

Exhibit 6

Procedure for Consumptive Use Accounting

**Exhibit A: Procedures for Calculating
Consumptive Use of Irrigation
Water Above Guernsey Reservoir,
Wyoming (with example
consumptive use calculations)**

**Exhibit B: Procedures to Evaluate Consumptive
Use Calculations Above Guernsey
Reservoir, Wyoming**

Procedure for Consumptive Use Accounting

A. Introduction and Purpose

The purpose of this procedure is to specify the data collection, accounting, reporting processes and methodologies necessary to implement the limitations on the consumptive use of irrigation water from the intentional irrigation of lands in the Wyoming portion of the North Platte River drainage located upstream of Guernsey Reservoir.

B. Definitions

1. **Area of Administration** – This procedure applies to irrigation water rights that divert from the North Platte River upstream of Guernsey Reservoir and other surface water sources that are tributary to the North Platte River upstream of Guernsey Reservoir, exclusive of the Kendrick Project. These procedures also apply to irrigation water rights that withdraw groundwater in this area, as defined below.
2. **Irrigated Lands** – Lands that are intentionally irrigated by the efforts of man using a ditch delivery system or a pump from a surface water, hydrologically connected groundwater or reservoir source.

3. Hydrologically connected groundwater well –
A well that is so located and constructed that if water were intentionally withdrawn by the well continuously for 40 years, the cumulative stream depletion would be greater than or equal to 28% of the total groundwater withdrawn by that well.

C. Administration

1. Consumptive Use Limitations

- a. The consumptive use limitations were established by determining the amount of applied irrigation water consumed by the crops on irrigated lands. The limitations set forth in this procedure are established for two distinct portions of the area of administration: First, the area upstream of Pathfinder Dam and second, the area upstream of Guernsey Reservoir and downstream of Pathfinder Dam, exclusive of the irrigated lands within the Kendrick Project.

These limitations are:

For the area upstream of Pathfinder Dam in Wyoming:

1,280,000 acre-feet for a period of ten consecutive years.

For the area between Guernsey Reservoir and Pathfinder Dam:

890,000 acre-feet for a period of ten consecutive years.

- b. These limitations are the maximum amounts of water consumed in any period of ten consecutive years under pre-2000 historical conditions and are intended to capture the pre-2000 irrigation practices, including the crops, number of irrigated acres, irrigation management and irrigation facilities, over a baseline climate period of 1952 to 1999, inclusive. The methods and data used for these determinations are attached to this procedure as Exhibit A.

2. Compliance Monitoring

The above limitation shall be enforced on the basis of ten consecutive years. Compliance with these limitations shall be determined by averaging the annual amounts of consumptive use of irrigation water calculated pursuant to Exhibit A for the current year and the preceding nine years, plus the annual amount of water consumed in each of the same ten years under a water right transferred from irrigation use to another use as described below.

3. Future Data Collection, Analyses and Administration

Beginning one year after court approval of the

Final Settlement Stipulation, the NPDC shall cooperatively develop, fund and implement a data collection, analyses and methodology review program as outlined and presented in Exhibit B to investigate potential new methodologies to calculate the consumptive use of irrigation water.

For the area below Pathfinder Dam, irrigated acreage is assessed under the Exhibit A method based on annual NASS surveys. After court approval of the Final Settlement Stipulation, actual inventories of irrigated acreage will be conducted for this area by Wyoming pursuant to Exhibit 4 to the North Platte Decree Committee Charter. The relationship between the Wyoming inventory acreage and the NASS survey information will be investigated with the goal of converting all acreage accounting to the Wyoming inventories. The NPDC will adjust the consumptive use limitations for the area below Pathfinder Dam accordingly, but such adjustments will not reflect post-2000 acreage or technological changes.

In an attempt to more accurately calculate the actual consumptive use, after five years of data collection and analyses pursuant to Exhibit B and during periodic reviews every five years thereafter, the NPDC will develop and adopt a method to calculate the consumptive use of irrigation water.

If at any time the NPDC determines that a new methodology will provide a more reliable

measure of consumptive use and either a credible relationship can be established between the new methodology and the methodology in Exhibit A or the new methodology can be applied to historical data to provide a more accurate and reliable measure of the historical consumptive use from 1952 through 1999, inclusive, the NPDC will adopt the new methodology and will revise the ten consecutive year consumptive use limitations contained in subsection C.1.a. to reflect the new methodology as adopted. Such revisions to the limitations will not reflect post-2000 acreage or technological changes. Thereafter, the adopted methodology will be used by Wyoming to assess compliance with the revised ten consecutive year consumptive use limitations. The adopted methodology will be implemented within the following calendar year, unless the NPDC determines this schedule is not appropriate. The data collection procedures described in Exhibit B will be revised to reflect the adopted changes to Exhibit A as deemed appropriate by the NPDC.

4. Irrigated Lands and Transfers
 - a. The irrigated lands located within the area of administration for which the consumptive use of irrigation water will be computed and included in the consumptive use calculations and limitations, shall include the following:
 1. Lands intentionally irrigated in whole

or in part by direct flow surface water diversions from the North Platte River and its tributaries.

2. Lands intentionally irrigated from hydrologically connected ground water wells that are not otherwise irrigated by direct flow surface water diversions or reservoir water.
3. Lands intentionally irrigated solely from reservoir water that are not otherwise irrigated by direct flow surface water diversions or hydrologically connected ground water wells.

b. The consumptive use calculations and limitations shall include the amount of transferred consumptive use, based on the record of such changes of use of agricultural water rights from irrigation to another beneficial use before the State Board of Control pursuant to Wyoming law. This includes transfers (changes of use) that have occurred within the area of administration since October 8, 1945. The actual amount of the transferred consumptive use water used each year under the new use will be included under the ten consecutive year consumptive use limitation. Future transfers will be accounted in the same manner for the purpose of assessing compliance.

D. Implementation Schedule, Funding and Reporting

1. Implementation Schedule

Wyoming will implement the consumptive use of irrigation water limitations in the first full year after court approval of the Final Settlement Stipulation with the understanding that acres irrigated by hydrologically connected groundwater wells will be treated as described in Exhibit A. Wyoming will be responsible for the collection of the information necessary to comply with the ten consecutive year limitations on consumptive use of irrigation water computations as described in the methodology in Exhibit A.

2. Funding

The Wyoming, Nebraska and the Bureau representatives to the NPDC will use their best efforts to secure appropriations to fund the future data collection and consumptive use analyses program described in Exhibit B within one year of court approval of the Final Settlement Stipulation. If a new methodology for determination of Wyoming's compliance is adopted by the NPDC, Wyoming will be responsible for the collection of the information necessary to comply with the new ten consecutive year limitations on the consumptive use of irrigation water under the new methodology.

3. Reporting

Wyoming will complete the consumptive use calculations including the consumptive use amounts used by an irrigation water right transferred to another use, and provide a report to the NPDC by March 1st of the year following the irrigation season. This date may be modified by the NPDC. This report will include all input data and calculations used to calculate the consumptive use of irrigation water as described in the methodology in Exhibit A and a tabulation of the transferred consumptive use, including the ten consecutive year limitations. All field and other data or information will be maintained by the Wyoming State Engineer and be available upon reasonable notice for inspection by the NPDC or any representative to the NPDC.

EXHIBIT A - PROCEDURES FOR CALCULATING CONSUMPTIVE USE OF IRRIGATION WATER ABOVE GUERNSEY RESERVOIR, WYOMING

This exhibit presents the method used to calculate the consumptive use of irrigation water in the North Platte River basin between the Wyoming:Colorado state line and Guernsey Reservoir over the historical period 1952-1999 and to be used for the calculation of the consumptive use of irrigation water for five years of data collection pursuant to Exhibit B. Basically, the method consists of compilation of meteorological data from established weather stations, calculation of monthly grass reference evapotranspiration (ET_o), multiplication of monthly ET_o by mean monthly crop coefficients (K_{c_o}) developed to represent the various crops and water-supply conditions in the study area to obtain maximum annual crop evapotranspiration ($ET_{c(max)}$), an annual yield-based adjustment of $ET_{c(max)}$ to reflect annual variations in growing conditions, and subtraction of effective precipitation to obtain the annual unit consumptive use of irrigation water (CU_w) for each crop. These unit CU_w values (acre-ft per acre) are multiplied by the acreage in each crop in each of five climatically-similar sub-areas and the results are summed to obtain the total CU_w in each of two areas: the North Platte River basin in Wyoming above Pathfinder Dam and the North Platte River basin between Pathfinder Dam and Guernsey Reservoir.

I. Reference Evapotranspiration (ET_o)

A. Climate Data

Daily maximum and minimum temperature and total precipitation data are obtained from the following weather stations and monthly averages are computed.

Encampment/Riverside	(Encampment)
Saratoga	(Saratoga 1 SSE)
Medicine Bow	
Muddy Gap	
Casper	(Casper WSO AP)
Glenrock	(Glenrock 5 ESE)
Douglas	(Douglas 1 SE)

Climatic data from the Casper, Glenrock, and Douglas stations are averaged and calculation of CU_w proceeds based on this composite, Pathfinder-Guernsey station data set.

For several of these sites, the physical location at which climate data have been collected has moved over the years. Historical calculations have been made without regard for these shifts, treating all Encampment data, for example, as coming from the same place. For periods in which there has been more than one weather station to choose from at a site (e.g. Douglas), the station most likely to be representative of agricultural conditions has been chosen. This procedure will be continued in the future. Table 1 presents the monthly data that were used to calculate historical CU_w values. These data were acquired from the High Plains Regional Climate Center via internet connection. The Climate Center employs rigorous procedures for estimating missing values and publishes fully-populated climate data summaries. Rather than developing specific protocols for filling in missing data points for this exhibit, the work of the Climate Center has been adopted. This procedure will be continued in the future. The station identifiers for the most recent climate stations used are included with the above list. (A fee subscription is currently required for access to High Plains Regional Climate Center data for Wyoming.)

B. Hargreaves Equation

The Hargreaves equation used for this method is:

$$\lambda ET_o = 0.0023 R_A TD^{0.5} (T + 17.8)$$

where λET_o is estimated reference evapotranspiration (ET) in the same energy units as R_A ; R_A is extraterrestrial solar radiation, calculated in $\text{MJ m}^{-2} \text{d}^{-1}$; T is mean air temperature in $^{\circ}\text{C}$; and TD is the difference between daily maximum and minimum air temperatures in $^{\circ}\text{C}$. The ET_o in $\text{MJ m}^{-2} \text{d}^{-1}$ is divided by the latent heat of vaporization, λ , in MJ kg^{-1} (varies slightly with temperature) to give ET_o in mm d^{-1} .

For application of this method in Wyoming, the Hargreaves equation was calibrated against the Penman-Monteith equation for grass reference ET using long-term mean climate data from Scottsbluff, Nebraska. This calibration is represented by a series of monthly factors. The Hargreaves equation results are multiplied by these monthly factors to calculate the ET_o values upon which subsequent ET and CU_w calculations are based.

The constants, unit conversions, and calibration factors are combined into the Hargreaves equation to provide monthly calculation of ET_o in inches of water:

$$ET_o = 0.0023 R_A TD^{0.5} (T + 17.8)(\text{calib.factor})$$

where R_A is expressed in units of inches equivalent evaporation depth per month. The following table provides the Hargreaves equation calibration factors used and the R_A

values for each weather station (radiation varies slightly with latitude) for calculation of monthly ET_0 in inches.

	Apr	May	Jun	Jul	Aug	Sept	Oct
calibration factor	1.060	0.958	0.964	0.935	0.937	0.967	1.055
R_A (in/mo)							
Encampment	16.26	19.44	19.96	20.15	18.04	14.29	
Saratoga	16.27	19.46	20.00	20.19	18.06	14.30	
Medicine Bow	16.26	19.45	19.99	20.18	18.05	14.29	
Muddy Gap	16.28	19.46	20.00	20.20	18.09	14.32	
Casper- Glenrock- Douglas	16.11	19.42	20.03	20.20	17.98	14.08	10.69

In the future, calculations of ET_0 will be made in this same manner, based on annually updated input climate data.

