252.          | 6.           | -108.    | 0.            | 20.          | -59.     | 0.            | 66.          | -429.    | 0.            |
| 347.                              | 94.              | 4.           | 0.       | 0.            | 7.           | -163.    | 90.           | 5.           | 0.       | 0.            | 16.          | 0.       | 0.            | 58.          | 0.       | 0.            |
| 234.                              | 88.              | 10.          | 0.       | 0.            | 7.           | -57.     | 33.           | 5.           | 0.       | 0.            | 14.          | 0.       | 0.            | 54.          | 0.       | 0.            |
| 177.                              | 81.              | 10.          | 0.       | 0.            | 6.           | -14.     | 19.           | 4.           | 0.       | 0.            | 13.          | 0.       | 0.            | 50.          | 0.       | 0.            |
| 162.                              | 71.              | 8.           | 0.       | 0.            | 6.           | -19.     | 0.            | 3.           | 0.       | 0.            | 11.          | 0.       | 0.            | 44.          | 0.       | 0.            |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 162.                              | 226.             | 14.          | 14.      | 14.           | 15.          | 15.      | 15.           | 9.           | 9.       | 9.            | 28.          | 28.      | 28.           | 115.         | 115.     | 115.          |
| 170.                              | 226.             | 14.          | 14.      | 28.           | 15.          | 15.      | 30.           | 10.          | 10.      | 19.           | 28.          | 28.      | 56.           | 115.         | 115.     | 230.          |
| 177.                              | 298.             | 18.          | 18.      | 46.           | 19.          | 19.      | 49.           | 11.          | 11.      | 30.           | 33.          | 33.      | 89.           | 151.         | 151.     | 381.          |
| 326.                              | 986.             | 63.          | 63.      | 109.          | 64.          | 64.      | 113.          | 40.          | 40.      | 70.           | 121.         | 121.     | 210.          | 501.         | 501.     | 892.          |
| 1146.                             | 4213.            | 410.         | 410.     | 519.          | 274.         | 274.     | 387.          | 263.         | 263.     | 333.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1954.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 533.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2081.                             | 678.             | 26.          | -114.    | 486.          | 44.          | -68.     | 465.          | 37.          | -61.     | 323.          | 112.         | -169.    | 631.          | 344.         | -428.    | 2137.         |
| 1551.                             | 339.             | 12.          | -109.    | 376.          | 22.          | -75.     | 390.          | 17.          | -68.     | 255.          | 52.          | -190.    | 441.          | 172.         | -495.    | 1643.         |
| 347.                              | 298.             | 10.          | 5.       | 382.          | 19.          | 15.      | 405.          | 14.          | 11.      | 266.          | 41.          | 31.      | 472.          | 151.         | 124.     | 1767.         |
| 234.                              | 277.             | 19.          | 19.      | 401.          | 18.          | 18.      | 423.          | 13.          | 13.      | 279.          | 37.          | 37.      | 509.          | 141.         | 141.     | 1908.         |
| 177.                              | 257.             | 18.          | 18.      | 419.          | 17.          | 17.      | 440.          | 11.          | 11.      | 290.          | 33.          | 33.      | 542.          | 130.         | 130.     | 2038.         |
| 162.                              | 225.             | 14.          | 14.      | 433.          | 15.          | 15.      | 455.          | 9.           | 9.       | 299.          | 28.          | 28.      | 570.          | 115.         | 115.     | 2153.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 162.                              | 226.             | 14.          | 14.      | 447.          | 15.          | 15.      | 470.          | 9.           | 9.       | 308.          | 28.          | 28.      | 598.          | 115.         | 115.     | 2268.         |
| 170.                              | 226.             | 14.          | 14.      | 461.          | 15.          | 15.      | 485.          | 10.          | 10.      | 318.          | 28.          | 28.      | 626.          | 115.         | 115.     | 2383.         |
| 177.                              | 298.             | 18.          | 18.      | 479.          | 19.          | 19.      | 504.          | 11.          | 11.      | 329.          | 33.          | 33.      | 659.          | 151.         | 151.     | 2534.         |
| 326.                              | 986.             | 63.          | 63.      | 542.          | 64.          | 64.      | 568.          | 40.          | 40.      | 369.          | 121.         | 121.     | 780.          | 501.         | 501.     | 2565.         |
| 1146.                             | 4213.            | 410.         | 410.     | 600.          | 274.         | 274.     | 842.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1954.                             | 2250.            | 290.         | 290.     | 600.          | 146.         | 146.     | 988.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 2081.                             | 678.             | 26.          | -114.    | 486.          | 44.          | -68.     | 920.          | 37.          | -61.     | 323.          | 112.         | -169.    | 631.          | 344.         | -428.    | 2137.         |
| 1551.                             | 339.             | 12.          | -109.    | 376.          | 22.          | -75.     | 845.          | 17.          | -68.     | 255.          | 52.          | -190.    | 441.          | 172.         | -495.    | 1643.         |
| 347.                              | 298.             | 10.          | 5.       | 382.          | 19.          | 15.      | 860.          | 14.          | 11.      | 266.          | 41.          | 31.      | 472.          | 151.         | 124.     | 1767.         |
| 234.                              | 277.             | 19.          | 19.      | 401.          | 18.          | 18.      | 878.          | 13.          | 13.      | 279.          | 37.          | 37.      | 509.          | 141.         | 141.     | 1908.         |
| 177.                              | 257.             | 18.          | 18.      | 419.          | 17.          | 17.      | 895.          | 11.          | 11.      | 290.          | 33.          | 33.      | 542.          | 130.         | 130.     | 2038.         |
| 162.                              | 225.             | 14.          | 14.      | 433.          | 15.          | 15.      | 910.          | 9.           | 9.       | 299.          | 28.          | 28.      | 570.          | 115.         | 115.     | 2153.         |