II. Grass-Reference Crop Coefficients (K_{co}) and Maximum Crop Evapotranspiration ($ET_{c(max)}$)

The following mean crop coefficients have been established for use in this method:

Crop	Apr	May	June	July	Aug	Sept	Oct
A. Alfalfa (one cutting, continued irrigation for pasture after cutting) above Pathfinder	0.330	0.509	1.144	0.820	0.771	0.771	--
B. Alfalfa (one cutting, no irrigation after cutting) above Pathfinder	0.330	0.509	1.144	0.808	precip	precip	--

C. Alfalfa (two cuttings, continued irrigation after 2 nd cutting for pasture) below Pathfinder	0.701	1.029	0.889	1.049	0.558	0.501	0.280
D. Alfalfa (two cuttings, no irrigation after 2 nd cutting) below Pathfinder	0.701	1.029	0.889	1.049	0.431	precip	precip
E. Grass hay (one cutting, continued irrigation after cutting for pasture) above Pathfinder	0.383	0.577	1.028	0.862	0.777	0.777	--
F. Grass hay (one cutting, no irrigation after cutting) above Pathfinder	0.383	0.577	1.028	0.660	precip	precip	--
G. Grass hay (one cutting, continued irrigation after cutting for pasture) below Pathfinder	0.500	0.702	1.043	1.093	0.685	0.742	0.488
H. Grass hay (one cutting, no irrigation after cutting) below Pathfinder	0.500	0.702	1.043	1.093	precip	precip	precip
I. Irrigated Pasture not harvested; above Pathfinder	0.383	0.536	0.745	0.707	0.777	0.777	--
J. Irrigated pasture not harvested (limited water supply) above Pathfinder	0.383	0.536	0.745	0.707	precip	precip	--
K. Irrigated pasture not harvested; below Pathfinder	0.300	0.461	0.731	0.772	0.772	0.772	0.486
L. Irrigated pasture not harvested (limited water supply) below Pathfinder	0.300	0.461	0.731	0.772	precip	precip	precip
M. Corn	0.250	0.397	1.152	1.253	1.009	0.417	0.250
N. Dry beans	0.250	0.250	0.887	1.183	0.577	0.250	0.250
O. Small grains	0.467	0.977	1.193	0.893	0.339	0.250	0.250

Monthly values of $ET_{c(max)}$ are calculated as:

$$ET_{c(max)} = ET_o * K_{co(mo)}$$

and the monthly results are summed to annual values.

$ET_{c(max)}$ values are calculated for each crop for each weather

station. (The Casper, Glenrock, and Douglas stations are combined to represent growing conditions in the Pathfinder to Guernsey reach of the North Platte River.)

Estimates of monthly $ET_{c(max)}$ for the months prior to planting of annual crops (e.g. April and May for beans) and after harvest use a K_{co} of 0.25 (see Table 2).

III. Yield-based ET adjustment (ET_i)

Crop yield data reported by the National Agricultural Statistics Service (NASS) are used as described below to calculate an adjustment of $ET_{c(max)}$ to account for water use at less than the rates reflected in the K_{co} values of Table 2. The yield adjustment is based on the concept of an envelope@ [sic] yield that approximates the yield that would be achieved under a fully-watered condition. To the extent the actual yield is less than this envelope level, a correspondingly lower ET is calculated. The resulting, yield-adjusted ET, is abbreviated as $ET_{c(i)}$, meaning the actual crop evapotranspiration in the specific year (i).

NASS county yield data are used to adjust $ET_{c(max)}$ to ET_i (for use in the subsequent calculations of CU_w) as follows:

<u>Calculation Sub-Area</u>	<u>NASS Yield Data</u>
Encampment	Carbon County
Saratoga	Carbon County
Medicine Bow	Carbon County
Sweetwater	Carbon County
Pathfinder - Guernsey	acreage-weighted average of Natrona and Converse Counties

The acreage-weighted yields for Pathfinder - Guernsey are calculated based on the individual, NASS-reported crop acreages in each county.

The ET adjustment is made as follows:

$$\frac{Y_i}{Y_{env(i)}} = (1 - ky) + ky \frac{ET_{c(i)}}{ET_{c(max)}}$$

isolating $ET_{c(i)}$:

$$ET_{c(i)} = \left[\frac{1}{ky} \frac{Y_i}{Y_{env(i)}} + 1 - \frac{1}{ky} \right] ET_{c(max)}$$

where Y_i = the average county yield in year “i”; $Y_{env(i)}$ = the envelope yield for year “i”; $ET_{c(max)}$ = the estimated maximum crop ET; and ky = the crop response function for each respective crop. The ky values used are: alfalfa and other hay, 1.05; corn, 1.25; and beans and small grains, 1.15.

The envelop yields for the historical analysis were calculated by fitting a polynomial equation to three of the highest annual county yield values per decade. The resulting curve of Y_{env} for each crop was then used to determine the individual $Y_{env(i)}$ values for individual year’s calculations. Table 3 presents the crop yield data compiled from the NASS, including the $Y_{env(i)}$ values used for each year for calculation of historical CU_w .

The polynomial curve approach used for analysis of the historical period successfully describes yield changes during the period of time when all crop yields were increasing. For

many of the crops grown in the area above Guernsey Reservoir, however, the maximum yields have been leveling off in recent years. Therefore, future values of $Y_{env(i)}$ will be based on linear regression through the top three reported yields in each of the two decades immediately preceding the year of calculation. For example, the $Y_{env(i)}$ value for 2005 above Pathfinder for alfalfa hay will be determined by calculating a linear regression through the three highest alfalfa yields reported from 1986-1995 and the three highest alfalfa yields reported from 1996-2005. Based on the assumption that $Y_{env(i)}$ values are quite unlikely to decline over time, if the regression analysis produces a value lower than that used for the previous year, the previous year's value will be used instead. (For example, the 1999 $Y_{env(i)}$ from Table 3 will be used until it is exceeded by the regression-based value.)

IV. Effective Precipitation

Effective precipitation for all crops from October 1 of the previous year above Pathfinder and from November 1 of the previous year below Pathfinder through March 30 of the current year is calculated as 0.50 x total measured precipitation up to a maximum of three inches.

Effective precipitation for forage crops from April 1 through September 30 of each year above Pathfinder and April 1 through October 31 of each year below Pathfinder is calculated as 0.95 x total measured April - September or April - October precipitation.

Table 1 includes summation of the 50% and 90% of the total measured precipitation for these growing and non-growing seasons of each water year.

For the non-forage crops, effective precipitation during the growing season months is calculated for each month using the method developed by the SCS-USDA as presented in ASCE Manual 70, Eq. 5.5¹:

$$R_e = f(D) [1.25 R_t^{0.824} - 2.93] [10^{0.000955 ET_i}]$$

where R_e is effective rainfall in mm; R_t = total measured rainfall in mm, ET_i is the monthly, actual crop ET calculated as above (in mm), and $f(D)$ is a factor to adjust for varying depletion depths. For application here, a depletion depth of 75 mm is assumed and $f(D)$ is a constant 1.00.

The annual effective precipitation is subtracted from the annual ET_i to obtain the actual crop consumptive use of irrigation water (CU_w) for the year. Thus, the CU_w values calculated for all the crop types listed in Table 2 reflect an adjustment for annual yields.

V. Crop Proportions

All irrigated acreage within each CU_w calculation subarea is assumed to have the same crop proportions as the county assigned to that subarea (as above). Crop acreages for each county are obtained from the NASS for harvested crops. The additional irrigated acreage that is not harvested is obtained from the U.S. Census of Agriculture conducted every 5 years. The irrigated-not-harvested acreage is assumed to be a constant percent of the NASS total irrigated acreage over the five year period, i.e., the Census acreage is used in the year of the Census and the ratio of Census acreage for

¹ *Evapotranspiration and Irrigation Water Requirements*. Am. Soc. Civ. Engr. Manuals and Reports on Engineering Practice No. 70, p. 67.

irrigated-not-harvested to the NASS total irrigated-harvested acreage is used to project an irrigated-not-harvested acreage for each following year until replaced by the subsequent Census. The county individual crop acreages so compiled are divided by the total county irrigated acreage to obtain the annual crop proportions.

The Carbon County crop proportions are applied to the entire above-Pathfinder reach, under the assumption that the portion of this reach in Fremont County is more reflective of Carbon County conditions than of the main irrigated area in the lower elevation part of Fremont County.

The crop proportions for the Pathfinder to Guernsey reach are calculated as the acreage-weighted average of the crops reported for Natrona and Converse Counties. These proportions are also applied to the small portions of this reach that are in Platte and Albany Counties.

Table 4 presents the crop acreages compiled from the NASS and Census of Agriculture as well as the crop proportions calculated from those acreages. "Other hay" and "grass hay" are used synonymously in this exhibit; this crop is irrigated and harvested and reported in the annual NASS reports. "Irrigated Pasture" is not reported by the NASS because it is not a harvested crop. However, it is reported (variously as "pastureland and other land", "used only for pasture", and "other cropland irrigated") as a component of total irrigated land by the Census of Agriculture, which is published approximately every 5 years. To fill in the intervening years, the percentage of irrigated pasture in the Census year is calculated and applied to the annual NASS total acreage. In 1978, for example, the irrigated pasture acreage was 40.2% of the total irrigated acreage in Carbon County. Thus, the irrigated pasture for 1979 through 1981 was calculated as "x", such that

$$x / (x + \text{total NASS acreage}) = 0.402$$

isolating the variable:

$$\text{pasture acreage} = (\text{total NASS acreage} * 0.402) / (1 - 0.402)$$

The next Census of Agriculture was for 1982, so the percentage was changed in that year. Future calculations will continue this same process. The most recent Census of Agriculture is for 1997, in which the total irrigated pasture is listed as “pastureland and other land” under the “Irrigated land” category.

Crop acreage that is accounted by neither the annual NASS surveys or as irrigated pasture by the Census of Agriculture, if any, is assumed to be quite small and is ignored by this procedure. Although there are sometimes discrepancies (generally small) between the NASS total for irrigated, harvested land and the Census of Agriculture listing for “harvested cropland”, the NASS data are used in the methodology of this exhibit.

According to NASS personnel, they continue to review and, potentially, revise their estimates of crop acreage for several years after its initial publication. For calculation of historical CU_w , the most recent NASS data have been used. If, in the future, revisions of previously-published NASS data have an impact on compliance assessment, the NPDC will have to determine an appropriate protocol for the use of revised NASS data.

VI. Irrigated Acreage

A. Above Pathfinder

1. Irrigated Acreage

For this reach, irrigated acreage data are compiled from the annual reports of the Wyoming State Engineer's Office (WSEO). Only the actually-irrigated acreage values are used for these calculations. Consumption of irrigation water under the "Ringsby" transfer and the consumptive use associated with transfers of use from agricultural to other uses is excluded from the irrigated acreage calculations, but is added to the total consumptive use for the above- and below-Pathfinder areas. (See discussion below.)

For the historical period in which the WSEO reporting did not include an acreage breakdown between the Sweetwater, Medicine Bow and North Platte River ("above Sinclair") drainages, the average proportions of acreage among these three areas is applied to the earlier, basin-wide total reported acreage values.

Over the historical period, the WSEO reports do not include groundwater-irrigated acreage (except where such acreage also received a surface water supply) nor, at least in recent years, do they include reservoir-supplied acreage. For purposes of calculating the historical CU_w , acreage is added to the historical WSEO reports in the following quantities:

Reservoir-supplied acreage: reported values for 1989-1999; 1,224 acres (the average of the reported values) for every year from 1952 to 1988.

The reported values for reservoir supplied acreage are:

1989	77
1990	63
1991	253
1992	397
1993	587
1994	495
1995	1378
1996	2771
1997	2573
1998	1860
<u>1999</u>	<u>3005</u>
average	1224

Hydrologically-connected groundwater-irrigated acreage of 2,000 is assumed for 1999². The distribution of this acreage over the 1952-1999 historical calculation period is the same as the temporal distribution of original-supply groundwater permits. (For example, if 65% of the 1999 total original-supply groundwater permits above Pathfinder were in place in 1962, 1962 is assigned 65% of the 2,000 acres.)

Both the reservoir-supply and hydrologically-connected groundwater acreage are distributed among the four CU_w calculation sub-areas in the same proportions as the WSEO-reported direct-flow surface-water irrigated acres in these sub-areas.

For future calculations of CU_w , the annual WSEO accounting of irrigated acreage will include both reservoir-supplied and hydrologically-connected groundwater acreage

²This value was negotiated by Wyoming, US, and Nebraska.

and no additional acreage increments will be added to reflect these types of use.

Division of the WSEO-reported acreage between the CU_w calculation sub-areas is made as follows:

- Encampment - 50% of the reported value for “above Sinclair”³
- Saratoga - 50% of the reported value for “above Sinclair”
- Medicine Bow - as reported
- Sweetwater - as reported

2. Application of unit CU_w values

The basic crop distribution within each of these acreage totals is apportioned as described above. A more detailed, water-supply-condition crop distribution is provided as follows.