\* IRRIGATION DEMAND = 7468 AC-FT/YEAR  
 FISHERIES DEMAND = 1020 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

TWO 1 IN 34: LOW RUNOFF YEARS

| DEMAND                            | SUB-BASIN INFLOW | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LAMBLY       |          |               |
|-----------------------------------|------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|
|                                   |                  | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 295.                              | 206.             | 14.          | 5.       | 600.          | 15.          | 8.       | 992.          | 9.           | 3.       | 384.          | 28.          | 10.      | 800.          | 115.         | 66.      | 2565.         |
| 300.                              | 206.             | 14.          | 5.       | 600.          | 15.          | 7.       | 992.          | 10.          | 3.       | 384.          | 28.          | 9.       | 800.          | 115.         | 63.      | 2565.         |
| 305.                              | 272.             | 18.          | 15.      | 600.          | 19.          | 16.      | 992.          | 11.          | 9.       | 384.          | 33.          | 26.      | 800.          | 151.         | 133.     | 2565.         |
| 406.                              | 900.             | 63.          | 63.      | 600.          | 64.          | 64.      | 992.          | 40.          | 40.      | 384.          | 121.         | 121.     | 800.          | 501.         | 501.     | 2565.         |
| 1003.                             | 3844.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1501.                             | 2053.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1586.                             | 619.             | 26.          | -71.     | 529.          | 44.          | -33.     | 959.          | 37.          | -31.     | 353.          | 112.         | -81.     | 719.          | 344.         | -188.    | 2377.         |
| 1229.                             | 309.             | 12.          | -80.     | 449.          | 22.          | -52.     | 907.          | 17.          | -47.     | 306.          | 52.          | -132.    | 587.          | 172.         | -334.    | 2043.         |
| 466.                              | 272.             | 10.          | -9.      | 440.          | 19.          | 3.       | 910.          | 14.          | 0.       | 306.          | 41.          | 2.       | 589.          | 151.         | 44.      | 2087.         |
| 391.                              | 253.             | 19.          | 6.       | 446.          | 18.          | 7.       | 917.          | 13.          | 3.       | 310.          | 37.          | 9.       | 598.          | 141.         | 65.      | 2153.         |
| 305.                              | 234.             | 18.          | 11.      | 456.          | 17.          | 11.      | 929.          | 11.          | 6.       | 316.          | 33.          | 19.      | 617.          | 130.         | 91.      | 2243.         |
| 295.                              | 225.             | 14.          | 7.       | 463.          | 15.          | 9.       | 938.          | 9.           | 4.       | 320.          | 28.          | 14.      | 631.          | 115.         | 76.      | 2320.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 295.                              | 206.             | 14.          | 5.       | 469.          | 15.          | 8.       | 946.          | 9.           | 3.       | 323.          | 28.          | 10.      | 641.          | 115.         | 66.      | 2386.         |
| 300.                              | 206.             | 14.          | 5.       | 473.          | 15.          | 7.       | 954.          | 10.          | 3.       | 326.          | 28.          | 9.       | 650.          | 115.         | 63.      | 2449.         |
| 305.                              | 272.             | 18.          | 15.      | 488.          | 19.          | 16.      | 970.          | 11.          | 9.       | 335.          | 33.          | 26.      | 677.          | 151.         | 133.     | 2565.         |
| 406.                              | 900.             | 63.          | 63.      | 551.          | 64.          | 64.      | 992.          | 40.          | 40.      | 375.          | 121.         | 121.     | 798.          | 501.         | 501.     | 2565.         |
| 1003.                             | 3844.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1501.                             | 2053.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1586.                             | 619.             | 26.          | -71.     | 529.          | 44.          | -33.     | 959.          | 37.          | -31.     | 353.          | 112.         | -81.     | 719.          | 344.         | -188.    | 2377.         |
| 1229.                             | 309.             | 12.          | -80.     | 449.          | 22.          | -52.     | 907.          | 17.          | -47.     | 306.          | 52.          | -132.    | 587.          | 172.         | -334.    | 2043.         |
| 466.                              | 272.             | 10.          | -9.      | 440.          | 19.          | 3.       | 910.          | 14.          | 0.       | 306.          | 41.          | 2.       | 589.          | 151.         | 44.      | 2087.         |
| 391.                              | 253.             | 19.          | 6.       | 446.          | 18.          | 7.       | 917.          | 13.          | 3.       | 310.          | 37.          | 9.       | 598.          | 141.         | 65.      | 2153.         |
| 305.                              | 234.             | 18.          | 11.      | 456.          | 17.          | 11.      | 929.          | 11.          | 6.       | 316.          | 33.          | 19.      | 617.          | 130.         | 91.      | 2243.         |
| 295.                              | 225.             | 14.          | 7.       | 463.          | 15.          | 9.       | 938.          | 9.           | 4.       | 320.          | 28.          | 14.      | 631.          | 115.         | 76.      | 2320.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 295.                              | 206.             | 14.          | 5.       | 469.          | 15.          | 8.       | 946.          | 9.           | 3.       | 323.          | 28.          | 10.      | 641.          | 115.         | 66.      | 2386.         |
| 300.                              | 206.             | 14.          | 5.       | 473.          | 15.          | 7.       | 954.          | 10.          | 3.       | 326.          | 28.          | 9.       | 650.          | 115.         | 63.      | 2449.         |
| 305.                              | 272.             | 18.          | 15.      | 488.          | 19.          | 16.      | 970.          | 11.          | 9.       | 335.          | 33.          | 26.      | 677.          | 151.         | 133.     | 2565.         |
| 406.                              | 900.             | 63.          | 63.      | 551.          | 64.          | 64.      | 992.          | 40.          | 40.      | 375.          | 121.         | 121.     | 798.          | 501.         | 501.     | 2565.         |
| 1003.                             | 3844.            | 410.         | 410.     | 600.          | 274.         | 274.     | 992.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1501.                             | 2053.            | 290.         | 290.     | 600.          | 146.         | 146.     | 992.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1586.                             | 619.             | 26.          | -71.     | 529.          | 44.          | -33.     | 959.          | 37.          | -31.     | 353.          | 112.         | -81.     | 719.          | 344.         | -188.    | 2377.         |
| 1229.                             | 309.             | 12.          | -80.     | 449.          | 22.          | -52.     | 907.          | 17.          | -47.     | 306.          | 52.          | -132.    | 587.          | 172.         | -334.    | 2043.         |
| 466.                              | 272.             | 10.          | -9.      | 440.          | 19.          | 3.       | 910.          | 14.          | 0.       | 306.          | 41.          | 2.       | 589.          | 151.         | 44.      | 2087.         |
| 391.                              | 253.             | 19.          | 6.       | 446.          | 18.          | 7.       | 917.          | 13.          | 3.       | 310.          | 37.          | 9.       | 598.          | 141.         | 65.      | 2153.         |
| 305.                              | 234.             | 18.          | 11.      | 456.          | 17.          | 11.      | 929.          | 11.          | 6.       | 316.          | 33.          | 19.      | 617.          | 130.         | 91.      | 2243.         |
| 295.                              | 225.             | 14.          | 7.       | 463.          | 15.          | 9.       | 938.          | 9.           | 4.       | 320.          | 28.          | 14.      | 631.          | 115.         | 76.      | 2320.         |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 295.                              | 52.              | 8.           | -17.     | 447.          | 6.           | -14.     | 924.          | 3.           | -14.     | 306.          | 11.          | -38.     | 593.          | 44.          | -90.     | 2230.         |
| 300.                              | 52.              | 8.           | -17.     | 429.          | 6.           | -14.     | 910.          | 4.           | -14.     | 293.          | 11.          | -39.     | 554.          | 44.          | -93.     | 2137.         |
| 305.                              | 68.              | 10.          | -14.     | 415.          | 7.           | -12.     | 899.          | 4.           | -12.     | 280.          | 13.          | -35.     | 519.          | 58.          | -73.     | 2064.         |
| 406.                              | 225.             | 34.          | 16.      | 431.          | 24.          | 10.      | 909.          | 15.          | 3.       | 283.          | 46.          | 10.      | 529.          | 191.         | 92.      | 2156.         |
| 1003.                             | 962.             | 219.         | 215.     | 600.          | 105.         | 101.     | 992.          | 100.         | 98.      | 380.          | 301.         | 293.     | 800.          | 817.         | 794.     | 2565.         |
| 1501.                             | 514.             | 155.         | 56.      | 600.          | 56.          | -23.     | 969.          | 71.          | 2.       | 382.          | 213.         | 16.      | 800.          | 436.         | -107.    | 2458.         |
| 1586.                             | 155.             | 10.          | -133.    | 467.          | 17.          | -98.     | 871.          | 14.          | -86.     | 294.          | 43.          | -243.    | 557.          | 131.         | -656.    | 1803.         |
| 1229.                             | 77.              | 5.           | -111.    | 356.          | 8.           | -84.     | 787.          | 6.           | -74.     | 222.          | 20.          | -211.    | 346.          | 66.          | -568.    | 1235.         |
| 466.                              | 68.              | 4.           | -36.     | 320.          | 7.           | -25.     | 763.          | 5.           | -23.     | 200.          | 16.          | -64.     | 282.          | 58.          | -161.    | 1073.         |
| 391.                              | 63.              | 10.          | -22.     | 298.          | 7.           | -19.     | 743.          | 5.           | -18.     | 182.          | 14.          | -51.     | 231.          | 54.          | -126.    | 947.          |
| 305.                              | 59.              | 10.          | -15.     | 283.          | 6.           | -13.     | 730.          | 4.           | -13.     | 169.          | 13.          | -37.     | 194.          | 50.          | -86.     | 861.          |
| 295.                              | 52.              | 8.           | -17.     | 266.          | 6.           | -14.     | 716.          | 3.           | -14.     | 155.          | 11.          | -38.     | 156.          | 44.          | -90.     | 771.          |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 295.                              | 52.              | 8.           | -17.     | 249.          | 6.           | -14.     | 703.          | 3.           | -14.     | 141.          | 11.          | -38.     | 118.          | 44.          | -90.     | 681.          |
| 300.                              | 52.              | 8.           | -17.     | 232.          | 6.           | -14.     | 689.          | 4.           | -14.     | 128.          | 11.          | -39.     | 79.           | 44.          | -93.     | 588.          |
| 305.                              | 68.              | 10.          | -14.     | 218.          | 7.           | -12.     | 677.          | 4.           | -12.     | 115.          | 13.          | -35.     | 44.           | 58.          | -73.     | 514.          |
| 406.                              | 225.             | 34.          | 16.      | 233.          | 24.          | 10.      | 687.          | 15.          | 3.       | 118.          | 46.          | 10.      | 54.           | 191.         | 92.      | 608.          |
| 1003.                             | 962.             | 219.         | 215.     | 448.          | 105.         | 101.     | 788.          | 100.         | 98.      | 216.          | 301.         | 293.     | 347.          | 817.         | 794.     | 1402.         |
| 1501.                             | 514.             | 155.         | 56.      | 505.          | 56.          | -23.     | 765.          | 71.          | 2.       | 217.          | 213.         | 16.      | 363.          | 436.         | -107.    | 1295.         |
| 1586.                             | 155.             | 10.          | -133.    | 372.          | 17.          | -98.     | 667.          | 14.          | -86.     | 131.          | 43.          | -243.    | 119.          | 131.         | -656.    | 839.          |
| 1229.                             | 77.              | 5.           | -119.    | 253.          | 8.           | -90.     | 577.          | 6.           | -80.     | 52.           | 20.          | -117.    | 0.            | 66.          | -639.    | 6.            |
| 466.                              | 68.              | 4.           | -145.    | 108.          | 7.           | -112.    | 466.          | 5.           | -52.     | 0.            | 16.          | 0.       | 0.            | 58.          | 0.       | 0.            |
| 391.                              | 63.              | 10.          | -108.    | 0.            | 7.           | -129.    | 337.          | 5.           | 0.       | 0.            | 14.          | 0.       | 0.            | 54.          | 0.       | 0.            |
| 305.                              | 59.              | 10.          | 0.       | 0.            | 6.           | -164.    | 173.          | 4.           | 0.       | 0.            | 13.          | 0.       | 0.            | 50.          | 0.       | 0.            |
| 295.                              | 52.              | 8.           | 0.       | 0.            | 6.           | -172.    | 0.            | 3.           | 0.       | 0.            | 11.          | 0.       | 0.            | 44.          | 0.       | 0.            |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 295.                              | 206.             | 14.          | 5.       | 5.            | 15.          | 8.       | 8.            | 9.           | 3.       | 3.            | 28.          | 10.      | 10.           | 115.         | 66.      | 66.           |
| 300.                              | 206.             | 14.          | 5.       | 10.           | 15.          | 7.       | 16.           | 10.          | 3.       | 6.            | 28.          | 9.       | 19.           | 115.         | 63.      | 129.          |
| 305.                              | 272.             | 18.          | 15.      | 24.           | 19.          | 16.      | 32.           | 11.          | 9.       | 15.           | 33.          | 26.      | 46.           | 151.         | 133.     | 262.          |
| 406.                              | 900.             | 63.          | 63.      | 87.           | 64.          | 64.      | 96.           | 40.          | 40.      | 55.           | 121.         | 121.     | 167.          | 501.         | 591.     | 763.          |
| 1003.                             | 3844.            | 410.         | 410.     | 497.          | 274.         | 274.     | 370.          | 263.         | 263.     | 318.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1501.                             | 2053.            | 290.         | 290.     | 600.          | 146.         | 146.     | 516.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1586.                             | 619.             | 26.          | -71.     | 529.          | 44.          | -33.     | 483.          | 37.          | -31.     | 353.          | 112.         | -81.     | 719.          | 344.         | -138.    | 2377.         |
| 1229.                             | 309.             | 12.          | -80.     | 449.          | 22.          | -52.     | 431.          | 17.          | -47.     | 306.          | 52.          | -132.    | 587.          | 172.         | -334.    | 2043.         |
| 466.                              | 272.             | 10.          | -9.      | 440.          | 19.          | 3.       | 435.          | 14.          | 0.       | 306.          | 41.          | 2.       | 589.          | 151.         | 44.      | 2087.         |
| 391.                              | 253.             | 19.          | 6.       | 446.          | 18.          | 7.       | 442.          | 13.          | 3.       | 310.          | 37.          | 9.       | 598.          | 141.         | 65.      | 2153.         |
| 305.                              | 234.             | 18.          | 11.      | 456.          | 17.          | 11.      | 453.          | 11.          | 6.       | 316.          | 33.          | 19.      | 617.          | 130.         | 91.      | 2243.         |
| 295.                              | 225.             | 14.          | 7.       | 463.          | 15.          | 9.       | 462.          | 9.           | 4.       | 320.          | 28.          | 14.      | 631.          | 115.         | 76.      | 2320.         |
| MEAN RUNOFF YEAR                  |                  |              |          |               |              |          |               |              |          |               |              |          |               |              |          |               |
| 295.                              | 206.             | 14.          | 5.       | 469.          | 15.          | 8.       | 470.          | 9.           | 3.       | 323.          | 28.          | 10.      | 641.          | 115.         | 66.      | 2386.         |
| 300.                              | 206.             | 14.          | 5.       | 473.          | 15.          | 7.       | 478.          | 10.          | 3.       | 326.          | 28.          | 9.       | 650.          | 115.         | 63.      | 2449.         |
| 305.                              | 272.             | 18.          | 15.      | 488.          | 19.          | 16.      | 494.          | 11.          | 9.       | 335.          | 33.          | 26.      | 677.          | 151.         | 133.     | 2565.         |
| 406.                              | 900.             | 63.          | 63.      | 551.          | 64.          | 64.      | 558.          | 40.          | 40.      | 375.          | 121.         | 121.     | 798.          | 501.         | 501.     | 2565.         |
| 1003.                             | 3844.            | 410.         | 410.     | 600.          | 274.         | 274.     | 832.          | 263.         | 263.     | 384.          | 789.         | 789.     | 800.          | 2139.        | 2139.    | 2565.         |
| 1501.                             | 2053.            | 290.         | 290.     | 600.          | 146.         | 146.     | 978.          | 186.         | 186.     | 384.          | 558.         | 558.     | 800.          | 1142.        | 1142.    | 2565.         |
| 1586.                             | 619.             | 26.          | -71.     | 529.          | 44.          | -33.     | 945.          | 37.          | -31.     | 353.          | 112.         | -81.     | 719.          | 344.         | -193.    | 2377.         |
| 1229.                             | 309.             | 12.          | -80.     | 449.          | 22.          | -52.     | 893.          | 17.          | -47.     | 306.          | 52.          | -132.    | 587.          | 172.         | -334.    | 2043.         |
| 466.                              | 272.             | 10.          | -9.      | 440.          | 19.          | 3.       | 896.          | 14.          | 0.       | 306.          | 41.          | 2.       | 589.          | 151.         | 44.      | 2087.         |
| 391.                              | 253.             | 19.          | 6.       | 446.          | 18.          | 7.       | 903.          | 13.          | 3.       | 310.          | 37.          | 9.       | 598.          | 141.         | 65.      | 2153.         |
| 305.                              | 234.             | 18.          | 11.      | 456.          | 17.          | 11.      | 915.          | 11.          | 6.       | 316.          | 33.          | 19.      | 617.          | 130.         | 91.      | 2243.         |
| 295.                              | 225.             | 14.          | 7.       | 463.          | 15.          | 9.       | 924.          | 9.           | 4.       | 320.          | 28.          | 14.      | 631.          | 115.         | 76.      | 2320.         |

\* IRRIGATION DEMAND = 5023 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 2000 AC-FT/YEAR

TWO 1 IN 34 LOW RUNOFF YEARS

| DEMAND SUB-BASIN INFLOW           | DOBBIN-WEST  |          |               | JACKPINE     |          |               | PAYNTER      |          |               | ISLAHT       |          |               | LANBLY       |          |               |
|-----------------------------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|--------------|----------|---------------|
|                                   | RES 1 INFLOW | RES 1 ΔS | RES 1 STORAGE | RES 2 INFLOW | RES 2 ΔS | RES 2 STORAGE | RES 3 INFLOW | RES 3 ΔS | RES 3 STORAGE | RES 4 INFLOW | RES 4 ΔS | RES 4 STORAGE | RES 5 INFLOW | RES 5 ΔS | RES 5 STORAGE |
| MEAN RUNOFF YEAR                  | 27.          | 27.      | 600.          | 29.          | 29.      | 992.          | 17.          | 17.      | 384.          | 50.          | 50.      | 800.          | 230.         | 230.     | 2565.         |
| 301.                              | 452.         | 27.      | 600.          | 29.          | 29.      | 992.          | 17.          | 17.      | 384.          | 50.          | 50.      | 800.          | 230.         | 230.     | 2565.         |
| 306.                              | 472.         | 29.      | 600.          | 31.          | 31.      | 992.          | 18.          | 18.      | 384.          | 54.          | 54.      | 800.          | 240.         | 240.     | 2565.         |
| 312.                              | 472.         | 31.      | 600.          | 31.          | 31.      | 992.          | 20.          | 20.      | 384.          | 59.          | 59.      | 800.          | 240.         | 240.     | 2565.         |
| 422.                              | 1603.        | 175.     | 600.          | 104.         | 104.     | 992.          | 112.         | 112.     | 384.          | 336.         | 336.     | 800.          | 813.         | 813.     | 2565.         |
| 1074.                             | 3370.        | 364.     | 600.          | 219.         | 219.     | 992.          | 233.         | 233.     | 384.          | 700.         | 700.     | 800.          | 1711.        | 1711.    | 2565.         |
| 1627.                             | 1747.        | 192.     | 600.          | 114.         | 114.     | 992.          | 123.         | 123.     | 384.          | 370.         | 370.     | 800.          | 807.         | 807.     | 2565.         |
| 1721.                             | 668.         | 22.      | 517.          | 43.          | -41.     | 951.          | 32.          | -42.     | 342.          | 95.          | -116.    | 684.          | 339.         | -240.    | 2325.         |
| 1329.                             | 277.         | 7.       | 419.          | 18.          | -66.     | 885.          | 11.          | -63.     | 280.          | 31.          | -179.    | 505.          | 141.         | -437.    | 1888.         |
| 483.                              | 308.         | 9.       | 410.          | 20.          | 6.       | 891.          | 12.          | -0.      | 279.          | 38.          | 3.       | 508.          | 156.         | 60.      | 1948.         |
| 400.                              | 298.         | 21.      | 421.          | 19.          | 11.      | 902.          | 14.          | 7.       | 286.          | 41.          | 21.      | 529.          | 152.         | 96.      | 2044.         |
| 312.                              | 318.         | 22.      | 443.          | 21.          | 21.      | 923.          | 14.          | 14.      | 300.          | 43.          | 43.      | 572.          | 161.         | 161.     | 2205.         |
| 301.                              | 286.         | 22.      | 463.          | 19.          | 18.      | 940.          | 14.          | 13.      | 313.          | 43.          | 40.      | 612.          | 146.         | 138.     | 2343.         |
| MEAN RUNOFF YEAR                  | 27.          | 27.      | 490.          | 29.          | 29.      | 969.          | 17.          | 17.      | 330.          | 50.          | 50.      | 662.          | 230.         | 230.     | 2565.         |
| 301.                              | 452.         | 27.      | 490.          | 29.          | 29.      | 969.          | 17.          | 17.      | 330.          | 50.          | 50.      | 662.          | 230.         | 230.     | 2565.         |
| 306.                              | 472.         | 29.      | 519.          | 31.          | 31.      | 992.          | 18.          | 18.      | 348.          | 54.          | 54.      | 716.          | 240.         | 240.     | 2565.         |
| 312.                              | 472.         | 31.      | 549.          | 31.          | 31.      | 992.          | 20.          | 20.      | 368.          | 59.          | 59.      | 775.          | 240.         | 240.     | 2565.         |
| 422.                              | 1603.        | 175.     | 600.          | 104.         | 104.     | 992.          | 112.         | 112.     | 384.          | 336.         | 336.     | 800.          | 813.         | 813.     | 2565.         |
| 1074.                             | 3370.        | 364.     | 600.          | 219.         | 219.     | 992.          | 233.         | 233.     | 384.          | 700.         | 700.     | 800.          | 1711.        | 1711.    | 2565.         |
| 1627.                             | 1747.        | 192.     | 600.          | 114.         | 114.     | 992.          | 123.         | 123.     | 384.          | 370.         | 370.     | 800.          | 807.         | 807.     | 2565.         |
| 1721.                             | 668.         | 22.      | 517.          | 43.          | -41.     | 951.          | 32.          | -42.     | 342.          | 95.          | -116.    | 684.          | 339.         | -240.    | 2325.         |
| 1329.                             | 277.         | 7.       | 419.          | 18.          | -66.     | 895.          | 11.          | -63.     | 280.          | 31.          | -179.    | 505.          | 141.         | -437.    | 1888.         |
| 483.                              | 308.         | 9.       | 410.          | 20.          | 6.       | 891.          | 12.          | -0.      | 279.          | 38.          | 3.       | 508.          | 156.         | 60.      | 1948.         |
| 400.                              | 298.         | 21.      | 421.          | 19.          | 11.      | 902.          | 14.          | 7.       | 286.          | 41.          | 21.      | 529.          | 152.         | 96.      | 2044.         |
| 312.                              | 318.         | 22.      | 443.          | 21.          | 21.      | 923.          | 14.          | 14.      | 300.          | 43.          | 43.      | 572.          | 161.         | 161.     | 2205.         |
| 301.                              | 286.         | 22.      | 463.          | 19.          | 18.      | 940.          | 14.          | 13.      | 313.          | 43.          | 40.      | 612.          | 146.         | 138.     | 2343.         |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) | 14.          | -2.      | 462.          | 11.          | -2.      | 939.          | 6.           | -5.      | 309.          | 19.          | -13.     | 600.          | 88.          | 1.       | 2344.         |
| 301.                              | 143.         | 14.      | 462.          | 11.          | -2.      | 939.          | 6.           | -5.      | 309.          | 19.          | -13.     | 600.          | 88.          | 1.       | 2344.         |
| 306.                              | 149.         | 15.      | 461.          | 12.          | -1.      | 938.          | 7.           | -4.      | 305.          | 21.          | -11.     | 589.          | 92.          | 5.       | 2349.         |
| 312.                              | 149.         | 16.      | 462.          | 12.          | -1.      | 937.          | 8.           | -4.      | 301.          | 23.          | -10.     | 579.          | 92.          | 2.       | 2351.         |
| 422.                              | 506.         | 94.      | 555.          | 40.          | 40.      | 977.          | 43.          | 43.      | 344.          | 128.         | 128.     | 707.          | 311.         | 311.     | 2565.         |
| 1074.                             | 1064.        | 194.     | 600.          | 84.          | 83.      | 992.          | 89.          | 88.      | 384.          | 267.         | 265.     | 800.          | 654.         | 648.     | 2565.         |
| 1627.                             | 552.         | 103.     | 595.          | 44.          | -42.     | 950.          | 47.          | -28.     | 356.          | 141.         | -74.     | 726.          | 339.         | -253.    | 2312.         |
| 1721.                             | 211.         | 8.       | 453.          | 16.          | -143.    | 845.          | 12.          | -93.     | 262.          | 36.          | -266.    | 461.          | 129.         | -701.    | 1611.         |
| 1329.                             | 88.          | 3.       | 331.          | 7.           | -92.     | 753.          | 4.           | -83.     | 180.          | 12.          | -236.    | 224.          | 54.          | -629.    | 983.          |
| 483.                              | 97.          | 3.       | 296.          | 8.           | -23.     | 730.          | 5.           | -22.     | 157.          | 15.          | -63.     | 162.          | 60.          | -152.    | 830.          |
| 400.                              | 94.          | 11.      | 277.          | 7.           | -17.     | 712.          | 5.           | -16.     | 141.          | 16.          | -45.     | 116.          | 58.          | -110.    | 720.          |
| 312.                              | 100.         | 12.      | 267.          | 8.           | -9.      | 703.          | 5.           | -9.      | 132.          | 16.          | -26.     | 90.           | 62.          | -55.     | 666.          |
| 301.                              | 91.          | 12.      | 258.          | 7.           | -10.     | 694.          | 5.           | -9.      | 122.          | 16.          | -26.     | 65.           | 56.          | -60.     | 606.          |
| LOW RUNOFF YEAR ( 38.20% OF MEAN) | 14.          | -2.      | 256.          | 11.          | -2.      | 692.          | 6.           | -5.      | 118.          | 19.          | -13.     | 52.           | 88.          | 1.       | 607.          |
| 301.                              | 143.         | 14.      | 256.          | 11.          | -2.      | 692.          | 6.           | -5.      | 118.          | 19.          | -13.     | 52.           | 88.          | 1.       | 607.          |
| 306.                              | 149.         | 15.      | 256.          | 12.          | -1.      | 692.          | 7.           | -4.      | 114.          | 21.          | -11.     | 41.           | 92.          | 5.       | 612.          |
| 312.                              | 149.         | 16.      | 256.          | 12.          | -1.      | 690.          | 8.           | -4.      | 110.          | 23.          | -10.     | 31.           | 92.          | 2.       | 614.          |
| 422.                              | 506.         | 94.      | 350.          | 40.          | 40.      | 730.          | 43.          | 43.      | 153.          | 128.         | 128.     | 160.          | 311.         | 311.     | 925.          |
| 1074.                             | 1064.        | 194.     | 543.          | 84.          | 83.      | 813.          | 89.          | 88.      | 241.          | 267.         | 265.     | 425.          | 654.         | 649.     | 1573.         |
| 1627.                             | 552.         | 103.     | 539.          | 44.          | -42.     | 771.          | 47.          | -28.     | 213.          | 141.         | -74.     | 352.          | 339.         | -253.    | 1321.         |
| 1721.                             | 211.         | 8.       | 396.          | 16.          | -104.    | 666.          | 12.          | -93.     | 119.          | 36.          | -266.    | 86.           | 129.         | -701.    | 620.          |
| 1329.                             | 88.          | 3.       | 206.          | 7.           | -147.    | 519.          | 4.           | -119.    | 0.            | 12.          | -86.     | 0.            | 54.          | -620.    | 0.            |
| 483.                              | 97.          | 3.       | 39.           | 8.           | -129.    | 390.          | 5.           | 0.       | 0.            | 15.          | 0.       | 0.            | 60.          | 0.       | 0.            |
| 400.                              | 94.          | 11.      | 0.            | 7.           | -169.    | 222.          | 5.           | 0.       | 0.            | 16.          | 0.       | 0.            | 58.          | 0.       | 0.            |
| 312.                              | 100.         | 12.      | 0.            | 8.           | -108.    | 113.          | 5.           | 0.       | 0.            | 16.          | 0.       | 0.            | 62.          | 0.       | 0.            |
| 301.                              | 91.          | 12.      | 0.            | 7.           | -113.    | 0.            | 5.           | 0.       | 0.            | 16.          | 0.       | 0.            | 56.          | 0.       | 0.            |
| MEAN RUNOFF YEAR                  | 27.          | 27.      | 27.           | 29.          | 29.      | 29.           | 17.          | 17.      | 17.           | 50.          | 50.      | 50.           | 230.         | 230.     | 230.          |
| 301.                              | 452.         | 27.      | 27.           | 29.          | 29.      | 29.           | 17.          | 17.      | 17.           | 50.          | 50.      | 50.           | 230.         | 230.     | 230.          |
| 306.                              | 472.         | 29.      | 55.           | 31.          | 31.      | 60.           | 18.          | 18.      | 35.           | 54.          | 54.      | 104.          | 240.         | 240.     | 470.          |
| 312.                              | 472.         | 31.      | 86.           | 31.          | 31.      | 91.           | 20.          | 20.      | 55.           | 59.          | 59.      | 163.          | 240.         | 240.     | 710.          |
| 422.                              | 1603.        | 175.     | 261.          | 104.         | 104.     | 195.          | 112.         | 112.     | 167.          | 336.         | 336.     | 499.          | 813.         | 813.     | 1523.         |
| 1074.                             | 3370.        | 364.     | 600.          | 219.         | 219.     | 414.          | 233.         | 233.     | 384.          | 700.         | 700.     | 800.          | 1711.        | 1711.    | 2565.         |
| 1627.                             | 1747.        | 192.     | 600.          | 114.         | 114.     | 528.          | 123.         | 123.     | 384.          | 370.         | 370.     | 800.          | 807.         | 807.     | 2565.         |
| 1721.                             | 668.         | 22.      | 517.          | 43.          | -41.     | 487.          | 32.          | -42.     | 342.          | 95.          | -116.    | 684.          | 339.         | -240.    | 2325.         |
| 1329.                             | 277.         | 7.       | 419.          | 18.          | -66.     | 421.          | 11.          | -63.     | 280.          | 31.          | -179.    | 505.          | 141.         | -437.    | 1888.         |
| 483.                              | 308.         | 9.       | 410.          | 20.          | 6.       | 427.          | 12.          | -0.      | 279.          | 38.          | 3.       | 508.          | 156.         | 60.      | 1948.         |
| 400.                              | 298.         | 21.      | 421.          | 19.          | 11.      | 438.          | 14.          | 7.       | 286.          | 41.          | 21.      | 529.          | 152.         | 96.      | 2044.         |
| 312.                              | 318.         | 22.      | 443.          | 21.          | 21.      | 459.          | 14.          | 14.      | 300.          | 43.          | 43.      | 572.          | 161.         | 161.     | 2205.         |
| 301.                              | 286.         | 22.      | 463.          | 19.          | 18.      | 476.          | 14.          | 13.      | 313.          | 43.          | 40.      | 612.          | 146.         | 138.     | 2343.         |
| MEAN RUNOFF YEAR                  | 27.          | 27.      | 490.          | 29.          | 29.      | 505.          | 17.          | 17.      | 330.          | 50.          | 50.      | 662.          | 230.         | 230.     | 2565.         |
| 301.                              | 452.         | 27.      | 490.          | 29.          | 29.      | 505.          | 17.          | 17.      | 330.          | 50.          | 50.      | 662.          | 230.         | 230.     | 2565.         |
| 306.                              | 472.         | 29.      | 519.          | 31.          | 31.      | 536.          | 18.          | 18.      | 348.          | 54.          | 54.      | 716.          | 240.         | 240.     | 2565.         |
| 312.                              | 472.         | 31.      | 549.          | 31.          | 31.      | 567.          | 20.          | 20.      | 368.          | 59.          | 59.      | 775.          | 240.         | 240.     | 2565.         |
| 422.                              | 1603.        | 175.     | 600.          | 104.         | 104.     | 671.          | 112.         | 112.     | 384.          | 336.         | 336.     | 800.          | 813.         | 813.     | 2565.         |
| 1074.                             | 3370.        | 364.     | 600.          | 219.         | 219.     | 890.          | 233.         | 233.     | 384.          | 700.         | 700.     | 800.          | 1711.        | 1711.    | 2565.         |
| 1627.                             | 1747.        | 192.     | 600.          | 114.         | 114.     | 992.          | 123.         | 123.     | 384.          | 370.         | 370.     | 800.          | 807.         | 807.     | 2565.         |
| 1721.                             | 668.         | 22.      | 517.          | 43.          | -41.     | 951.          | 32.          | -42.     | 342.          | 95.          | -116.    | 684.          | 339.         | -240.    | 2325.         |
| 1329.                             | 277.         | 7.       | 419.          | 18.          | -66.     | 885.          | 11.          | -63.     | 280.          | 31.          | -179.    | 505.          | 141.         | -437.    | 1888.         |
| 483.                              | 308.         | 9.       | 410.          | 20.          | 6.       | 891.          | 12.          | -0.      | 279.          | 38.          | 3.       | 508.          | 156.         | 60.      | 1948.         |
| 400.                              | 298.         | 21.      | 421.          | 19.          | 11.      | 902.          | 14.          | 7.       | 286.          | 41.          | 21.      | 529.          | 152.         | 96.      | 2044.         |
| 312.                              | 318.         | 22.      | 443.          | 21.          | 21.      | 923.          | 14.          | 14.      | 300.          | 43.          | 43.      | 572.          | 161.         | 161.     | 2205.         |
| 301.                              | 286.         | 22.      | 463.          | 19.          | 18.      | 940.          | 14.          | 13.      | 313.          | 43.          | 40.      | 612.          | 146.         | 138.     | 2343.         |