All acreage irrigated under reservoir supply and all acreage irrigated by groundwater is assumed to have a normal water supply and calculations of CU_w are made using the normal-water supply unit CU_w values, i.e. for crops A, E, and I as listed on Table 2. Depending upon the yield-based adjustments applied to $ET_{c(max)}$ values, these “normal irrigation” CU_w values may or may not represent a full irrigation water supply.

³The 50% approximation is based on review of the 1997 WSEO acreage accounting. That accounting found 53.7% of the total “above Sinclair” acreage to be located on the 7.5-minute topographic quadrangles south of 41° 22.5' latitude. The 50:50 approximation is to be held constant until adjusted by decision of the NPDC.

For the remaining irrigated acreage:

1. "alfalfa" acreage is split 50:50 between unit CU_w values for crops A and B.
2. other hay acreage is split 50:50 between unit CU_w values for crops E and F, as above.
3. non-harvested pasture is split 50:50 between unit CU_w values for crops I and J.
4. small grains, corn, and potatoes use unit CU_w values for crop E (grass hay) because the small acreage of these crops in this reach do not justify independent calculation. If the acreage in these crops changes significantly in the future, the NPDC will establish appropriate K_{co} values and discrete CU_w calculations will be made as for the other crops.

Groundwater irrigation is approximated by consideration of groundwater permits. Compilation of groundwater permit information from the files of the WSEO for the North Platte River basin above Pathfinder Dam shows that as of 1999 there were:

398 acres of adjudicated original supply
496 acres of adjudicated additional supply
6,652 acres of unadjudicated original supply
8,182 acres of unadjudicated additional supply

In the absence of detailed data on the actual irrigated acreage under these permits, this method assumes that 100% of the adjudicated acreage is active and that 50% of the unadjudicated acreage is active. Thus, the method estimates there are currently 8,311 acres receiving the water-supply benefits of groundwater irrigation. For the historical analysis, this acreage is assumed to be distributed over the

1952-1999 period in correspondence with the dates on which these permits were issued. For future calculations, the same permit-based analysis will determine the acreage assigned to groundwater CU_w status, with the permit acreage totals listed above used as a 1999 baseline. (For example, if the 2005 groundwater irrigation permit listing shows 498 acres of adjudicated original supply, the total acreage receiving the water-supply benefits of groundwater irrigation will be increased to 8,411 acres.)

B. Below- Pathfinder

1. Mainstem Acreage

For the area between Pathfinder Dam and Guernsey Reservoir, irrigated acreage data are compiled from the annual reports of the WSEO.

2. Tributary Acreage

Irrigated acreage is calculated based on annual NASS surveys for Natrona, Converse, and Platte Counties, with an additional increment from the U.S. Census of Agriculture to account for irrigated acreage that is not harvested. Because the Census of Agriculture only provides an acreage value every 5 years, the most recent percentage is used for each year until the next update is published. (See discussion above, p. [217].)

These county-wide totals are assigned to the tributary portion of the Pathfinder to Guernsey reach of the North Platte in proportion to the surface water rights, e.g. if in a given year the WSEO surface water right permit files show 75% of all the surface water rights in Converse County are on North Platte River tributaries above Guernsey, 75% of the total county irrigated acreage is assigned to the tributaries. Table

5 presents the water-rights based proportions used for the historical period. Future calculations of CU_w will be based on the same procedures applied to an annually updated listing of surface water rights from the WSEO. (It is understood that this method tacitly assumes that all groundwater irrigation, which is included in the NASS and Census of Agriculture totals, has the same geographic distribution as the surface water rights and that actual surface irrigation has the same geographic distribution as the associated water rights.)

As a 1995 baseline for future application of this method, the total permit acreage values listed in Table 6 are adopted.

Table 6 - 1995 Surface Water Irrigation Water Right Permit Total Acreage			
	county total permit acreage	tributary permit acreage	%
Natrona	57,957	30,476	52.6
Converse	83,859	64,077	76.4
Platte	132,101	14,162	10.7
Albany	213,064	776	0.36

To these totals, any post-1995 permit acreage will be added for re-calculation of the proportions of the county irrigated acreage attributed to the tributary area. For example, if a permit is issued in 2003 for 5,000 acres of irrigation on a North Platte tributary in Converse County, the proportion of tributary acreage for Converse County will increase to 77.7% ($=69077/88859$).

3. Other Acreage

Use of WSEO-reported acreage for the mainstem and NASS-based acreage for the tributaries has been found to overlook approximately 3788 acres⁴. Although it is difficult to define the exact location and nature of this “missing” acreage, it is conceptualized as groundwater irrigation along the mainstem. In the absence of information on the temporal distribution of this acreage, but in recognition of the minimal groundwater irrigation in the early 1950's, this quantity is assumed to have grown linearly from 0 in 1952 to 3,788 in 1996 and to remain constant (3,788 acres) into the future. Thus, to the acreage calculated under 1. and 2. above, will be added 3,788 acres until such time as this factor is changed by decision of the NPDC.

⁴In 1996, an inventory of irrigated lands between Pathfinder and Guernsey was completed for the State of Wyoming by States West Water Resources Corp. That inventory found 16,441 acres irrigated along the mainstem. The 1993-1996 average acreage identified by the Wyoming State Engineer's Office as being irrigated by diversions from the mainstem was 12,653 acres. The difference – 3,788 acres – is assumed to reflect acreage along the mainstem that is not irrigated by mainstem diversions (e.g. groundwater irrigation). Because the method of this exhibit assesses tributary acreage based on the distribution of water rights and mainstem acreage based on the Wyoming State Engineer reports, a 3,788-acre discontinuity is assumed to result and is accommodated by addition of that acreage to the Pathfinder to Guernsey total.

4. Application of unit CU_w values

All crops irrigated from the mainstem or groundwater are assigned the normal irrigation supply unit CU_w values (crops C, G, K, M, N, O on Table 2), with “beets” and “potatoes” assigned the average CU_w calculated for crops M, N, and O (the other non-forage crops). The latter assignment is made because the small acreage of these crops in this reach do not justify independent calculation. If the acreage in these crops changes significantly in the future, the NPDC will establish appropriate K_{co} values and discrete CU_w calculations will be made as for the other crops.

Mainstem acreage is that reported by the WSEO. Groundwater irrigation is derived by consideration of groundwater permits. Compilation of groundwater permit information from the files of the WSEO for the North Platte River basin between Pathfinder Dam and Guernsey Reservoir shows that as of 1999 there were:

- 2586 acres of adjudicated original supply
- 3667 acres of adjudicated additional supply
- 5805 acres of unadjudicated original supply
- 9073 acres of unadjudicated additional supply

In the absence of detailed data on the actual irrigated acreage under these permits, this method assumes that 100% of the adjudicated acreage is active and that 50% of the unadjudicated acreage is active. Thus, the method estimates there are currently 13,692 acres receiving the water-supply benefits of groundwater irrigation. For the historical analysis, this acreage is assumed to be distributed over the 1952-1999 period in correspondence with the dates on which these permits were issued. For future calculations, the same permit-based analysis will determine the acreage assigned to

groundwater CU_w status, with the above permit numbers used as a 1999 baseline.

The remaining acreage (solely surface-water irrigated acreage on the tributaries) uses the limited water supply unit CU_w values for forage crops and the same non-forage unit CU_w values as above, i.e., crops D, H, L, M, N, and O from Table 2.

VII. Calculation of Total Consumptive Use

Calculation of total CU_w is accomplished by multiplication of each acreage type as defined above, by the corresponding unit CU_w values. Table 5 presents the final acreage values used for CU_w calculation. Processing of these acreage totals by the crop distributions (Table 4) and water-supply assumptions discussed above produces the total CU_w values for each sub-area.

To these totals are added the consumptive use associated with water right “transfers”.

The “Ringsby transfer” equivalent acreage is assigned a consumptive use of 1.42 acre-ft/acre. This is the consumption rate used by the WSEO to calculate the equivalent acreage in the first place, so the method simply returns to the original, measured volume of exported water. For the 1970 - 1984 period in which the Ringsby transfer was not reported, the average of the 1985-1996 reported values is used. In the future, consumptive use associated with the Ringsby transfer will be accounted based on the annual Wyoming State Engineer’s Office accounting.

For calculation of the historical baseline, the consumptive use under water rights transferred from agricultural production has been compiled from the Wyoming Board of

Control documents permitting those transfers. Table 7 presents those data.

Table 7 - Historical Consumptive Use under Transfer Rights		
Transfer	Starting Year	Annual CU (acre-ft)
ABOVE PATHFINDER		
White/Rock River	1953	43.39
Geneva Steel/Sweetwater	1958	2,800
Storer/NPR	1966	86.47
Storer/NPR	1966	7.58
WLX/Pierce Reservoir	1983	76.9
Saratoga/NPR	1984	30.83
Casper/Rock Creek	1986	13.78
Dumalo/Bridger Creek	1987	9.0
TOTAL		3,067.95
BELOW PATHFINDER		
Pacific Power/Keck	1956	819.18
Pacific Power/Lockett	1961	2,308.87
Pacific Power/various	1972	2,785.2

Douglas/NPR	1978	263.52
Casper/Elkhorn Creek	1985	182.04
Mills/Cannon	1989	137.5
Mills/Cannon	1990	56.05
Pacific Power/Cannon	1992	3,037.
TOTAL		9,589.36

For the calculation of historical consumptive use, the transfer totals listed above are added to the calculated CU_w for each year beginning with the year in which the transfer began.

Future WSEO accounting procedures will include an explicit increment for the consumptive use associated with transfers from agricultural use, which will be added to the CU_w value calculated for irrigated acres.

Total CU_w is aggregated into two reaches: A) above Pathfinder; and B) below Pathfinder, for reporting to the NPDC. Table 8 presents the annual consumptive use of irrigation water (CU_w) and the additional consumptive use associated with water right transfers for the two overall reporting areas divided by Pathfinder Dam. Ten-year running averages are provided for the historical period, rounded to the nearest 1,000 acre-ft.