\* IRRIGATION DEMAND = 5527 AC-FT/YEAR  
 FISHERIES DEMAND = 3060 AC-FT/YEAR  
 WASTE = 1100 AC-FT/YEAR

PROPOSED SYSTEM (STORAGE = 10341 AC-FT)

SINGLE 1 IN 125 LOW RUNOFF YEAR

| DEMAND SUB-BASIN                  | DOBBIN-WEST LAMBLY       |                      |                           | JACKPINE PROPOSED        |                      |                           | PAYNTER                  |                      |                           | ISLAHT                   |                      |                           |      |
|-----------------------------------|--------------------------|----------------------|---------------------------|--------------------------|----------------------|---------------------------|--------------------------|----------------------|---------------------------|--------------------------|----------------------|---------------------------|------|
|                                   | RES 1<br>RES 5<br>INFLOW | RES 1<br>RES 5<br>ΔS | RES 1<br>RES 5<br>STORAGE | RES 2<br>RES 6<br>INFLOW | RES 2<br>RES 6<br>ΔS | RES 2<br>RES 6<br>STORAGE | RES 3<br>RES 3<br>INFLOW | RES 3<br>RES 3<br>ΔS | RES 3<br>RES 3<br>STORAGE | RES 4<br>RES 4<br>INFLOW | RES 4<br>RES 4<br>ΔS | RES 4<br>RES 4<br>STORAGE |      |
| MEAN RUNOFF YEAR                  |                          |                      |                           |                          |                      |                           |                          |                      |                           |                          |                      |                           |      |
| 339.                              | 64.                      | 14.                  | -8.                       | 592.                     | 15.                  | -4.                       | 988.                     | 9.                   | -5.                       | 379.                     | 28.                  | -2.                       | 798. |
|                                   |                          | 115.                 | 35.                       | 2565.                    | 163.                 | 53.                       | 5000.                    |                      |                           |                          |                      |                           |      |
| 348.                              | 64.                      | 14.                  | -9.                       | 584.                     | 15.                  | -5.                       | 983.                     | 10.                  | -4.                       | 375.                     | 28.                  | -3.                       | 795. |
|                                   |                          | 115.                 | 33.                       | 2565.                    | 163.                 | 49.                       | 5000.                    |                      |                           |                          |                      |                           |      |
| 357.                              | 83.                      | 18.                  | -4.                       | 580.                     | 19.                  | -0.                       | 983.                     | 11.                  | -3.                       | 372.                     | 33.                  | 3.                        | 797. |
|                                   |                          | 151.                 | 72.                       | 2565.                    | 214.                 | 105.                      | 5000.                    |                      |                           |                          |                      |                           |      |
| 536.                              | 276.                     | 63.                  | 42.                       | 600.                     | 64.                  | 46.                       | 992.                     | 40.                  | 27.                       | 384.                     | 121.                 | 92.                       | 800. |
|                                   |                          | 501.                 | 426.                      | 2565.                    | 710.                 | 606.                      | 5000.                    |                      |                           |                          |                      |                           |      |
| 1557.                             | 1180.                    | 410.                 | 380.                      | 600.                     | 274.                 | 248.                      | 992.                     | 263.                 | 244.                      | 384.                     | 789.                 | 748.                      | 800. |
|                                   |                          | 2139.                | 2030.                     | 2565.                    | 3033.                | 2882.                     | 5000.                    |                      |                           |                          |                      |                           |      |
| 2493.                             | 630.                     | 290.                 | 141.                      | 600.                     | 146.                 | 16.                       | 992.                     | 186.                 | 93.                       | 384.                     | 558.                 | 353.                      | 800. |
|                                   |                          | 1142.                | 602.                      | 2565.                    | 1620.                | 875.                      | 5000.                    |                      |                           |                          |                      |                           |      |
| 2645.                             | 190.                     | 26.                  | -170.                     | 430.                     | 44.                  | -128.                     | 864.                     | 37.                  | -86.                      | 298.                     | 112.                 | -158.                     | 642. |
|                                   |                          | 344.                 | -368.                     | 2197.                    | 488.                 | -494.                     | 4506.                    |                      |                           |                          |                      |                           |      |
| 2008.                             | 95.                      | 12.                  | -141.                     | 288.                     | 22.                  | -112.                     | 752.                     | 17.                  | -79.                      | 220.                     | 52.                  | -158.                     | 483. |
|                                   |                          | 172.                 | -383.                     | 1814.                    | 244.                 | -521.                     | 3984.                    |                      |                           |                          |                      |                           |      |
| 596.                              | 83.                      | 10.                  | -31.                      | 257.                     | 19.                  | -17.                      | 735.                     | 14.                  | -12.                      | 208.                     | 41.                  | -15.                      | 468. |
|                                   |                          | 151.                 | 2.                        | 1816.                    | 214.                 | 9.                        | 3993.                    |                      |                           |                          |                      |                           |      |
| 462.                              | 77.                      | 19.                  | -11.                      | 246.                     | 18.                  | -9.                       | 726.                     | 13.                  | -6.                       | 202.                     | 37.                  | -5.                       | 463. |
|                                   |                          | 141.                 | 30.                       | 1846.                    | 200.                 | 46.                       | 4039.                    |                      |                           |                          |                      |                           |      |
| 357.                              | 72.                      | 18.                  | -5.                       | 241.                     | 17.                  | -3.                       | 723.                     | 11.                  | -3.                       | 198.                     | 33.                  | 2.                        | 464. |
|                                   |                          | 130.                 | 47.                       | 1893.                    | 185.                 | 71.                       | 4110.                    |                      |                           |                          |                      |                           |      |
| 339.                              | 79.                      | 14.                  | -7.                       | 235.                     | 15.                  | -3.                       | 720.                     | 9.                   | -4.                       | 194.                     | 28.                  | -1.                       | 464. |
|                                   |                          | 115.                 | 40.                       | 1933.                    | 163.                 | 59.                       | 4169.                    |                      |                           |                          |                      |                           |      |
| MEAN RUNOFF YEAR                  |                          |                      |                           |                          |                      |                           |                          |                      |                           |                          |                      |                           |      |
| 339.                              | 64.                      | 14.                  | -8.                       | 227.                     | 15.                  | -4.                       | 716.                     | 9.                   | -5.                       | 190.                     | 28.                  | -2.                       | 462. |
|                                   |                          | 115.                 | 35.                       | 1968.                    | 163.                 | 53.                       | 4222.                    |                      |                           |                          |                      |                           |      |
| 348.                              | 64.                      | 14.                  | -9.                       | 218.                     | 15.                  | -5.                       | 711.                     | 10.                  | -4.                       | 185.                     | 28.                  | -3.                       | 458. |
|                                   |                          | 115.                 | 33.                       | 2001.                    | 163.                 | 49.                       | 4272.                    |                      |                           |                          |                      |                           |      |
| 357.                              | 83.                      | 18.                  | -4.                       | 214.                     | 19.                  | -0.                       | 711.                     | 11.                  | -3.                       | 183.                     | 33.                  | 3.                        | 461. |
|                                   |                          | 151.                 | 72.                       | 2072.                    | 214.                 | 105.                      | 4377.                    |                      |                           |                          |                      |                           |      |
| 536.                              | 276.                     | 63.                  | 42.                       | 256.                     | 64.                  | 46.                       | 757.                     | 40.                  | 27.                       | 210.                     | 121.                 | 92.                       | 554. |
|                                   |                          | 501.                 | 426.                      | 2498.                    | 710.                 | 606.                      | 4983.                    |                      |                           |                          |                      |                           |      |
| 1557.                             | 1180.                    | 410.                 | 380.                      | 600.                     | 274.                 | 248.                      | 992.                     | 263.                 | 244.                      | 384.                     | 789.                 | 748.                      | 800. |
|                                   |                          | 2139.                | 2030.                     | 2565.                    | 3033.                | 2882.                     | 5000.                    |                      |                           |                          |                      |                           |      |
| 2493.                             | 630.                     | 290.                 | 141.                      | 600.                     | 146.                 | 16.                       | 992.                     | 186.                 | 93.                       | 384.                     | 558.                 | 353.                      | 800. |
|                                   |                          | 1142.                | 602.                      | 2565.                    | 1620.                | 875.                      | 5000.                    |                      |                           |                          |                      |                           |      |
| 2645.                             | 190.                     | 26.                  | -170.                     | 430.                     | 44.                  | -128.                     | 864.                     | 37.                  | -86.                      | 298.                     | 112.                 | -158.                     | 642. |
|                                   |                          | 344.                 | -368.                     | 2197.                    | 488.                 | -494.                     | 4506.                    |                      |                           |                          |                      |                           |      |
| 2008.                             | 95.                      | 12.                  | -141.                     | 288.                     | 22.                  | -112.                     | 752.                     | 17.                  | -79.                      | 220.                     | 52.                  | -158.                     | 483. |
|                                   |                          | 172.                 | -383.                     | 1814.                    | 244.                 | -521.                     | 3984.                    |                      |                           |                          |                      |                           |      |
| 596.                              | 83.                      | 10.                  | -31.                      | 257.                     | 19.                  | -17.                      | 735.                     | 14.                  | -12.                      | 208.                     | 41.                  | -15.                      | 468. |
|                                   |                          | 151.                 | 2.                        | 1816.                    | 214.                 | 9.                        | 3993.                    |                      |                           |                          |                      |                           |      |
| 462.                              | 77.                      | 19.                  | -11.                      | 246.                     | 18.                  | -9.                       | 726.                     | 13.                  | -6.                       | 202.                     | 37.                  | -5.                       | 463. |
|                                   |                          | 141.                 | 30.                       | 1846.                    | 200.                 | 46.                       | 4039.                    |                      |                           |                          |                      |                           |      |
| 357.                              | 72.                      | 18.                  | -5.                       | 241.                     | 17.                  | -3.                       | 723.                     | 11.                  | -3.                       | 198.                     | 33.                  | 2.                        | 464. |
|                                   |                          | 130.                 | 47.                       | 1893.                    | 185.                 | 71.                       | 4110.                    |                      |                           |                          |                      |                           |      |
| 339.                              | 79.                      | 14.                  | -7.                       | 235.                     | 15.                  | -3.                       | 720.                     | 9.                   | -4.                       | 194.                     | 28.                  | -1.                       | 464. |
|                                   |                          | 115.                 | 40.                       | 1933.                    | 163.                 | 59.                       | 4169.                    |                      |                           |                          |                      |                           |      |
| LOW RUNOFF YEAR ( 25.83% OF MEAN) |                          |                      |                           |                          |                      |                           |                          |                      |                           |                          |                      |                           |      |
| 339.                              | -2.                      | 5.                   | -22.                      | 212.                     | 4.                   | -20.                      | 700.                     | 2.                   | -15.                      | 180.                     | 7.                   | -30.                      | 434. |
|                                   |                          | 30.                  | -69.                      | 1864.                    | 42.                  | -94.                      | 4075.                    |                      |                           |                          |                      |                           |      |
| 348.                              | -2.                      | 5.                   | -23.                      | 190.                     | 4.                   | -21.                      | 680.                     | 3.                   | -15.                      | 165.                     | 7.                   | -31.                      | 402. |
|                                   |                          | 30.                  | -72.                      | 1792.                    | 42.                  | -98.                      | 3978.                    |                      |                           |                          |                      |                           |      |
| 357.                              | -2.                      | 6.                   | -22.                      | 167.                     | 5.                   | -20.                      | 659.                     | 3.                   | -15.                      | 150.                     | 9.                   | -31.                      | 371. |
|                                   |                          | 39.                  | -65.                      | 1727.                    | 55.                  | -88.                      | 3890.                    |                      |                           |                          |                      |                           |      |
| 536.                              | -7.                      | 23.                  | -21.                      | 147.                     | 17.                  | -21.                      | 638.                     | 10.                  | -17.                      | 133.                     | 31.                  | -28.                      | 343. |
|                                   |                          | 129.                 | -29.                      | 1699.                    | 183.                 | -34.                      | 3854.                    |                      |                           |                          |                      |                           |      |
| 1557.                             | -30.                     | 148.                 | 21.                       | 168.                     | 71.                  | -40.                      | 598.                     | 68.                  | -11.                      | 122.                     | 204.                 | 29.                       | 372. |
|                                   |                          | 553.                 | 92.                       | 1791.                    | 783.                 | 149.                      | 4005.                    |                      |                           |                          |                      |                           |      |
| 2493.                             | -16.                     | 105.                 | -96.                      | 72.                      | 38.                  | -138.                     | 460.                     | 48.                  | -77.                      | 44.                      | 144.                 | -132.                     | 240. |
|                                   |                          | 295.                 | -433.                     | 1359.                    | 418.                 | -585.                     | 3420.                    |                      |                           |                          |                      |                           |      |
| 2645.                             | -5.                      | 7.                   | -72.                      | 0.                       | 11.                  | -184.                     | 276.                     | 10.                  | -44.                      | 0.                       | 29.                  | -240.                     | 0.   |
|                                   |                          | 89.                  | -774.                     | 585.                     | 126.                 | -1064.                    | 2354.                    |                      |                           |                          |                      |                           |      |
| 2008.                             | -2.                      | 3.                   | 0.                        | 0.                       | 6.                   | -147.                     | 128.                     | 4.                   | 0.                        | 0.                       | 13.                  | 0.                        | 0.   |
|                                   |                          | 44.                  | -585.                     | 0.                       | 63.                  | -1144.                    | 1211.                    |                      |                           |                          |                      |                           |      |
| 596.                              | -2.                      | 3.                   | 0.                        | 0.                       | 5.                   | -40.                      | 88.                      | 4.                   | 0.                        | 0.                       | 11.                  | 0.                        | 0.   |
|                                   |                          | 39.                  | 0.                        | 0.                       | 55.                  | -442.                     | 769.                     |                      |                           |                          |                      |                           |      |
| 462.                              | -2.                      | 7.                   | 0.                        | 0.                       | 5.                   | -30.                      | 58.                      | 3.                   | 0.                        | 0.                       | 10.                  | 0.                        | 0.   |
|                                   |                          | 36.                  | 0.                        | 0.                       | 52.                  | -321.                     | 448.                     |                      |                           |                          |                      |                           |      |
| 357.                              | -2.                      | 6.                   | 0.                        | 0.                       | 4.                   | -22.                      | 36.                      | 3.                   | 0.                        | 0.                       | 9.                   | 0.                        | 0.   |
|                                   |                          | 34.                  | 0.                        | 0.                       | 48.                  | -232.                     | 214.                     |                      |                           |                          |                      |                           |      |
| 339.                              | -2.                      | 5.                   | 0.                        | 0.                       | 4.                   | -34.                      | 1.                       | 2.                   | 0.                        | 0.                       | 7.                   | 0.                        | 0.   |
|                                   |                          | 30.                  | 0.                        | 0.                       | 42.                  | -218.                     | 0.                       |                      |                           |                          |                      |                           |      |

continued . . .

Proposed system. Single 1 in 125 low runoff year (continued)

| MEAN RUNOFF YEAR |       |       |       |       |       |       |       |      |      |      |      |       |      |
|------------------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|-------|------|
| 339.             | 64.   | 14.   | 0.    | 0.    | 15.   | -1.   | 0.    | 9.   | 0.   | 0.   | 28.  | 0.    | 0.   |
|                  |       | 115.  | 28.   | 28.   | 163.  | 43.   | 43.   |      |      |      |      |       |      |
| 348.             | 64.   | 14.   | 0.    | 0.    | 15.   | 0.    | 0.    | 10.  | 0.   | 0.   | 28.  | 0.    | 0.   |
|                  |       | 115.  | 24.   | 52.   | 163.  | 37.   | 80.   |      |      |      |      |       |      |
| 357.             | 83.   | 18.   | 0.    | 0.    | 19.   | 0.    | 0.    | 11.  | 0.   | 0.   | 33.  | 2.    | 2.   |
|                  |       | 151.  | 69.   | 121.  | 214.  | 101.  | 181.  |      |      |      |      |       |      |
| 536.             | 276.  | 63.   | 42.   | 42.   | 64.   | 46.   | 46.   | 40.  | 27.  | 27.  | 121. | 92.   | 94.  |
|                  |       | 501.  | 426.  | 547.  | 710.  | 606.  | 787.  |      |      |      |      |       |      |
| 1557.            | 1180. | 410.  | 380.  | 422.  | 274.  | 248.  | 293.  | 263. | 244. | 271. | 789. | 748.  | 800. |
|                  |       | 2139. | 2030. | 2565. | 3033. | 2882. | 3670. |      |      |      |      |       |      |
| 2493.            | 630.  | 290.  | 141.  | 563.  | 146.  | 16.   | 309.  | 186. | 93.  | 344. | 558. | 353.  | 800. |
|                  |       | 1142. | 602.  | 2565. | 1620. | 875.  | 4544. |      |      |      |      |       |      |
| 2645.            | 190.  | 26.   | -170. | 393.  | 44.   | -128. | 181.  | 37.  | -86. | 278. | 112. | -158. | 642. |
|                  |       | 344.  | -368. | 2197. | 488.  | -494. | 4050. |      |      |      |      |       |      |
| 2008.            | 95.   | 12.   | -141. | 252.  | 22.   | -112. | 69.   | 17.  | -79. | 200. | 52.  | -158. | 483. |
|                  |       | 172.  | -383. | 1814. | 244.  | -521. | 3529. |      |      |      |      |       |      |
| 596.             | 83.   | 10.   | -31.  | 221.  | 19.   | -17.  | 52.   | 14.  | -12. | 188. | 41.  | -15.  | 468. |
|                  |       | 151.  | 2.    | 1816. | 214.  | 9.    | 3537. |      |      |      |      |       |      |
| 462.             | 77.   | 19.   | -11.  | 209.  | 18.   | -9.   | 43.   | 13.  | -6.  | 182. | 37.  | -5.   | 463. |
|                  |       | 141.  | 30.   | 1846. | 200.  | 46.   | 3594. |      |      |      |      |       |      |
| 357.             | 72.   | 18.   | -5.   | 214.  | 17.   | -3.   | 40.   | 11.  | -3.  | 178. | 33.  | 2.    | 464. |
|                  |       | 130.  | 47.   | 1893. | 185.  | 71.   | 3655. |      |      |      |      |       |      |
| 339.             | 79.   | 14.   | -7.   | 198.  | 15.   | -3.   | 37.   | 9.   | -4.  | 174. | 28.  | -1.   | 464. |
|                  |       | 115.  | 40.   | 1933. | 163.  | 59.   | 3714. |      |      |      |      |       |      |