Table 1 - Climate Data for CUw Calculation

SARATOGA													
Minimum Air Temperature, F													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	8.0	14.8	14.8	26.1	35.5	38.7	47.4	46.6	37.0	29.7	15.0	13.8	27.3
1952	9.7	9.7	13.1	27.6	35.5	43.7	46.4	45.5	37.0	26.3	9.1	11.1	26.2
1953	20.4	12.7	22.6	22.9	30.4	38.8	43.8	46.6	36.1	27.4	23.1	8.7	27.8
1954	14.7	18.7	14.6	27.1	34.4	41.5	51.4	45.4	40.0	27.1	19.0	8.5	28.5
1955	7.8	8.2	13.3	24.3	34.2	41.0	43.8	50.2	37.4	27.5	15.4	16.4	26.6
1956	14.2	2.0	14.8	25.5	37.2	43.6	45.4	43.7	35.7	25.5	12.0	9.3	25.7
1957	2.6	19.2	18.6	24.5	34.9	41.2	49.0	48.8	35.6	29.4	14.9	13.4	27.7
1958	6.5	19.0	12.5	23.9	37.7	42.4	45.4	49.3	39.3	26.9	19.5	19.4	28.4
1959	12.1	14.1	19.0	27.1	35.3	46.5	48.0	47.5	38.5	29.0	17.3	12.1	28.9
1960	11.3	7.4	19.7	25.6	35.4	43.4	49.2	45.7	41.2	30.0	19.0	11.2	28.3
1961	7.2	16.6	19.5	24.2	37.0	45.5	49.3	49.2	36.3	28.4	16.1	11.7	28.4
1962	-0.2	16.0	14.5	29.6	37.7	44.1	47.3	43.5	36.7	29.4	22.7	12.1	27.8
1963	3.4	18.4	17.6	27.2	36.8	44.7	50.1	50.4	42.7	33.2	21.6	13.3	30.0
1964	4.9	5.1	10.8	26.9	35.5	42.3	50.9	45.6	35.6	26.6	20.4	13.8	26.5
1965	17.0	12.9	9.0	29.9	35.5	43.0	50.1	45.1	34.8	29.9	26.5	13.3	28.9
1966	11.4	7.1	18.3	21.2	32.0	41.3	49.5	43.9	39.1	26.0	21.7	11.3	26.9
1967	14.8	13.2	22.7	27.3	33.5	40.7	46.7	43.5	38.5	31.1	19.8	8.2	28.3
1968	15.6	16.8	20.5	21.4	31.4	41.8	48.0	44.9	34.5	29.8	16.3	9.4	27.5
1969	16.4	13.3	9.8	29.9	37.0	39.6	47.6	47.9	40.6	24.5	18.4	9.3	27.9
1970	12.4	16.1	16.6	23.7	35.4	42.2	48.7	48.1	35.3	23.6	23.8	11.9	28.2
1971	19.3	12.8	18.8	26.2	33.7	42.8	47.0	47.0	35.2	26.8	18.7	10.6	28.2
1972	12.2	16.3	24.1	28.0	34.3	46.6	47.1	45.9	39.1	32.1	17.0	8.3	29.3
1973	5.0	5.1	16.1	23.6	33.4	42.9	48.5	48.6	37.9	30.4	20.7	14.2	27.2
1974	8.8	11.2	25.1	27.7	34.7	43.9	50.2	41.8	33.0	30.9	21.0	6.7	27.9
1975	12.1	11.5	20.1	23.2	33.3	40.0	50.7	44.1	33.9	28.0	17.0	13.5	27.3
1976	9.6	15.9	17.0	28.1	35.4	42.2	52.0	46.1	38.6	25.3	14.6	10.0	27.9
1977	9.5	12.7	15.9	29.9	34.5	45.7	49.9	47.1	38.0	28.5	18.4	18.6	29.1
1978	12.6	14.3	25.6	30.0	36.1	44.8	49.7	44.8	38.2	28.1	19.4	5.3	29.1
1979	-3.1	16.8	24.0	28.7	35.0	42.9	49.7	48.1	39.1	30.7	12.1	15.8	28.3
1980	10.3	16.3	19.2	27.1	36.7	43.5	51.3	49.0	40.0	27.4	19.6	21.4	30.2
1981	12.8	15.2	22.5	32.0	36.9	46.2	50.5	47.5	43.2	30.8	22.6	18.3	31.5
1982	9.8	11.4	21.4	23.1	34.8	40.5	48.8	51.7	40.8	27.5	14.6	12.1	28.0
1983	14.6	16.4	22.0	22.6	31.8	43.1	51.3	51.6	39.9	30.7	18.5	5.5	29.0
1984	4.1	7.8	18.3	22.3	36.3	42.5	50.6	50.3	38.7	25.6	20.3	12.3	27.4
1985	2.9	6.9	18.7	27.6	34.8	42.9	51.3	45.3	36.4	28.0	19.2	8.5	26.9
1986	15.3	19.0	25.2	28.8	32.9	47.0	48.8	47.5	39.4	28.6	21.5	10.7	30.4
1987	8.7	16.3	17.1	28.8	39.8	43.3	50.1	46.0	37.1	29.3	18.2	10.8	28.8
1988	6.5	12.5	17.5	29.1	37.1	50.3	51.2	47.1	38.1	33.2	22.7	9.3	29.6
1989	12.7	3.8	24.2	30.6	35.6	43.3	51.1	47.9	38.7	29.1	22.2	9.6	29.1
1990	16.4	10.5	24.6	29.8	33.1	44.9	50.3	48.4	44.3	32.9	23.5	4.4	30.3
1991	8.3	18.2	23.4	26.5	37.5	46.7	49.6	49.3	39.7	28.9	18.3	9.5	29.7
1992	6.7	18.1	25.7	33.0	40.2	44.4	48.1	48.1	40.2	33.0	16.3	9.8	30.3
1993	11.7	9.6	22.8	27.9	38.1	43.5	44.5	46.1	37.3	29.8	13.8	12.6	28.1
1994	17.1	11.5	24.3	29.3	38.6	45.1	48.4	48.9	39.6	31.3	17.8	15.8	30.6
1995	12.6	20.6	23.2	27.3	34.5	42.9	48.8	51.5	40.9	28.7	25.7	17.1	31.2
1996	11.8	16.0	20.5	28.7	37.2	45.0	49.9	45.9	38.2	28.4	24.3	18.6	30.4
1997	11.0	11.6	22.2	24.0	36.5	46.8	49.9	49.8	44.2	30.4	17.8	9.0	29.4
1998	19.5	18.3	19.1	28.0	38.1	41.4	53.2	49.4	44.3	31.2	26.1	11.4	31.7
1999	19.5	19.6	23.4	27.2	34.5	44.7	52.8	49.5	37.2	26.9	22.9	13.1	30.9
Average	10.8	13.4	19.3	26.8	35.5	43.4	49.0	47.2	38.4	28.9	19.1	11.9	28.6

Table 1 - Climate Data for CUw Calculation

SARATOGA													
Year	Maximum Air Temperature, F												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1951	30.1	38.3	38.7	51.7	65.2	68.8	84.3	78.6	72.2	54.6	40.9	32.6	54.7
1952	32.3	34.3	35.1	54.2	64.7	78.2	82.7	81.0	76.2	66.7	41.1	35.1	56.8
1953	40.3	34.1	46.6	50.3	58.4	78.0	87.1	80.6	76.9	64.2	49.8	35.7	58.5
1954	39.4	47.7	39.9	58.4	69.1	75.5	88.5	81.6	74.0	61.8	52.5	38.7	60.6
1955	32.8	32.3	39.4	51.8	66.5	73.1	85.8	83.5	75.6	62.7	41.1	37.5	56.8
1956	40.7	30.6	41.1	54.7	68.3	81.6	82.2	77.5	76.5	63.5	37.6	36.1	57.5
1957	29.5	41.0	43.7	50.5	61.0	71.8	82.1	81.5	68.9	59.4	38.7	39.8	55.7
1958	37.5	44.0	39.2	49.8	70.9	79.0	81.3	83.0	73.6	63.7	50.2	40.0	59.4
1959	35.6	35.7	40.9	55.1	64.5	79.6	84.2	81.6	68.0	56.3	45.8	42.1	57.5
1960	33.0	29.7	44.6	58.8	66.2	77.8	85.1	81.5	74.3	60.3	43.3	36.6	57.6
1961	38.4	39.4	44.4	53.0	67.2	79.0	82.4	81.9	63.6	57.2	40.1	31.5	56.5
1962	29.5	35.7	38.1	58.5	66.4	74.6	81.8	81.2	73.1	63.5	50.8	40.4	57.8
1963	27.8	42.0	43.5	53.2	69.5	76.4	85.4	79.9	75.5	66.3	50.2	37.0	58.9
1964	30.0	28.9	35.0	50.2	66.2	72.2	86.5	79.2	71.1	62.4	42.5	33.3	54.8
1965	36.3	35.9	34.9	54.1	61.7	73.0	80.5	77.3	60.6	65.0	49.1	39.5	55.7
1966	33.9	33.6	50.1	55.9	71.3	76.1	85.8	80.6	73.1	56.9	46.9	34.2	58.2
1967	33.9	36.3	45.7	53.4	60.4	69.5	78.9	78.6	67.8	58.2	43.9	27.8	54.5
1968	35.1	36.4	42.6	44.5	57.5	74.9	84.5	77.4	71.4	60.9	40.1	33.9	54.9
1969	38.8	38.2	37.5	58.1	71.6	69.6	85.7	85.5	76.2	47.5	44.2	38.7	57.6
1970	32.9	42.6	38.6	46.7	67.3	75.0	84.0	84.3	69.2	52.4	42.3	35.1	55.9
1971	33.0	34.6	40.8	55.4	63.8	79.0	84.3	85.9	69.0	58.0	43.0	31.9	56.6
1972	33.0	38.7	51.4	57.6	67.2	77.3	83.4	81.7	71.3	57.0	37.3	30.9	57.2
1973	28.3	34.3	39.2	45.4	64.0	76.0	81.0	82.7	69.9	63.7	42.8	36.1	55.3
1974	30.5	36.6	47.8	53.0	69.9	79.7	83.7	80.6	72.3	63.0	45.8	33.9	58.1
1975	32.1	35.0	41.8	49.7	62.3	72.6	83.8	81.0	72.0	61.5	44.7	37.4	56.2
1976	34.3	40.9	43.5	56.5	67.8	74.3	85.7	80.6	73.8	59.4	46.2	39.8	58.6
1977	33.6	42.9	42.1	58.8	68.1	84.1	83.8	80.4	76.0	63.5	45.1	38.6	59.8
1978	34.4	37.2	48.1	57.2	61.7	76.7	85.0	78.8	72.3	63.1	43.5	25.6	57.0
1979	21.8	35.2	42.2	55.3	63.4	77.5	84.5	78.4	77.6	61.9	35.7	40.0	56.1
1980	30.2	38.1	40.1	53.7	63.6	79.2	84.1	80.2	72.8	59.3	46.6	44.7	57.7
1981	43.6	41.5	47.7	61.4	61.1	78.4	82.6	81.4	76.2	55.2	47.9	37.8	59.6
1982	32.2	35.7	45.6	54.0	63.2	73.0	81.8	82.6	69.7	55.4	39.9	33.8	55.6
1983	38.7	39.8	43.3	46.9	60.2	71.9	82.0	83.7	74.6	62.0	41.8	26.6	56.0
1984	30.3	36.0	39.7	47.1	67.7	73.2	82.6	81.5	70.6	51.7	45.1	34.6	55.0
1985	27.3	31.6	45.1	58.8	68.2	77.2	82.8	82.4	67.3	59.0	37.8	32.1	55.8
1986	40.3	39.5	54.0	54.4	65.9	80.5	79.4	81.5	67.1	57.0	42.9	38.2	58.4
1987	33.1	39.5	41.9	60.9	65.7	75.5	80.1	76.8	72.0	62.2	42.3	31.4	56.8
1988	27.5	35.7	39.5	59.6	65.6	80.4	84.3	81.6	69.7	65.0	40.4	34.6	57.0
1989	35.1	27.0	49.3	59.2	68.5	74.7	83.3	78.4	72.2	60.3	45.8	33.6	57.3
1990	37.3	34.0	47.1	57.6	64.3	78.2	79.5	79.5	75.4	58.9	46.0	29.2	57.3
1991	30.9	43.4	45.2	52.8	66.3	75.8	79.8	80.2	70.5	60.6	37.0	36.0	56.5
1992	33.4	39.7	48.6	61.3	67.7	72.8	76.3	78.9	72.5	62.9	35.8	32.0	56.8
1993	33.7	31.1	43.7	50.6	64.6	71.2	78.4	76.8	69.2	55.0	37.0	33.7	53.8
1994	34.9	34.6	49.4	56.6	70.4	79.8	82.3	82.3	73.0	56.6	40.5	38.9	56.3
1995	34.7	42.0	47.4	51.6	56.6	71.2	78.7	82.8	70.2	57.3	47.0	39.5	56.6
1996	32.6	40.0	44.9	54.8	65.1	77.6	83.8	82.6	69.1	56.6	44.9	34.9	57.2
1997	31.7	32.5	49.6	49.6	65.7	75.8	81.7	78.6	71.7	58.7	41.3	32.3	55.8
1998	37.6	37.8	42.7	54.2	67.3	69.7	83.0	80.7	75.7	57.7	46.3	34.1	57.2
1999	36.1	40.6	51.9	52.0	63.7	74.8	83.9	80.2	69.0	63.7	55.7	35.3	58.9
Average	33.7	37.0	43.5	54.1	65.4	75.8	82.9	80.8	71.8	59.8	43.6	35.4	57.0