| MEAN RUNOFF YEAR |       |       |       |       |       |       |       |      |      |      |      |       |      |
|------------------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|-------|------|
| 339.             | 64.   | 14.   | -8.   | 190.  | 15.   | -4.   | 33.   | 9.   | -5.  | 170. | 28.  | -2.   | 462. |
|                  |       | 115.  | 35.   | 1968. | 163.  | 53.   | 3767. |      |      |      |      |       |      |
| 348.             | 64.   | 14.   | -9.   | 181.  | 15.   | -5.   | 28.   | 10.  | -4.  | 166. | 28.  | -3.   | 458. |
|                  |       | 115.  | 33.   | 2001. | 163.  | 49.   | 3816. |      |      |      |      |       |      |
| 357.             | 83.   | 18.   | -4.   | 177.  | 19.   | -0.   | 28.   | 11.  | -3.  | 163. | 33.  | 3.    | 461. |
|                  |       | 151.  | 72.   | 2072. | 214.  | 105.  | 3921. |      |      |      |      |       |      |
| 536.             | 276.  | 63.   | 42.   | 219.  | 64.   | 46.   | 74.   | 40.  | 27.  | 190. | 121. | 92.   | 554. |
|                  |       | 501.  | 426.  | 2498. | 710.  | 606.  | 4527. |      |      |      |      |       |      |
| 1557.            | 1180. | 410.  | 380.  | 599.  | 274.  | 248.  | 321.  | 263. | 244. | 384. | 789. | 748.  | 800. |
|                  |       | 2139. | 2030. | 2565. | 3033. | 2882. | 5000. |      |      |      |      |       |      |
| 2493.            | 630.  | 290.  | 141.  | 600.  | 146.  | 16.   | 317.  | 186. | 93.  | 384. | 558. | 353.  | 800. |
|                  |       | 1142. | 602.  | 2565. | 1620. | 875.  | 5000. |      |      |      |      |       |      |
| 2645.            | 190.  | 26.   | -170. | 430.  | 44.   | -128. | 209.  | 37.  | -86. | 298. | 112. | -158. | 642. |
|                  |       | 344.  | -368. | 2197. | 488.  | -494. | 4506. |      |      |      |      |       |      |
| 2008.            | 95.   | 12.   | -141. | 298.  | 22.   | -112. | 97.   | 17.  | -79. | 220. | 52.  | -158. | 483. |
|                  |       | 172.  | -383. | 1814. | 244.  | -521. | 3984. |      |      |      |      |       |      |
| 596.             | 83.   | 10.   | -31.  | 257.  | 19.   | -17.  | 80.   | 14.  | -12. | 208. | 41.  | -15.  | 468. |
|                  |       | 151.  | 2.    | 1816. | 214.  | 9.    | 3993. |      |      |      |      |       |      |
| 462.             | 77.   | 19.   | -11.  | 246.  | 18.   | -9.   | 71.   | 13.  | -6.  | 202. | 37.  | -5.   | 463. |
|                  |       | 141.  | 30.   | 1846. | 200.  | 46.   | 4039. |      |      |      |      |       |      |
| 357.             | 72.   | 18.   | -5.   | 241.  | 17.   | -3.   | 68.   | 11.  | -3.  | 198. | 33.  | 2.    | 464. |
|                  |       | 130.  | 47.   | 1893. | 185.  | 71.   | 4110. |      |      |      |      |       |      |
| 339.             | 79.   | 14.   | -7.   | 235.  | 15.   | -3.   | 63.   | 9.   | -4.  | 194. | 28.  | -1.   | 464. |
|                  |       | 115.  | 40.   | 1933. | 163.  | 59.   | 4169. |      |      |      |      |       |      |

IRRIGATION DEMAND = 8976 AC-FI/YEAR  
 FISHERIES DEMAND = 3060 AC-FI/YEAR  
 WASTE = 1100 AC-FI/YEAR

PROPOSED SYSTEM (STORAGE = 10341 AC-FT)

TWO 1 IN 20 LOW RUNOFF YEARS

| DEMAND SUB-BASIN                  | MEAN RUNOFF YEAR | DOBRIN-WEST LAHBLY |                      |                           | JACKPINE PROPOSED        |                      |                           | PAYNTER         |             |                  | ISLAHT          |             |                  |
|-----------------------------------|------------------|--------------------|----------------------|---------------------------|--------------------------|----------------------|---------------------------|-----------------|-------------|------------------|-----------------|-------------|------------------|
|                                   |                  | RES 1<br>INFLOW    | RES 5<br>RES 5<br>ΔS | RES 1<br>RES 5<br>STORAGE | RES 2<br>RES 6<br>INFLOW | RES 2<br>RES 6<br>ΔS | RES 2<br>RES 6<br>STORAGE | RES 3<br>INFLOW | RES 3<br>ΔS | RES 3<br>STORAGE | RES 4<br>INFLOW | RES 4<br>ΔS | RES 4<br>STORAGE |
| 339.                              | 64.              | 14.                | -8.                  | 592.                      | 15.                      | -4.                  | 988.                      | 9.              | -5.         | 379.             | 28.             | -2.         | 798.             |
|                                   |                  | 115.               | 35.                  | 2565.                     | 163.                     | 53.                  | 5000.                     |                 |             |                  |                 |             |                  |
| 348.                              | 64.              | 14.                | -9.                  | 584.                      | 15.                      | -5.                  | 983.                      | 10.             | -4.         | 375.             | 28.             | -3.         | 795.             |
|                                   |                  | 115.               | 33.                  | 2565.                     | 163.                     | 49.                  | 5000.                     |                 |             |                  |                 |             |                  |
| 357.                              | 83.              | 18.                | -4.                  | 580.                      | 19.                      | -0.                  | 983.                      | 11.             | -3.         | 372.             | 33.             | 3.          | 797.             |
|                                   |                  | 151.               | 72.                  | 2565.                     | 214.                     | 105.                 | 5000.                     |                 |             |                  |                 |             |                  |
| 536.                              | 276.             | 63.                | 42.                  | 600.                      | 64.                      | 46.                  | 992.                      | 40.             | 27.         | 384.             | 121.            | 92.         | 800.             |
|                                   |                  | 501.               | 426.                 | 2565.                     | 710.                     | 606.                 | 5000.                     |                 |             |                  |                 |             |                  |
| 1557.                             | 1180.            | 410.               | 380.                 | 600.                      | 274.                     | 248.                 | 992.                      | 263.            | 244.        | 384.             | 789.            | 748.        | 800.             |
|                                   |                  | 2139.              | 2030.                | 2565.                     | 3033.                    | 2882.                | 5000.                     |                 |             |                  |                 |             |                  |
| 2493.                             | 630.             | 290.               | 141.                 | 600.                      | 146.                     | 15.                  | 992.                      | 186.            | 93.         | 384.             | 558.            | 353.        | 800.             |
|                                   |                  | 1142.              | 602.                 | 2565.                     | 1620.                    | 875.                 | 5000.                     |                 |             |                  |                 |             |                  |
| 2645.                             | 190.             | 26.                | -170.                | 430.                      | 44.                      | -128.                | 864.                      | 37.             | -86.        | 298.             | 112.            | -158.       | 642.             |
|                                   |                  | 344.               | -368.                | 2197.                     | 498.                     | -494.                | 4506.                     |                 |             |                  |                 |             |                  |
| 2008.                             | 95.              | 12.                | -141.                | 288.                      | 22.                      | -112.                | 752.                      | 17.             | -79.        | 220.             | 52.             | -158.       | 483.             |
|                                   |                  | 172.               | -383.                | 1814.                     | 244.                     | -521.                | 3984.                     |                 |             |                  |                 |             |                  |
| 596.                              | 83.              | 10.                | -31.                 | 257.                      | 19.                      | -17.                 | 735.                      | 14.             | -12.        | 208.             | 41.             | -15.        | 468.             |
|                                   |                  | 151.               | 2.                   | 1816.                     | 214.                     | 9.                   | 3993.                     |                 |             |                  |                 |             |                  |
| 462.                              | 77.              | 19.                | -11.                 | 246.                      | 18.                      | -9.                  | 726.                      | 13.             | -6.         | 202.             | 37.             | -5.         | 463.             |
|                                   |                  | 141.               | 30.                  | 1846.                     | 200.                     | 46.                  | 4039.                     |                 |             |                  |                 |             |                  |
| 357.                              | 72.              | 18.                | -5.                  | 241.                      | 17.                      | -3.                  | 723.                      | 11.             | -3.         | 198.             | 33.             | 2.          | 464.             |
|                                   |                  | 130.               | 47.                  | 1893.                     | 185.                     | 71.                  | 4110.                     |                 |             |                  |                 |             |                  |
| 339.                              | 79.              | 14.                | -7.                  | 235.                      | 15.                      | -3.                  | 720.                      | 9.              | -4.         | 194.             | 28.             | -1.         | 464.             |
|                                   |                  | 115.               | 40.                  | 1933.                     | 163.                     | 59.                  | 4169.                     |                 |             |                  |                 |             |                  |
| MEAN RUNOFF YEAR                  |                  |                    |                      |                           |                          |                      |                           |                 |             |                  |                 |             |                  |
| 339.                              | 64.              | 14.                | -8.                  | 227.                      | 15.                      | -4.                  | 716.                      | 9.              | -5.         | 190.             | 28.             | -2.         | 462.             |
|                                   |                  | 115.               | 35.                  | 1969.                     | 163.                     | 53.                  | 4222.                     |                 |             |                  |                 |             |                  |
| 348.                              | 64.              | 14.                | -9.                  | 218.                      | 15.                      | -5.                  | 711.                      | 10.             | -4.         | 185.             | 28.             | -3.         | 458.             |
|                                   |                  | 115.               | 33.                  | 2001.                     | 163.                     | 49.                  | 4272.                     |                 |             |                  |                 |             |                  |
| 357.                              | 83.              | 18.                | -4.                  | 214.                      | 19.                      | -0.                  | 711.                      | 11.             | -3.         | 183.             | 33.             | 3.          | 461.             |
|                                   |                  | 151.               | 72.                  | 2072.                     | 214.                     | 105.                 | 4377.                     |                 |             |                  |                 |             |                  |
| 536.                              | 276.             | 63.                | 42.                  | 256.                      | 64.                      | 46.                  | 737.                      | 40.             | 27.         | 210.             | 121.            | 92.         | 554.             |
|                                   |                  | 501.               | 426.                 | 2493.                     | 710.                     | 606.                 | 4983.                     |                 |             |                  |                 |             |                  |
| 1557.                             | 1180.            | 410.               | 380.                 | 600.                      | 274.                     | 248.                 | 992.                      | 263.            | 244.        | 384.             | 789.            | 748.        | 800.             |
|                                   |                  | 2139.              | 2030.                | 2565.                     | 3033.                    | 2882.                | 5000.                     |                 |             |                  |                 |             |                  |
| 2493.                             | 630.             | 290.               | 141.                 | 600.                      | 146.                     | 18.                  | 992.                      | 186.            | 93.         | 384.             | 558.            | 353.        | 800.             |
|                                   |                  | 1142.              | 602.                 | 2565.                     | 1620.                    | 875.                 | 5000.                     |                 |             |                  |                 |             |                  |
| 2645.                             | 190.             | 26.                | -170.                | 430.                      | 44.                      | -128.                | 864.                      | 37.             | -86.        | 298.             | 112.            | -158.       | 642.             |
|                                   |                  | 344.               | -368.                | 2197.                     | 498.                     | -494.                | 4506.                     |                 |             |                  |                 |             |                  |
| 2008.                             | 95.              | 12.                | -141.                | 283.                      | 22.                      | -112.                | 752.                      | 17.             | -79.        | 220.             | 52.             | -158.       | 483.             |
|                                   |                  | 172.               | -383.                | 1814.                     | 244.                     | -521.                | 3984.                     |                 |             |                  |                 |             |                  |
| 596.                              | 83.              | 10.                | -31.                 | 257.                      | 19.                      | -17.                 | 735.                      | 14.             | -12.        | 208.             | 41.             | -15.        | 468.             |
|                                   |                  | 151.               | 2.                   | 1816.                     | 214.                     | 9.                   | 3993.                     |                 |             |                  |                 |             |                  |
| 462.                              | 77.              | 19.                | -11.                 | 246.                      | 18.                      | -9.                  | 726.                      | 13.             | -6.         | 202.             | 37.             | -5.         | 463.             |
|                                   |                  | 141.               | 30.                  | 1846.                     | 200.                     | 46.                  | 4039.                     |                 |             |                  |                 |             |                  |
| 357.                              | 72.              | 18.                | -5.                  | 241.                      | 17.                      | -3.                  | 723.                      | 11.             | -3.         | 198.             | 33.             | 2.          | 464.             |
|                                   |                  | 130.               | 47.                  | 1893.                     | 185.                     | 71.                  | 4110.                     |                 |             |                  |                 |             |                  |
| 339.                              | 79.              | 14.                | -7.                  | 235.                      | 15.                      | -3.                  | 720.                      | 9.              | -4.         | 194.             | 28.             | -1.         | 461.             |
|                                   |                  | 115.               | 40.                  | 1933.                     | 163.                     | 59.                  | 4169.                     |                 |             |                  |                 |             |                  |
| LOW RUNOFF YEAR ( 44.20% OF MEAN) |                  |                    |                      |                           |                          |                      |                           |                 |             |                  |                 |             |                  |
| 339.                              | 15.              | 9.                 | -17.                 | 217.                      | 7.                       | -16.                 | 704.                      | 4.              | -12.        | 182.             | 12.             | -23.        | 440.             |
|                                   |                  | 51.                | -43.                 | 1890.                     | 72.                      | -59.                 | 4112.                     |                 |             |                  |                 |             |                  |
| 348.                              | 15.              | 9.                 | -18.                 | 200.                      | 7.                       | -17.                 | 687.                      | 4.              | -12.        | 170.             | 12.             | -24.        | 416.             |
|                                   |                  | 51.                | -46.                 | 1844.                     | 72.                      | -61.                 | 4051.                     |                 |             |                  |                 |             |                  |
| 357.                              | 19.              | 11.                | -16.                 | 184.                      | 8.                       | -15.                 | 672.                      | 5.              | -12.        | 158.             | 15.             | -23.        | 394.             |
|                                   |                  | 67.                | -31.                 | 1813.                     | 95.                      | -40.                 | 4010.                     |                 |             |                  |                 |             |                  |
| 536.                              | 63.              | 39.                | 1.                   | 185.                      | 28.                      | -5.                  | 667.                      | 19.             | -6.         | 152.             | 53.             | 1.          | 395.             |
|                                   |                  | 221.               | 84.                  | 1897.                     | 314.                     | 125.                 | 4135.                     |                 |             |                  |                 |             |                  |
| 1557.                             | 270.             | 254.               | 151.                 | 335.                      | 121.                     | 31.                  | 698.                      | 116.            | 52.         | 204.             | 349.            | 207.        | 602.             |
|                                   |                  | 945.               | 572.                 | 2469.                     | 1341.                    | 876.                 | 4961.                     |                 |             |                  |                 |             |                  |
| 2493.                             | 144.             | 179.               | -8.                  | 327.                      | 45.                      | -100.                | 599.                      | 82.             | -35.        | 169.             | 247.            | -12.        | 591.             |
|                                   |                  | 505.               | -176.                | 2293.                     | 716.                     | -223.                | 4737.                     |                 |             |                  |                 |             |                  |
| 2645.                             | 13.              | 11.                | -197.                | 130.                      | 19.                      | -143.                | 434.                      | 16.             | -114.       | 55.              | 50.             | -237.       | 354.             |
|                                   |                  | 152.               | -603.                | 1690.                     | 216.                     | -825.                | 3912.                     |                 |             |                  |                 |             |                  |
| 2008.                             | 22.              | 5.                 | -130.                | 0.                        | 10.                      | -131.                | 305.                      | 8.              | -55.        | 0.               | 23.             | -204.       | 150.             |
|                                   |                  | 76.                | -521.                | 1169.                     | 108.                     | -716.                | 3194.                     |                 |             |                  |                 |             |                  |
| 596.                              | 19.              | 4.                 | 0.                   | 0.                        | 8.                       | -35.                 | 270.                      | 6.              | 0.          | 0.               | 18.             | -54.        | 96.              |
|                                   |                  | 67.                | -123.                | 1046.                     | 95.                      | -167.                | 3029.                     |                 |             |                  |                 |             |                  |
| 462.                              | 18.              | 12.                | 0.                   | 0.                        | 8.                       | -25.                 | 245.                      | 6.              | 0.          | 0.               | 16.             | -30.        | 59.              |
|                                   |                  | 62.                | -60.                 | 966.                      | 88.                      | -108.                | 2921.                     |                 |             |                  |                 |             |                  |
| 357.                              | 14.              | 11.                | 0.                   | 0.                        | 8.                       | -18.                 | 227.                      | 5.              | 0.          | 0.               | 15.             | -27.        | 32.              |
|                                   |                  | 57.                | -51.                 | 915.                      | 82.                      | -68.                 | 2853.                     |                 |             |                  |                 |             |                  |
| 339.                              | 15.              | 9.                 | 0.                   | 0.                        | 7.                       | -17.                 | 210.                      | 4.              | 0.          | 0.               | 12.             | -27.        | 5.               |
|                                   |                  | 51.                | -53.                 | 861.                      | 72.                      | -72.                 | 2781.                     |                 |             |                  |                 |             |                  |

continued . . .

Proposed system. Two in 20 low runoff years (continued)

| LOW RUNOFF YEAR ( 44.20% OF MEAN) |      |      |       |       |       |        |       |      |      |     |      |       |      |
|-----------------------------------|------|------|-------|-------|-------|--------|-------|------|------|-----|------|-------|------|
| 339.                              | 15.  | 9.   | 0.    | 0.    | 7.    | -17.   | 192.  | 4.   | 0.   | 0.  | 12.  | -5.   | 0.   |
|                                   |      | 51.  | -63.  | 799.  | 72.   | -84.   | 2697. |      |      |     | 12.  | 0.    | 0.   |
| 348.                              | 15.  | 9.   | 0.    | 0.    | 7.    | -18.   | 174.  | 4.   | 0.   | 0.  | 12.  | 0.    | 0.   |
|                                   |      | 51.  | -68.  | 731.  | 72.   | -92.   | 2605. |      |      |     | 15.  | 0.    | 0.   |
| 357.                              | 19.  | 11.  | 0.    | 0.    | 8.    | -14.   | 158.  | 5.   | 0.   | 0.  | 15.  | 0.    | 0.   |
|                                   |      | 67.  | -52.  | 679.  | 95.   | -69.   | 2534. |      |      |     | 53.  | 1.    | 1.   |
| 536.                              | 63.  | 39.  | 1.    | 1.    | 28.   | -5.    | 153.  | 18.  | 0.   | 0.  | 53.  | 1.    | 1.   |
|                                   |      | 221. | 82.   | 761.  | 314.  | 122.   | 2658. |      |      |     | 349. | 207.  | 208. |
| 1557.                             | 270. | 254. | 151.  | 152.  | 121.  | 31.    | 184.  | 116. | 52.  | 52. | 349. | 207.  | 208. |
|                                   |      | 945. | 572.  | 1333. | 1341. | 824.   | 3483. |      |      |     | 247. | -12.  | 196. |
| 2493.                             | 144. | 179. | -8.   | 143.  | 65.   | -100.  | 84.   | 82.  | -35. | 17. | 247. | -12.  | 196. |
|                                   |      | 505. | -172. | 1137. | 716.  | -223.  | 3240. |      |      |     | 50.  | -196. | 0.   |
| 2645.                             | 43.  | 11.  | -143. | 0.    | 19.   | -84.   | 0.    | 16.  | -17. | 0.  | 50.  | -196. | 0.   |
|                                   |      | 152. | -716. | 441.  | 216.  | -981.  | 2279. |      |      |     | 23.  | 0.    | 0.   |
| 2008.                             | 22.  | 5.   | 0.    | 0.    | 10.   | 0.     | 0.    | 8.   | 0.   | 0.  | 23.  | 0.    | 0.   |
|                                   |      | 76.  | -441. | 0.    | 108.  | -1314. | 962.  |      |      |     | 18.  | 0.    | 0.   |
| 596.                              | 19.  | 4.   | 0.    | 0.    | 8.    | 0.     | 0.    | 6.   | 0.   | 0.  | 18.  | 0.    | 0.   |
|                                   |      | 67.  | 0.    | 0.    | 95.   | -379.  | 583.  |      |      |     | 16.  | 0.    | 0.   |
| 462.                              | 18.  | 12.  | 0.    | 0.    | 8.    | 0.     | 0.    | 6.   | 0.   | 0.  | 16.  | 0.    | 0.   |
|                                   |      | 62.  | 0.    | 0.    | 88.   | -251.  | 332.  |      |      |     | 15.  | 0.    | 0.   |
| 357.                              | 16.  | 11.  | 0.    | 0.    | 8.    | 0.     | 0.    | 5.   | 0.   | 0.  | 15.  | 0.    | 0.   |
|                                   |      | 57.  | 0.    | 0.    | 82.   | -163.  | 169.  |      |      |     | 12.  | 0.    | 0.   |
| 339.                              | 15.  | 9.   | 0.    | 0.    | 7.    | 0.     | 0.    | 4.   | 0.   | 0.  | 12.  | 0.    | 0.   |
|                                   |      | 51.  | 0.    | 0.    | 72.   | -169.  | -0.   |      |      |     |      |       |      |