Table 1 - Climate Data for CUw Calculation

SARATOGA															
Precipitation, inches															
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	50% Oct-Mar	95% Apr-Sep
1951	0.87	0.04	0.66	0.81	1.30	1.16	1.03	1.32	0.38	3.69	0.49	0.46	12.21		
1952	0.69	0.78	0.83	0.84	1.10	0.79	0.84	1.44	0.08	0.00	0.55	0.19	8.13	3.47	4.84
1953	0.46	0.48	0.21	0.96	2.50	0.50	0.64	0.97	0.14	0.07	0.49	0.21	7.63	0.95	5.42
1954	0.54	0.25	1.95	0.00	0.42	0.00	0.31	0.44	1.00	0.77	0.43	0.33	6.44	1.76	2.06
1955	0.20	0.32	0.77	0.38	0.60	0.25	0.00	1.83	0.13	0.57	0.70	0.45	6.20	1.41	3.03
1956	0.62	0.41	0.25	0.83	0.99	0.36	1.50	0.80	0.00	0.73	0.45	0.88	7.82	1.50	4.26
1957	0.64	0.22	0.81	0.36	2.59	0.85	0.43	1.49	0.36	2.30	0.31	0.04	10.40	1.87	5.78
1958	0.08	0.13	0.81	0.43	0.81	0.66	0.56	0.93	0.75	0.01	0.02	0.67	5.86	1.84	3.93
1959	0.41	0.54	0.66	0.23	1.28	1.60	0.10	0.96	1.27	0.97	0.06	0.14	8.22	1.16	5.17
1960	0.15	0.39	0.82	0.48	0.85	1.38	0.77	0.81	0.12	0.55	1.28	0.07	7.67	1.27	4.19
1961	0.24	0.44	0.35	0.87	1.47	1.04	1.30	1.03	2.93	0.58	0.52	0.13	10.90	1.47	8.21
1962	1.08	1.08	0.46	1.41	0.77	1.27	0.44	0.35	0.27	1.01	0.21	0.12	8.47	1.93	4.28
1963	0.44	0.17	0.41	1.69	0.22	0.71	0.91	2.09	0.34	0.29	0.16	0.17	7.60	1.18	5.66
1964	0.48	0.73	0.61	1.94	0.76	1.50	0.27	1.28	0.52	0.18	0.61	0.86	9.74	1.22	5.96
1965	0.23	0.15	0.66	1.02	3.55	0.87	1.24	0.35	2.86	0.02	0.29	0.60	11.64	1.35	9.21
1966	0.08	0.15	0.85	0.87	0.20	1.53	0.60	1.15	1.19	1.78	0.63	0.39	9.42	1.00	5.26
1967	0.48	0.76	1.36	0.66	1.39	2.31	1.79	0.86	1.80	1.07	1.09	1.62	15.19	2.70	8.37
1968	0.51	1.00	0.40	3.16	1.47	0.38	0.51	1.17	0.70	0.72	0.81	0.30	11.13	2.85	7.02
1969	0.43	0.51	0.34	0.61	0.40	2.16	0.17	0.43	0.67	2.25	0.22	0.51	8.70	1.56	4.22
1970	0.18	0.02	0.89	1.04	0.51	2.01	0.74	0.73	1.48	1.47	0.89	0.55	10.51	2.04	6.18
1971	0.17	0.28	0.29	0.69	1.91	0.04	0.24	0.57	0.59	0.72	0.10	0.28	5.88	1.83	3.84
1972	0.41	0.26	0.34	0.51	0.90	2.00	0.61	0.64	1.14	3.24	0.79	0.74	11.58	1.06	5.51
1973	0.27	0.42	1.27	1.91	0.46	1.01	1.44	0.58	1.36	0.03	1.53	0.98	11.26	3.37	6.42
1974	0.31	0.26	0.51	1.42	0.09	0.98	3.12	0.30	0.67	1.62	0.32	0.73	10.33	1.81	6.25
1975	0.76	0.17	1.04	1.09	0.57	0.61	1.39	0.49	0.41	1.60	0.22	0.75	9.10	2.32	4.33
1976	0.05	0.53	0.40	1.16	1.76	1.46	2.49	0.52	0.44	0.17	0.00	0.23	9.21	1.78	7.44
1977	0.29	0.25	0.75	1.35	3.26	0.45	1.10	1.30	0.40	0.34	0.60	0.00	10.09	0.85	7.47
1978	0.55	0.45	0.54	0.38	2.40	0.24	0.62	0.95	0.47	0.55	0.41	1.10	8.66	1.24	4.81
1979	0.39	0.41	1.02	0.93	1.67	0.20	0.15	1.76	0.15	1.29	0.43	0.37	8.77	1.94	4.62
1980	2.03	0.50	0.86	0.33	1.85	0.00	0.74	1.01	1.11	1.27	0.39	0.38	10.47	2.74	4.79
1981	0.12	0.22	0.59	0.72	3.02	0.00	1.46	0.76	0.53	1.60	0.41	0.33	9.76	1.49	6.17
1982	0.28	0.18	0.35	0.39	1.14	1.41	2.69	0.47	1.63	0.87	0.98	0.68	11.07	1.58	7.34
1983	0.02	0.13	1.47	1.72	1.53	1.60	2.33	0.79	0.78	1.16	2.28	0.69	14.50	2.08	8.31
1984	0.22	0.68	1.46	2.22	0.15	0.81	3.45	2.29	1.69	0.33	0.41	0.06	13.77	3.25	10.08
1985	0.68	0.23	0.62	0.50	0.61	0.37	1.04	0.22	0.58	0.99	1.16	0.43	7.43	1.17	3.15
1986	0.05	0.70	0.63	1.50	1.45	2.31	0.98	1.34	0.67	1.18	0.71	0.15	11.87	1.98	8.03
1987	0.41	0.74	0.88	0.48	1.24	0.24	1.02	1.21	0.21	0.82	1.13	0.91	9.29	2.04	4.18
1988	0.84	0.14	1.71	0.30	1.64	0.18	0.39	0.30	1.35	0.01	0.61	0.38	7.85	2.78	3.95
1989	0.08	1.92	0.47	0.06	0.26	0.42	0.79	1.09	1.28	0.48	0.18	0.57	7.60	1.74	3.71
1990	0.27	0.99	0.84	0.40	0.74	0.79	0.99	1.17	0.60	0.93	0.69	0.43	8.84	1.67	4.46
1991	0.34	0.32	0.61	0.79	2.49	1.15	0.78	0.64	0.53	0.50	0.99	0.14	9.28	1.66	6.06
1992	1.06	0.60	0.54	0.40	2.40	0.97	1.63	0.77	0.51	0.88	0.65	0.74	11.15	1.92	6.35
1993	0.19	0.47	0.95	2.02	2.49	0.90	0.29	1.21	1.32	2.22	0.84	0.37	13.27	1.94	7.82
1994	0.37	0.94	0.67	1.04	0.23	0.37	0.24	0.51	0.29	1.31	0.43	0.28	6.68	2.71	2.55
1995	0.52	0.52	0.77	1.51	5.44	2.31	0.99	0.89	1.08	1.18	0.96	0.12	16.29	1.92	11.61
1996	0.71	0.20	0.45	2.04	1.98	0.41	0.31	0.30	0.36	0.91	0.64	0.34	8.65	1.81	5.13
1997	1.19	0.38	0.20	1.67	1.98	1.32	0.80	2.14	2.01	0.55	0.15	0.38	12.77	1.83	9.42
1998	0.17	0.39	0.68	0.56	1.18	3.01	1.29	1.34	0.71	2.28	0.30	0.61	12.52	1.16	7.69
1999	0.70	0.18	0.24	1.03	1.53	1.96	1.38	0.64	1.39	0.14	0.57	0.21	9.97	2.16	7.53
Average	0.45	0.45	0.72	0.97	1.42	0.99	1.00	0.95	0.85	0.98	0.59	0.45	9.83	1.84	5.86

Table 1 - Climate Data for CUw Calculation

MEDICINE BOW													
Year	Minimum Temperature												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	8.5	15.1	17.9	24.2	35.7	37.0	46.8	44.9	35.6	29.1	16.2	12.5	27.0
1952	12.5	11.1	13.0	26.9	35.2	44.1	46.3	46.6	34.6	24.0	9.8	13.2	26.4
1953	22.5	12.7	21.5	22.9	32.5	43.6	49.5	46.8	35.8	24.9	21.2	10.8	28.7
1954	18.0	21.1	14.7	28.3	32.5	40.7	50.2	42.2	37.6	28.3	19.6	10.1	28.6
1955	7.2	8.0	13.9	21.9	32.9	40.4	46.3	48.0	36.9	27.6	19.0	21.8	27.0
1956	13.6	3.1	16.8	23.8	37.3	43.1	46.2	42.9	33.1	25.7	14.0	13.7	26.1
1957	3.2	20.9	19.3	24.4	35.8	41.8	47.7	47.2	32.9	31.7	16.5	17.8	28.3
1958	9.3	20.8	14.0	24.3	37.2	42.7	45.2	46.3	37.8	25.1	18.7	15.4	28.1
1959	11.4	12.4	18.6	26.0	35.1	43.1	45.9	46.1	36.2	27.7	17.4	13.1	27.8
1960	11.2	7.1	19.6	27.3	33.8	42.8	44.5	42.0	35.8	25.4	17.7	7.9	26.3
1961	10.7	15.9	20.7	25.0	36.1	40.4	45.7	46.9	34.4	24.9	16.5	11.7	27.4
1962	1.7	17.1	11.9	28.7	35.5	41.8	44.5	41.1	34.9	27.5	22.4	13.8	26.7
1963	1.4	18.6	12.8	26.2	34.6	41.8	47.5	45.4	40.4	28.4	20.7	11.8	27.5
1964	8.5	6.9	9.7	25.4	34.0	40.3	47.4	43.4	32.9	24.8	17.5	11.5	25.2
1965	17.5	11.4	6.7	28.1	33.1	41.9	47.7	43.1	33.2	29.0	23.9	14.0	27.5
1966	10.7	10.3	18.5	21.9	34.0	41.0	50.0	43.0	38.3	26.8	22.8	15.3	27.7
1967	16.8	14.9	23.5	25.0	33.0	41.2	47.3	42.6	37.8	29.7	14.8	4.1	27.6
1968	6.2	14.8	20.5	20.7	30.1	41.7	46.9	43.8	32.8	26.2	12.8	8.0	25.4
1969	15.6	12.7	11.2	28.3	35.4	40.5	47.8	45.9	40.3	22.8	19.4	12.7	27.7
1970	16.2	16.9	15.5	22.5	33.7	40.8	47.5	46.5	32.4	20.9	23.4	13.5	27.5
1971	19.5	12.9	19.4	25.2	32.8	43.4	46.7	45.2	34.4	25.2	18.2	11.3	27.9
1972	11.5	15.8	23.7	26.2	33.1	44.9	45.7	46.4	36.4	29.7	14.2	6.5	27.8
1973	4.6	4.7	17.1	22.5	32.1	42.8	48.0	47.9	36.2	28.3	23.5	18.2	27.2
1974	10.3	16.0	23.6	28.6	36.2	42.3	47.0	40.0	30.9	28.4	20.8	8.3	27.7
1975	9.7	8.7	19.3	23.1	31.2	37.9	46.8	40.1	29.0	22.9	14.6	12.4	24.6
1976	9.4	16.0	13.1	25.2	31.6	37.8	46.3	40.5	34.2	16.2	12.5	7.6	24.2
1977	4.7	12.5	13.3	25.4	32.8	44.2	46.4	45.1	35.8	27.0	17.3	18.8	26.9
1978	11.3	14.7	23.9	26.6	33.2	42.4	44.3	42.9	35.7	21.0	16.8	5.0	26.5
1979	-0.1	15.1	20.8	26.9	31.9	41.1	46.2	44.5	34.7	25.6	11.1	15.2	26.1
1980	8.2	12.6	17.9	24.7	34.0	42.0	48.0	43.8	36.9	25.4	16.1	20.5	27.5
1981	11.8	16.8	21.2	33.2	35.6	47.1	49.1	47.1	39.4	30.3	24.5	18.1	31.2
1982	10.6	8.9	22.2	23.1	34.0	40.5	48.7	50.4	39.9	28.2	20.0	14.4	28.4
1983	19.3	14.7	19.9	20.8	30.5	41.0	48.5	51.0	38.3	30.8	18.6	2.5	28.0
1984	8.0	11.5	17.1	20.9	35.6	41.0	48.6	49.5	35.9	24.5	18.7	12.1	27.0
1985	3.7	5.8	17.2	26.9	34.8	39.4	48.2	41.4	35.0	28.8	16.8	10.2	25.7
1986	19.2	17.3	27.0	29.7	33.5	45.4	45.4	46.3	36.2	30.0	19.8	11.1	30.1
1987	8.9	16.2	19.3	27.1	38.7	42.4	47.3	44.6	34.7	27.9	18.8	10.5	28.0
1988	8.5	11.5	18.1	26.3	36.0	48.3	48.3	44.6	35.6	30.8	21.6	9.5	28.3
1989	14.1	3.5	22.8	27.4	34.1	41.3	48.9	43.9	37.1	29.7	23.1	12.2	28.2
1990	18.0	12.1	21.6	27.5	31.6	43.5	48.8	44.5	41.6	30.8	22.9	5.3	29.0
1991	10.2	17.8	22.5	24.9	37.3	45.0	47.8	46.9	37.6	28.6	18.8	10.7	29.0
1992	9.2	18.9	22.6	30.5	37.1	43.2	47.1	46.2	37.7	29.9	16.9	10.6	29.2
1993	9.3	4.6	21.5	27.9	37.0	41.9	43.3	44.2	33.2	27.8	13.3	15.7	26.6
1994	16.5	13.0	23.9	26.7	37.3	44.4	47.0	48.1	35.4	30.4	17.5	17.3	29.8
1995	11.7	20.4	22.0	26.3	34.5	41.5	47.5	46.8	38.4	29.7	25.5	17.6	30.2
1996	8.8	15.3	17.9	27.0	35.6	42.6	48.4	44.3	35.5	27.5	23.3	17.7	28.7
1997	12.7	10.6	21.6	23.2	35.4	45.1	46.6	48.4	42.1	29.1	15.7	9.4	28.3
1998	18.3	18.0	17.7	25.4	38.0	40.4	52.5	47.5	41.7	30.9	27.9	13.1	30.8
1999	17.9	19.0	20.3	26.3	32.6	42.8	47.8	47.5	33.8	24.4	20.2	13.3	28.8
Average	11.2	13.4	18.5	25.7	34.4	42.2	47.3	45.2	36.1	27.1	18.6	12.4	27.7