| MEAN RUNOFF YEAR |       |       |       |       |       |       |       |      |      |      |      |       |      |
|------------------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|-------|------|
| 339.             | 64.   | 14.   | 0.    | 0.    | 15.   | 0.    | 0.    | 9.   | 0.   | 0.   | 28.  | 0.    | 0.   |
|                  |       | 115.  | 27.   | 27.   | 163.  | 42.   | 42.   |      |      |      | 28.  | 0.    | 0.   |
| 348.             | 64.   | 14.   | 0.    | 0.    | 15.   | 0.    | 0.    | 10.  | 0.   | 0.   | 28.  | 0.    | 0.   |
|                  |       | 115.  | 24.   | 51.   | 163.  | 37.   | 79.   |      |      |      | 33.  | 2.    | 2.   |
| 357.             | 83.   | 18.   | 0.    | 0.    | 19.   | 0.    | 0.    | 11.  | 0.   | 0.   | 33.  | 2.    | 2.   |
|                  |       | 151.  | 69.   | 120.  | 214.  | 101.  | 180.  |      |      |      | 121. | 92.   | 94.  |
| 536.             | 276.  | 63.   | 42.   | 42.   | 64.   | 44.   | 46.   | 40.  | 27.  | 27.  | 121. | 92.   | 94.  |
|                  |       | 501.  | 426.  | 546.  | 710.  | 606.  | 786.  |      |      |      | 789. | 748.  | 800. |
| 1557.            | 1180. | 410.  | 380.  | 422.  | 274.  | 248.  | 293.  | 263. | 244. | 271. | 789. | 748.  | 800. |
|                  |       | 2139. | 2030. | 2565. | 3033. | 2882. | 3669. |      |      |      | 558. | 353.  | 800. |
| 2493.            | 630.  | 290.  | 141.  | 563.  | 146.  | 16.   | 309.  | 186. | 93.  | 364. | 558. | 353.  | 800. |
|                  |       | 1142. | 602.  | 2565. | 1620. | 875.  | 4543. |      |      |      | 112. | -158. | 642. |
| 2645.            | 190.  | 26.   | -170. | 393.  | 44.   | -128. | 181.  | 37.  | -86. | 278. | 112. | -158. | 642. |
|                  |       | 344.  | -368. | 2197. | 488.  | -494. | 4049. |      |      |      | 52.  | -158. | 483. |
| 2008.            | 95.   | 12.   | -141. | 252.  | 22.   | -112. | 69.   | 17.  | -79. | 200. | 52.  | -158. | 483. |
|                  |       | 172.  | -383. | 1814. | 244.  | -521. | 3528. |      |      |      | 41.  | -15.  | 468. |
| 596.             | 83.   | 10.   | -31.  | 221.  | 19.   | -17.  | 52.   | 14.  | -12. | 188. | 41.  | -15.  | 468. |
|                  |       | 151.  | 2.    | 1816. | 214.  | 9.    | 3536. |      |      |      | 37.  | -5.   | 463. |
| 462.             | 77.   | 19.   | -11.  | 209.  | 18.   | -9.   | 43.   | 13.  | -6.  | 182. | 37.  | -5.   | 463. |
|                  |       | 141.  | 30.   | 1846. | 200.  | 46.   | 3583. |      |      |      | 33.  | 2.    | 464. |
| 357.             | 72.   | 18.   | -5.   | 204.  | 17.   | -3.   | 40.   | 11.  | -3.  | 178. | 33.  | 2.    | 464. |
|                  |       | 130.  | 47.   | 1893. | 185.  | 71.   | 3654. |      |      |      | 28.  | -1.   | 464. |
| 339.             | 79.   | 14.   | -7.   | 198.  | 15.   | -3.   | 37.   | 9.   | -4.  | 174. | 28.  | -1.   | 464. |
|                  |       | 115.  | 40.   | 1933. | 163.  | 59.   | 3713. |      |      |      |      |       |      |

| MEAN RUNOFF YEAR |       |       |       |       |       |       |       |      |      |      |      |       |      |
|------------------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|-------|------|
| 339.             | 64.   | 14.   | -8.   | 190.  | 15.   | -4.   | 33.   | 9.   | -5.  | 170. | 28.  | -2.   | 462. |
|                  |       | 115.  | 35.   | 1968. | 163.  | 53.   | 3766. |      |      |      | 28.  | -3.   | 458. |
| 348.             | 64.   | 14.   | -9.   | 181.  | 15.   | -5.   | 29.   | 10.  | -4.  | 166. | 28.  | -3.   | 458. |
|                  |       | 115.  | 33.   | 2001. | 163.  | 49.   | 3815. |      |      |      | 33.  | 3.    | 461. |
| 357.             | 83.   | 18.   | -4.   | 177.  | 19.   | -0.   | 28.   | 11.  | -3.  | 163. | 33.  | 3.    | 461. |
|                  |       | 151.  | 72.   | 2072. | 214.  | 105.  | 3920. |      |      |      | 121. | 92.   | 554. |
| 536.             | 276.  | 63.   | 42.   | 219.  | 64.   | 46.   | 74.   | 40.  | 27.  | 190. | 121. | 92.   | 554. |
|                  |       | 501.  | 426.  | 2498. | 710.  | 606.  | 4526. |      |      |      | 789. | 748.  | 800. |
| 1557.            | 1180. | 410.  | 380.  | 592.  | 274.  | 243.  | 321.  | 263. | 244. | 384. | 789. | 748.  | 800. |
|                  |       | 2139. | 2030. | 2565. | 3033. | 2882. | 5000. |      |      |      | 558. | 353.  | 800. |
| 2493.            | 630.  | 290.  | 141.  | 600.  | 146.  | 16.   | 337.  | 186. | 93.  | 384. | 558. | 353.  | 800. |
|                  |       | 1142. | 602.  | 2565. | 1620. | 875.  | 5000. |      |      |      | 112. | -158. | 642. |
| 2645.            | 190.  | 26.   | -170. | 430.  | 44.   | -128. | 209.  | 37.  | -86. | 298. | 112. | -158. | 642. |
|                  |       | 344.  | -368. | 2197. | 488.  | -494. | 4506. |      |      |      | 52.  | -158. | 483. |
| 2008.            | 95.   | 12.   | -141. | 288.  | 22.   | -112. | 97.   | 17.  | -79. | 220. | 52.  | -158. | 483. |
|                  |       | 172.  | -383. | 1814. | 244.  | -521. | 3984. |      |      |      | 41.  | -15.  | 468. |
| 596.             | 83.   | 10.   | -31.  | 257.  | 19.   | -17.  | 80.   | 14.  | -12. | 208. | 41.  | -15.  | 468. |
|                  |       | 151.  | 2.    | 1816. | 214.  | 9.    | 3993. |      |      |      | 37.  | -5.   | 463. |
| 462.             | 77.   | 19.   | -11.  | 246.  | 18.   | -9.   | 71.   | 13.  | -6.  | 202. | 37.  | -5.   | 463. |
|                  |       | 141.  | 30.   | 1846. | 200.  | 46.   | 4039. |      |      |      | 33.  | 2.    | 464. |
| 357.             | 72.   | 18.   | -5.   | 241.  | 17.   | -3.   | 68.   | 11.  | -3.  | 198. | 33.  | 2.    | 464. |
|                  |       | 130.  | 47.   | 1893. | 185.  | 71.   | 4110. |      |      |      | 28.  | -1.   | 464. |
| 339.             | 79.   | 14.   | -7.   | 235.  | 15.   | -3.   | 45.   | 9.   | -4.  | 194. | 28.  | -1.   | 464. |
|                  |       | 115.  | 40.   | 1933. | 163.  | 59.   | 4169. |      |      |      |      |       |      |

\* IRRIGATION DEMAND = 3976 AC-FI/YEAR  
 FISHERIES DEMAND = 3060 AC-FI/YEAR  
 WASTE = 1100 AC-FI/YEAR

## Appendix C

### Estimating Drought Risk

## APPENDIX C

### Estimating Drought Risk

The risk of at least one (i.e., one or more) occurrence of a single year drought of less than or equal to a certain probability in a given period of years can be computed by the following equation:

$$R = 1 - (1 - p)^r$$

where R = risk  
p = probability of drought  
r = number of years

Mathematically, this is equivalent to the sum of the risk of one occurrence of the specified drought in "r" years, plus the risk of two occurrences in "r" years, and so on up to and including the risk of "r" occurrences in "r" years. The total risk is comprised mostly of the first several terms, as long as the drought is fairly extreme.

For a single year drought, one occurrence takes one year; there are "r" possible "locations" for it to happen in a period of "r" years, and a maximum number of occurrences of "r" times in "r" years. For a multi-year drought of "t" years duration, there are  $r - t + 1$  "locations" where it can happen in "r" years, and a maximum number of occurrences of  $r/t$  times in "r" years. For example, for a 2-year drought in 30 years there are 29 possible locations for one occurrence, but a maximum of 15 occurrences. Because of this, the equation given above is not a strictly correct method of computing the risk of occurrence of multi-year droughts. However, for multi-year droughts with small probabilities or large return periods relative to the period of years in question, a modified form can provide a usable approximation. The following equation can be used to estimate risk when the first several terms are the biggest part of the total,

or when the first term is the largest term. This happens when  $1/p$  is suitably greater than  $r-t$ .

$$R = 1 - (1 - p)^{r - t + 1}$$

This equation was used to compute an estimate of the risk for the Powers Creek system for a period of 30 years. These are shown in Table A.1. Table A.1 also shows an estimate of the total risk to the system associated with a given yield. The total risk is the sum of the risks of at least one occurrence of droughts of all durations, and is approximated by summing the risk of 1, 2, and 3 year droughts. It can be seen from the table that the risk of the single year droughts dominates the total risk, and that the risk of the three year droughts is small compared to the total. The total risk is increased somewhat to account for the risks of droughts with greater than three years duration.

Note that the risks of two and three year droughts are a greater proportion of the total for the proposed system than for the existing system. This is generally the case when system storage is increased. The fact that the risk of the single year drought dominates the total risk reduces the significance of any error introduced by the use of the modified equation for estimating the risk of multi-year droughts. If the two or three year drought had a greater probability of occurrence than the single year drought, the approximation may not be as good.

TABLE C.1.

Powers Creek Risk  
(drought probabilities from Figure 3)

1. Existing System

## (a) Yield 5,920 acre-feet/year (irrigation-domestic)

|             |               |                              |
|-------------|---------------|------------------------------|
| Single year | $p = .01$     | $R = 1 - (1-p)^{30} = .2602$ |
| Two year    | $p = .0015$   | $R = 1 - (1-p)^{29} = .0426$ |
| Three year  | $p = .000182$ | $R = 1 - (1-p)^{28} = .0049$ |

.3077<sup>+</sup> say .32

## (b) Yield 5,700 acre-feet/year (irrigation-domestic)

|             |              |                              |
|-------------|--------------|------------------------------|
| Single year | $p = .008$   | $R = 1 - (1-p)^{30} = .2140$ |
| Two year    | $p = .0012$  | $R = 1 - (1-p)^{29} = .0342$ |
| Three year  | $p = .00013$ | $R = 1 - (1-p)^{28} = .0036$ |

.2518<sup>+</sup> say .27

2. Proposed System

## (a) Yield 9,230 acre-feet/year (irrigation-domestic)

|             |             |                              |
|-------------|-------------|------------------------------|
| Single year | $p = .01$   | $R = 1 - (1-p)^{30} = .2602$ |
| Two year    | $p = .0032$ | $R = 1 - (1-p)^{29} = .0700$ |
| Three year  | $p = .0078$ | $R = 1 - (1-p)^{28} = .0216$ |

.3518<sup>+</sup> say .37

## (b) Yield 8,976 acre-feet/year (irrigation-domestic)

|             |             |                              |
|-------------|-------------|------------------------------|
| Single year | $p = .008$  | $R = 1 - (1-p)^{30} = .2140$ |
| Two year    | $p = .0025$ | $R = 1 - (1-p)^{29} = .0700$ |
| Three year  | $p = .0006$ | $R = 1 - (1-p)^{28} = .0167$ |

.3007<sup>+</sup> say .32