Table 1 - Climate Data for CUw Calculation

MEDICINE BOW													
Maximum Temperature													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	29.2	38.6	41.8	51.3	64.6	67.8	82.4	78.5	70.5	54.3	38.9	31.0	54.1
1952	32.9	34.1	34.7	56.5	64.6	79.4	82.9	80.5	75.7	65.5	36.9	33.0	56.4
1953	39.3	33.9	47.8	50.1	59.0	78.5	85.1	80.6	75.2	61.8	48.7	33.4	57.8
1954	39.4	47.2	40.2	60.4	66.7	77.0	87.4	82.2	73.5	59.1	50.2	33.2	59.7
1955	29.6	29.1	37.2	55.8	68.6	71.9	86.3	82.2	72.8	61.3	39.6	37.5	56.0
1956	36.7	27.7	43.3	54.6	69.0	82.5	80.4	77.9	75.6	63.2	37.4	34.5	56.9
1957	26.4	41.6	44.1	50.2	60.0	72.9	81.2	80.0	68.7	58.1	36.2	38.0	54.8
1958	33.2	42.6	35.6	50.5	70.7	77.0	78.6	80.8	71.8	62.7	46.7	36.8	57.3
1959	33.9	33.9	38.9	54.0	61.4	79.3	82.6	80.4	65.5	54.1	43.5	40.3	55.7
1960	31.0	26.3	43.9	58.3	65.9	76.0	83.7	80.6	72.6	58.5	39.0	31.9	55.6
1961	34.3	38.1	44.1	51.1	65.3	78.5	81.5	81.0	64.1	55.4	37.3	29.4	55.0
1962	24.6	34.4	35.8	59.1	65.5	73.9	80.8	80.8	72.7	61.8	48.7	38.4	56.4
1963	25.7	41.6	41.0	51.8	68.1	75.8	84.5	80.6	75.3	66.1	48.9	33.4	57.7
1964	29.1	27.4	32.7	49.0	65.5	72.4	86.2	77.9	72.7	60.5	40.7	31.5	53.8
1965	35.8	33.6	33.1	54.8	60.6	71.7	80.1	77.6	60.8	63.4	48.4	35.5	54.6
1966	30.9	31.6	47.1	53.5	69.1	74.6	85.4	79.2	71.2	56.3	46.9	33.7	56.6
1967	34.7	35.4	46.1	54.7	58.6	69.1	81.9	82.0	70.7	60.0	42.5	25.9	55.1
1968	29.7	35.7	45.3	46.3	61.2	74.8	81.6	76.9	68.8	57.8	39.5	31.6	54.1
1969	38.0	36.5	37.0	62.1	71.0	69.6	86.2	85.5	76.8	48.7	44.5	37.8	57.8
1970	33.8	43.2	38.1	47.7	67.4	74.7	84.3	85.5	70.8	52.5	41.8	34.8	56.2
1971	34.5	33.1	40.8	54.6	62.7	78.2	82.1	84.1	67.9	57.5	41.2	30.7	55.6
1972	30.1	36.3	51.6	56.1	66.0	76.5	80.8	79.9	70.3	56.0	35.3	26.9	55.5
1973	24.8	29.4	36.7	44.3	63.4	75.6	78.8	80.8	68.9	62.8	41.1	36.9	53.6
1974	27.7	33.6	44.1	50.4	66.8	79.6	84.3	80.1	72.1	62.4	44.5	32.1	56.5
1975	32.7	32.1	40.7	50.1	62.5	73.2	83.8	82.6	73.7	60.7	43.9	36.8	56.1
1976	31.8	39.0	41.0	56.5	68.1	74.8	85.6	81.0	74.6	59.4	46.4	37.9	58.0
1977	30.3	43.3	43.3	60.1	68.6	83.2	84.0	80.4	73.2	62.4	44.3	38.6	59.3
1978	30.9	34.4	48.6	56.3	63.9	76.9	85.2	80.6	73.2	62.4	38.1	24.8	56.3
1979	21.3	32.5	39.3	49.1	64.6	78.1	86.2	79.0	79.3	63.0	35.5	38.9	55.6
1980	29.9	34.3	38.7	48.0	65.3	81.7	85.7	82.0	74.5	59.4	44.5	43.0	57.3
1981	42.5	42.6	47.2	63.5	59.9	79.6	84.4	81.7	75.2	52.1	46.4	35.3	59.2
1982	30.6	35.4	46.1	49.0	58.6	68.7	78.2	81.1	66.0	51.4	39.0	32.8	53.1
1983	37.6	37.0	39.8	43.0	55.6	68.2	79.8	79.5	71.1	57.8	37.9	22.2	52.5
1984	28.4	32.9	34.7	40.8	63.5	70.0	80.2	76.2	64.9	47.8	39.3	31.3	50.8
1985	26.7	27.8	38.8	52.6	64.7	72.2	80.0	77.9	63.3	54.9	34.1	29.6	51.9
1986	37.3	32.6	48.4	50.4	59.3	77.5	79.5	82.2	67.0	55.1	39.8	33.6	55.2
1987	29.1	36.6	41.1	61.5	66.7	77.6	81.6	77.9	73.3	62.1	41.7	29.7	56.6
1988	25.0	33.2	38.9	60.2	67.5	83.5	86.7	83.8	71.8	65.5	40.9	31.7	57.4
1989	34.3	22.4	50.0	59.1	67.8	75.5	86.2	80.4	72.6	58.8	45.0	32.2	57.0
1990	36.5	33.0	44.8	57.2	64.5	80.1	81.1	81.6	76.1	59.2	44.0	27.0	57.1
1991	28.7	42.2	45.9	53.1	64.8	76.8	81.9	82.2	71.9	61.0	35.8	30.8	56.3
1992	30.3	40.2	49.7	62.5	69.8	74.8	78.9	80.1	73.5	63.8	33.9	29.0	57.2
1993	29.5	26.5	42.0	51.7	65.5	71.0	80.2	78.9	69.8	55.5	34.5	31.2	53.0
1994	34.3	33.5	49.6	56.8	71.5	81.7	83.9	84.0	74.5	57.4	40.7	36.8	58.7
1995	31.5	40.4	47.2	52.5	56.3	71.5	80.9	84.7	71.0	57.6	46.5	39.7	56.7
1996	30.5	38.6	45.5	55.9	64.9	79.8	85.2	84.0	69.8	56.1	43.6	33.9	57.3
1997	30.9	31.4	48.5	48.6	67.2	77.3	82.6	79.8	73.1	60.3	40.4	29.8	55.8
1998	36.6	37.8	42.0	53.9	67.9	68.5	84.5	82.4	78.6	57.4	46.1	32.6	57.4
1999	34.4	39.0	52.0	49.0	61.8	76.2	85.2	82.0	69.5	59.5	55.4	34.8	58.2
Average	31.8	35.2	42.5	53.4	64.7	75.6	82.9	80.8	71.6	58.8	42.0	33.3	56.1

Table 1 - Climate Data for CUw Calculation

MEDICINE BOW

Precipitation, Inches

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	50% Oct-Mar	95% Apr-Sep
1951	0.80	0.25	0.43	1.28	1.81	1.63	0.61	0.30	0.91	1.93	0.56	0.20	10.71		
1952	0.42	0.63	0.76	0.88	2.34	0.48	0.74	1.52	0.39	0.17	0.60	0.48	9.41	2.25	6.03
1953	0.22	0.81	0.29	1.09	1.35	0.61	1.42	0.71	0.13	0.24	0.61	0.11	7.59	1.29	5.04
1954	0.34	0.13	1.09	0.01	0.88	0.31	0.41	0.66	1.10	0.68	0.21	0.37	6.19	1.26	3.20
1955	0.38	0.75	0.88	0.50	0.71	1.54	0.61	1.65	0.34	0.37	1.01	0.29	9.03	1.64	5.08
1956	1.03	0.53	0.33	0.95	1.73	0.36	1.93	0.35	0.05	0.14	0.85	1.01	9.26	1.78	5.10
1957	0.89	0.46	2.02	0.83	2.44	0.54	1.02	1.21	0.40	1.27	0.69	0.11	11.88	2.69	6.12
1958	0.20	0.32	0.81	0.38	1.78	1.02	3.96	1.37	0.28	0.02	0.66	0.91	11.71	1.70	8.35
1959	0.43	0.71	0.82	0.84	1.84	1.30	0.20	0.17	2.45	1.27	0.04	0.06	10.13	1.78	6.46
1960	0.28	0.43	0.42	1.53	0.87	2.12	1.45	0.58	0.41	0.18	1.64	0.29	10.20	1.25	6.61
1961	0.13	0.28	0.89	0.80	1.18	0.66	1.40	0.60	1.94	0.87	0.82	0.26	9.83	1.71	6.25
1962	0.65	0.65	0.68	0.90	2.73	1.72	1.32	0.54	0.32	1.42	0.23	0.07	11.23	1.97	7.15
1963	0.78	0.33	0.76	2.15	0.20	1.29	0.63	1.04	1.29	0.05	0.03	0.21	8.76	1.80	6.27
1964	0.24	0.28	1.43	2.44	0.80	2.11	0.36	0.50	0.70	0.00	0.13	0.51	9.50	1.12	6.56
1965	0.15	0.28	0.24	1.29	1.71	1.55	2.88	0.51	2.75	0.34	0.74	0.52	12.96	0.66	10.16
1966	0.02	0.25	0.06	0.60	0.31	0.84	2.04	0.63	1.07	0.86	0.51	0.16	7.35	0.97	5.22
1967	0.44	0.36	0.87	0.48	1.45	3.40	0.96	0.38	0.81	0.76	1.04	0.75	11.70	1.60	7.11
1968	0.16	0.33	0.26	2.01	1.61	0.65	2.12	0.51	0.60	0.68	0.37	0.19	9.49	1.65	7.13
1969	0.15	0.50	0.39	0.85	0.61	2.66	0.36	0.26	0.02	1.86	0.20	0.38	8.24	1.14	4.52
1970	0.13	0.11	0.58	1.41	0.60	2.05	0.81	0.16	1.22	0.86	0.35	0.16	8.44	1.63	5.94
1971	0.19	0.32	0.65	1.42	2.31	0.03	0.69	1.28	1.07	0.72	0.20	0.85	9.73	1.27	6.46
1972	0.71	0.22	0.16	1.35	0.96	1.65	0.12	1.97	0.96	2.47	0.77	0.88	12.22	1.43	6.66
1973	0.61	0.56	2.18	2.56	0.68	0.48	4.47	0.30	4.22	0.07	1.65	1.39	19.17	3.74	12.07
1974	0.79	0.48	1.08	1.96	0.27	1.88	0.25	0.26	1.21	1.25	0.00	0.17	9.60	2.73	5.54
1975	1.40	1.70	1.87	0.67	1.80	0.44	2.01	0.60	0.94	0.75	0.50	3.22	15.90	3.20	6.14
1976	1.10	0.85	0.50	1.61	0.94	1.10	0.56	1.13	0.14	0.17	0.18	0.49	8.77	3.46	5.21
1977	0.77	0.08	0.43	1.79	1.49	0.62	1.40	0.93	0.00	1.18	0.81	0.10	9.60	1.06	5.92
1978	0.69	0.56	0.67	0.94	3.48	0.48	0.70	1.25	0.70	1.16	0.75	1.74	13.12	2.01	7.17
1979	0.70	0.40	1.15	0.62	0.90	0.27	0.00	3.27	0.10	1.90	0.56	0.40	10.27	2.95	4.90
1980	1.19	1.80	0.79	0.71	0.76	0.00	0.09	0.93	0.62	2.01	0.25	0.11	9.26	3.32	2.95
1981	0.07	0.05	0.50	1.40	3.90	0.02	1.25	0.00	1.00	1.41	0.44	1.06	11.10	1.50	7.19
1982	0.68	0.46	0.93	0.95	2.08	1.59	1.56	0.70	2.03	0.85	0.77	0.72	13.32	2.49	8.46
1983	0.39	0.28	1.47	1.81	1.44	1.39	1.47	1.10	0.47	0.78	2.75	0.99	14.34	2.24	7.30
1984	0.28	0.51	0.85	1.46	0.54	0.61	2.66	0.82	0.94	0.56	0.45	0.60	10.28	3.08	6.68
1985	0.65	0.25	0.69	0.74	1.62	1.13	0.98	0.35	1.04	0.78	1.74	0.43	10.40	1.60	5.57
1986	0.16	0.74	0.31	1.39	1.06	2.75	0.59	1.94	0.64	1.36	0.91	0.01	11.86	2.08	7.95
1987	0.08	0.44	0.18	0.24	2.18	1.10	0.60	1.22	0.34	0.36	0.37	0.92	8.03	1.49	5.40
1988	0.41	0.30	0.38	0.45	1.18	1.12	0.20	0.49	0.32	0.00	0.42	0.19	5.46	1.37	3.57
1989	0.00	1.53	0.41	0.40	1.09	3.46	0.87	0.88	2.21	0.01	0.25	0.18	11.29	1.28	8.46
1990	0.34	0.43	1.73	0.76	0.49	0.00	1.28	0.86	2.16	0.54	0.93	0.41	9.93	1.47	5.27
1991	0.19	0.05	0.10	0.42	3.29	2.03	1.41	0.65	0.24	0.42	1.18	0.10	10.08	1.11	7.64
1992	0.24	0.30	0.85	1.13	3.65	0.77	4.06	0.51	0.62	0.54	0.82	0.59	14.08	1.55	10.20
1993	0.54	0.73	0.34	1.40	1.49	2.07	0.39	1.26	1.71	2.26	0.99	0.22	13.40	1.78	7.90
1994	0.25	0.50	0.27	0.74	0.84	1.96	1.91	0.39	0.21	1.17	0.58	0.41	9.23	2.25	5.75
1995	0.30	0.68	0.28	2.05	4.98	2.26	1.36	0.35	1.95	1.07	0.43	0.18	15.89	1.71	12.30
1996	0.87	0.22	0.30	1.32	1.77	0.76	0.69	0.32	0.78	1.18	0.76	0.31	9.28	1.54	5.36
1997	0.72	0.54	0.39	1.14	1.14	2.19	0.30	2.04	2.06	0.24	0.35	0.37	11.48	1.95	8.43
1998	0.18	0.36	0.84	0.59	1.27	2.60	2.59	1.07	0.70	2.57	0.31	0.78	13.86	1.17	8.38
1999	0.74	0.13	0.24	2.41	1.25	1.01	0.75	0.33	0.38	0.33	0.51	0.17	8.25	2.39	5.82
Average	0.47	0.49	0.71	1.14	1.55	1.28	1.23	0.83	0.96	0.86	0.65	0.51	10.67	1.85	6.65

Table 1 - Climate Data for CUw Calculation

ENCAMPMENT													
Year	Minimum Air Temperature, F												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1951	7.8	8.8	14.3	25.5	36.2	36.3	46.9	46.1	34.8	29.6	16.2	9.7	26.0
1952	11.6	9.5	12.4	27.7	35.5	43.7	46.2	47.5	38.5	29.1	11.3	12.8	27.2
1953	20.8	12.2	22.2	23.1	31.9	42.0	49.6	46.6	37.8	30.5	25.5	11.9	29.5
1954	17.6	19.0	14.9	28.9	35.8	40.1	51.1	45.6	40.9	30.5	23.6	13.5	30.1
1955	11.1	7.4	13.5	25.9	34.8	40.2	48.0	50.2	38.8	29.3	17.4	19.3	28.0
1956	16.0	4.8	16.3	25.9	38.0	43.1	45.5	43.8	36.6	29.0	14.2	12.5	27.1
1957	7.6	19.8	18.3	26.1	35.6	42.3	48.8	47.8	36.1	32.2	16.4	16.4	29.0
1958	11.2	23.3	13.7	24.3	38.7	40.7	44.2	48.0	38.4	28.0	21.4	18.6	29.2
1959	11.7	13.5	17.7	26.2	33.9	45.4	45.9	47.3	37.8	27.8	16.4	12.3	28.0
1960	10.2	4.3	17.9	26.1	32.0	38.4	43.5	44.7	41.0	29.6	20.3	10.4	26.5
1961	8.9	15.0	19.4	23.7	35.4	42.9	46.9	48.4	34.0	28.1	15.3	7.5	27.1
1962	2.8	14.8	11.8	27.8	35.1	40.3	45.3	43.8	36.4	28.3	21.9	12.9	26.8
1963	3.2	18.6	17.1	25.9	34.4	40.6	48.1	50.1	43.2	34.4	22.3	12.2	29.2
1964	8.3	5.5	10.2	25.3	34.4	40.5	50.0	46.0	36.3	27.0	19.8	13.8	26.4
1965	14.8	10.7	6.0	29.4	33.7	42.9	48.3	44.4	33.5	30.0	25.8	15.0	27.9
1966	9.4	7.1	18.6	23.0	35.5	41.4	49.9	43.6	39.9	26.5	22.3	12.6	27.5
1967	14.7	12.2	22.5	26.5	33.0	41.0	48.1	45.9	39.4	31.9	20.2	8.1	28.6
1968	13.2	16.4	18.9	22.3	33.7	42.7	48.6	45.5	37.4	31.4	16.8	10.3	28.1
1969	18.4	13.0	7.7	30.0	37.9	40.1	46.7	47.1	40.4	22.6	17.7	14.2	28.0
1970	14.8	17.7	16.0	21.2	35.2	41.8	48.9	49.7	37.7	23.1	23.4	13.0	28.5
1971	17.0	11.9	18.7	24.6	33.2	41.0	45.5	47.9	33.8	26.2	18.8	9.1	27.3
1972	10.9	15.7	24.1	27.4	33.5	44.1	44.2	41.0	37.5	29.9	13.9	8.8	27.6
1973	5.7	10.1	15.6	21.5	32.7	40.1	46.5	47.1	36.8	29.8	19.9	13.5	26.6
1974	9.0	9.8	22.7	25.5	33.1	42.5	48.3	39.5	33.4	31.3	19.9	8.0	26.9
1975	8.0	10.1	17.2	22.3	31.8	38.6	48.2	42.4	32.5	27.4	15.9	14.1	25.7
1976	9.4	15.4	13.7	24.1	32.6	38.9	49.2	43.0	36.5	20.4	13.5	8.7	25.5
1977	8.2	11.8	11.8	27.1	31.8	41.1	45.7	43.0	33.2	25.4	14.8	14.0	25.7
1978	12.6	12.3	18.5	22.2	30.0	34.1	44.1	42.2	35.7	25.1	17.9	6.0	25.1
1979	1.3	13.7	19.9	24.1	32.6	38.0	45.4	45.0	36.5	28.0	12.2	15.9	26.1
1980	11.9	16.9	16.8	22.9	34.2	37.9	46.6	43.7	36.2	27.2	19.9	21.3	28.0
1981	15.5	14.3	21.1	29.6	34.0	41.6	47.1	45.2	40.8	29.4	22.0	16.5	29.8
1982	9.3	10.3	20.9	21.2	32.5	38.5	45.3	49.3	38.9	25.5	16.0	12.0	26.6
1983	15.5	16.3	19.6	19.5	30.2	38.9	45.1	49.1	38.0	29.4	17.1	4.5	26.9
1984	6.5	9.2	14.3	18.3	32.0	38.3	46.9	47.3	36.6	24.0	19.2	12.0	25.4
1985	5.2	4.5	17.7	24.9	33.1	38.9	47.5	39.5	31.6	26.4	16.8	8.5	24.6
1986	16.8	15.6	23.3	25.8	30.4	39.1	42.7	43.8	34.7	26.4	19.5	11.5	27.5
1987	8.5	14.3	16.2	26.5	35.7	41.1	46.7	41.1	31.2	25.5	16.2	8.6	26.0
1988	4.3	10.1	12.4	24.9	31.5	42.5	45.4	46.7	36.5	30.7	16.2	8.3	25.8
1989	6.7	5.0	21.0	28.6	33.1	39.2	47.8	43.5	35.7	26.3	16.1	5.4	25.7
1990	10.8	7.0	17.9	24.9	26.2	42.2	48.1	46.2	42.5	28.0	21.0	1.5	26.4
1991	6.0	15.5	17.2	21.5	31.5	40.8	46.2	47.2	37.7	26.0	14.2	10.8	26.2
1992	7.7	14.2	20.8	28.0	34.6	39.6	42.7	43.3	37.8	32.0	13.7	9.7	27.0
1993	11.3	9.8	18.4	23.6	34.4	39.6	43.0	44.6	36.0	26.8	11.9	9.7	25.8
1994	14.3	9.9	19.7	26.3	33.9	39.0	40.7	43.1	37.3	27.2	15.3	15.4	26.8
1995	11.6	17.8	20.4	22.7	30.6	37.8	41.5	43.8	35.4	25.0	24.7	16.6	27.3
1996	11.1	13.9	18.6	25.4	32.8	39.3	43.5	41.1	32.4	22.4	18.1	14.0	26.1
1997	10.9	11.5	19.9	18.9	31.1	38.8	40.4	41.9	35.1	21.1	9.3	2.6	23.5
1998	8.0	8.6	8.5	17.2	26.3	27.8	40.8	36.4	30.5	17.0	26.9	12.6	21.7
1999	17.7	15.6	19.4	29.2	37.1	43.8	49.6	47.2	34.4	28.1	21.3	14.7	29.8
Average	10.7	12.3	17.1	24.8	33.4	40.2	46.2	45.0	36.6	27.5	18.2	11.7	27.0

Table 1 - Climate Data for CUw Calculation

ENCAMPMENT													
Maximum Air Temperature, F													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	31.0	38.2	40.4	50.9	64.8	67.1	82.5	77.4	72.4	57.7	42.7	28.8	54.5
1952	32.4	33.7	35.4	54.3	64.5	77.7	81.0	79.3	75.6	67.6	41.2	33.5	56.4
1953	40.8	34.0	46.9	50.0	58.7	76.7	83.7	79.2	75.9	63.8	49.1	35.6	57.9
1954	39.0	43.2	39.9	58.7	67.7	74.6	85.4	81.4	74.1	61.5	52.6	35.8	59.5
1955	32.0	30.3	38.5	53.2	65.2	70.9	85.4	80.5	74.7	62.9	40.1	39.1	56.1
1956	38.8	29.0	41.2	53.2	67.3	77.8	79.8	77.4	77.8	66.3	41.0	35.2	57.1
1957	29.9	39.8	41.2	50.2	60.5	70.8	80.4	80.7	72.6	60.9	41.3	42.1	55.9
1958	36.5	41.8	39.1	50.9	70.1	76.9	79.0	82.2	73.0	64.6	50.1	41.2	58.8
1959	35.4	35.6	38.9	54.5	64.6	78.7	81.8	79.2	68.3	56.4	47.9	42.7	57.0
1960	33.4	29.3	43.8	56.6	63.6	75.5	82.9	80.3	75.0	64.2	45.0	35.6	57.1
1961	36.2	37.2	42.5	49.9	64.9	76.5	79.8	78.9	62.9	59.9	41.6	31.9	55.2
1962	27.7	35.4	36.1	57.7	65.1	71.7	78.9	78.8	71.7	65.2	50.6	43.3	56.9
1963	26.0	40.1	42.9	53.3	67.6	73.9	82.1	76.4	75.3	67.7	51.1	38.4	57.9
1964	31.4	27.9	33.7	49.9	64.4	69.5	84.2	77.5	70.7	64.9	44.7	33.6	54.4
1965	34.5	33.6	32.1	52.9	60.3	69.7	78.3	77.7	60.2	65.4	49.3	40.2	54.5
1966	31.8	31.5	45.3	53.6	67.7	72.0	83.8	77.8	72.8	58.4	49.1	33.5	56.4
1967	33.8	34.1	45.5	53.5	59.4	67.6	80.0	80.5	70.3	60.3	47.0	29.4	55.1
1968	34.0	35.8	42.2	46.6	59.6	74.4	80.4	75.5	68.6	60.5	40.5	32.1	54.2
1969	37.0	34.8	33.7	55.9	69.0	66.0	81.8	83.7	73.4	46.1	43.6	37.7	55.2
1970	32.0	39.7	36.9	44.3	65.3	71.7	81.0	81.4	68.1	52.7	43.2	34.4	54.2
1971	32.3	31.6	39.5	52.5	59.7	73.9	79.3	80.9	66.3	58.0	44.0	31.1	54.1
1972	33.2	38.0	49.3	53.8	63.5	73.1	79.1	76.0	68.6	56.5	37.1	31.6	55.0
1973	28.9	35.3	38.4	44.2	60.8	70.5	75.6	79.0	67.9	62.2	43.2	37.4	53.6
1974	31.1	38.0	46.2	51.6	66.5	74.5	78.5	76.7	68.3	59.8	43.9	32.1	55.6
1975	31.1	34.0	40.3	47.8	59.6	68.4	77.7	75.3	68.4	61.5	46.5	37.4	54.0
1976	34.2	40.9	40.0	54.2	63.9	70.5	80.2	75.5	68.8	58.1	46.5	38.4	55.9
1977	33.4	40.9	40.1	56.2	64.5	78.8	80.3	75.5	73.3	62.5	44.9	37.0	57.3
1978	33.3	37.1	47.5	56.3	59.9	73.7	80.1	78.2	72.9	62.2	45.9	29.2	56.4
1979	24.0	34.7	40.6	52.7	60.0	72.0	78.3	73.9	72.8	58.7	34.3	40.7	53.6
1980	31.6	38.4	39.1	50.0	61.4	75.1	79.0	76.3	70.6	56.4	44.6	45.6	55.7
1981	44.0	40.7	45.4	59.9	57.9	73.8	78.1	77.5	72.1	54.1	48.5	36.7	57.4
1982	33.0	35.6	44.3	50.1	59.5	68.6	75.5	77.2	65.5	52.2	38.2	33.3	52.8
1983	37.3	38.5	40.3	44.2	56.1	67.2	76.0	78.1	70.7	59.0	41.0	26.7	52.9
1984	28.5	31.8	38.4	43.0	64.5	69.0	76.4	75.5	66.1	48.5	43.2	33.6	51.5
1985	26.7	30.2	41.9	55.8	64.5	71.6	76.2	77.2	62.8	55.8	37.9	30.7	52.6
1986	36.5	36.3	50.6	53.6	62.2	74.4	73.9	76.1	63.6	54.8	41.8	35.2	54.9
1987	32.6	37.4	41.6	58.6	62.9	72.6	77.3	73.5	69.1	61.2	41.8	31.3	55.0
1988	29.3	35.3	39.4	57.2	63.8	76.4	78.8	78.8	67.1	62.0	38.6	33.4	55.0
1989	31.5	29.3	45.5	55.4	64.9	71.0	81.7	75.1	69.0	57.9	43.4	31.8	54.7
1990	34.1	32.8	41.8	53.9	61.5	76.0	77.1	77.8	73.0	56.0	44.3	27.6	54.7
1991	30.1	40.6	41.1	49.6	63.2	72.6	78.5	78.6	69.4	59.3	37.3	35.5	54.7
1992	34.7	38.6	44.7	57.5	64.6	70.3	74.0	76.5	69.7	61.3	34.3	31.5	54.8
1993	34.2	31.8	41.7	46.4	62.0	68.9	76.1	75.4	67.5	52.6	36.0	33.1	52.1
1994	33.4	33.9	44.3	54.1	69.1	77.6	81.2	80.6	72.9	56.6	41.6	38.4	57.0
1995	35.5	43.4	47.5	51.6	55.2	69.5	78.3	83.0	70.1	58.1	48.2	40.0	56.7
1996	34.0	39.7	44.0	54.6	64.8	75.0	81.6	80.7	68.7	57.7	45.7	35.7	56.9
1997	35.3	35.6	50.8	49.5	63.9	74.5	81.4	77.5	71.6	59.3	44.4	37.1	56.7
1998	36.5	37.9	44.2	54.3	67.0	67.3	82.4	78.4	76.4	60.1	45.9	33.4	57.2
1999	34.7	38.9	48.8	52.4	60.6	71.9	79.6	76.6	66.2	62.8	49.5	34.9	56.4
Average	33.3	36.0	41.9	52.5	63.2	72.6	79.7	78.1	70.3	59.4	43.8	35.2	55.5

Table 1 - Climate Data for CUw Calculation

ENCAMPMENT																
Precipitation, inches																
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	50% Oct-Mar	95% Apr-Sep	
1951	1.64	0.37	1.12	2.43	0.56	1.23	1.13	1.79	0.25	3.08	0.94	1.73	16.27			
1952	1.00	0.67	1.51	0.82	0.95	1.54	0.90	1.08	0.09	0.00	0.96	0.55	10.07	4.47	5.11	
1953	0.68	0.94	0.64	2.43	2.84	1.99	1.43	2.10	0.41	0.60	1.14	0.51	15.71	1.89	10.64	
1954	1.01	0.58	3.96	0.13	1.28	0.31	1.38	1.51	1.75	1.86	0.62	0.55	14.94	3.90	6.04	
1955	0.61	0.66	1.02	0.58	1.36	1.10	0.29	3.17	0.36	1.70	1.58	1.07	13.50	2.66	6.52	
1956	1.90	0.55	0.55	1.90	2.05	0.57	2.03	0.59	0.00	0.69	1.09	1.82	13.74	3.68	6.78	
1957	1.15	1.29	1.10	1.95	4.45	1.55	2.30	1.69	0.50	2.23	1.00	0.33	19.54	3.57	11.82	
1958	0.24	0.62	1.77	1.75	1.99	0.61	0.83	1.89	0.78	0.07	0.67	1.23	12.45	3.10	7.42	
1959	0.53	0.67	1.20	0.88	2.14	1.37	0.44	1.57	1.41	1.02	0.23	0.72	12.18	2.19	7.42	
1960	0.00	0.87	1.12	0.31	1.89	1.57	0.58	0.77	0.81	0.99	1.32	0.49	10.72	1.98	5.63	
1961	0.34	0.35	1.29	2.49	1.92	1.61	2.68	2.32	4.98	0.55	1.15	0.63	20.31	2.39	15.20	
1962	1.75	1.60	0.40	2.13	1.00	1.88	0.57	0.75	0.51	0.58	0.36	0.62	12.15	3.04	6.50	
1963	0.74	0.26	0.51	1.97	0.22	1.25	1.53	3.51	0.66	0.45	0.84	0.74	12.68	1.54	8.68	
1964	1.05	1.12	0.94	1.62	1.12	1.74	0.63	1.96	0.69	0.53	2.22	1.15	14.77	2.57	7.37	
1965	0.68	0.60	0.96	2.05	3.53	1.83	1.32	3.14	2.66	0.00	1.18	0.86	18.81	3.07	13.80	
1966	0.50	0.72	1.01	1.12	0.50	1.51	1.08	2.58	1.08	1.96	0.36	0.92	13.34	2.14	7.48	
1967	0.56	0.73	1.73	1.39	1.94	2.12	3.72	1.51	2.75	1.48	0.49	1.67	20.09	3.13	12.76	
1968	0.42	0.85	0.29	3.28	1.98	0.47	1.18	1.88	1.37	1.24	1.63	0.67	15.36	2.65	9.65	
1969	1.09	1.08	0.90	1.49	0.83	3.47	0.96	1.21	1.20	3.41	0.99	0.68	17.31	3.31	8.70	
1970	0.31	0.29	0.89	2.10	1.51	2.37	0.74	3.65	1.92	3.04	1.58	0.83	19.23	3.29	11.68	
1971	0.48	0.88	0.87	1.64	1.67	0.44	1.37	0.64	0.89	0.83	0.69	1.24	11.64	3.84	6.32	
1972	1.14	0.65	0.70	1.63	0.79	1.85	0.58	1.13	2.03	3.18	1.27	2.30	17.25	2.63	7.61	
1973	0.50	0.50	1.24	3.04	1.95	1.04	1.66	0.62	1.25	0.23	2.45	1.58	16.06	4.50	9.08	
1974	1.02	0.72	2.35	2.25	0.59	1.69	1.27	0.20	1.05	1.18	0.41	1.03	13.76	4.18	6.70	
1975	1.67	0.66	2.69	2.17	1.68	0.88	2.15	0.87	0.55	2.39	0.52	1.55	17.58	3.82	7.70	
1976	0.37	1.32	1.50	1.69	1.41	1.85	1.49	1.28	0.30	0.40	0.28	0.59	12.48	3.83	7.62	
1977	0.47	0.59	1.66	2.11	4.20	0.06	2.41	1.62	0.86	0.77	1.22	0.32	16.29	2.00	10.70	
1978	0.72	0.83	1.01	0.88	3.03	0.68	0.25	0.20	1.07	0.87	0.92	2.14	12.40	2.44	5.61	
1979	0.48	0.40	1.38	1.11	1.38	0.20	0.32	2.40	0.39	1.72	0.66	0.34	10.78	3.10	5.51	
1980	2.38	0.79	1.28	0.25	2.02	0.03	0.39	0.82	1.30	1.26	0.53	0.19	11.25	3.59	4.58	
1981	0.06	0.52	0.94	1.00	4.36	0.60	1.93	1.31	0.81	1.53	0.63	0.87	14.76	1.75	9.70	
1982	1.33	0.38	0.87	0.64	1.41	1.34	1.68	0.46	1.45	1.85	1.04	0.60	13.05	2.81	6.63	
1983	0.08	0.44	2.21	2.12	1.55	2.79	1.45	1.34	0.52	1.74	2.59	1.18	18.02	3.11	9.29	
1984	0.28	0.84	1.58	2.51	0.69	1.26	1.72	1.49	1.81	0.80	0.72	0.60	14.30	4.11	9.01	
1985	1.02	0.36	1.07	1.36	0.65	0.60	1.88	0.24	1.27	2.04	2.08	0.44	13.01	2.29	5.70	
1986	0.10	1.85	0.95	1.39	1.23	2.48	1.38	0.73	1.15	1.83	0.75	0.26	14.10	3.73	7.94	
1987	0.67	0.63	0.88	1.02	1.24	0.79	1.45	1.07	0.11	1.23	0.83	0.91	10.83	2.51	5.40	
1988	0.62	0.56	1.41	0.36	1.30	1.29	0.46	0.45	1.35	0.15	1.29	0.55	9.79	2.78	4.95	
1989	0.25	2.63	1.05	0.33	0.49	0.77	0.91	1.87	1.50	0.33	0.70	0.88	11.71	2.86	5.58	
1990	0.22	1.38	1.26	0.99	0.51	0.99	1.98	0.70	1.12	1.68	0.84	0.48	12.15	2.39	5.98	
1991	0.60	0.41	0.89	1.01	2.15	1.46	0.53	1.51	0.48	0.42	1.72	0.18	11.36	2.45	6.78	
1992	2.20	0.81	0.86	1.30	2.39	1.43	2.88	1.28	1.05	0.95	1.55	1.34	18.04	3.10	9.81	
1993	0.70	1.53	1.48	2.77	1.84	2.26	0.34	1.30	1.55	2.10	2.08	1.28	19.23	3.78	9.56	
1994	0.41	1.74	1.01	1.35	0.66	0.66	0.40	1.35	0.22	1.18	1.07	0.34	10.39	4.31	4.41	
1995	1.01	0.69	0.95	1.59	5.12	1.73	1.53	0.54	2.06	1.70	1.21	0.10	18.23	2.62	11.94	
1996	0.51	0.43	0.90	1.55	2.21	0.47	1.01	0.93	0.60	1.76	1.75	1.17	13.29	2.43	6.43	
1997	1.70	0.57	0.41	2.62	1.34	0.77	0.96	2.39	2.80	1.24	0.25	0.34	15.39	3.68	10.34	
1998	0.29	1.04	0.96	1.29	1.02	2.27	2.76	0.84	0.78	2.38	0.55	0.76	14.94	2.06	8.51	
1999	0.86	0.59	0.55	2.15	1.69	1.45	1.10	1.03	1.20	0.37	0.45	0	11.44	2.85	8.19	
Average	0.78	0.81	1.18	1.57	1.73	1.31	1.31	1.41	1.14	1.30	1.05	0.84	14.42	3.00	8.06	

Table 1 - Climate Data for CUw Calculation

MUDDY GAP

Year	Minimum Air Temperature, F												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1951	4.7	15.9	15.7	26.1	37.7	39.9	54.0	49.5	37.9	33.4	18.9	10.8	28.7
1952	12.3	12.7	12.2	31.5	38.5	49.1	51.9	54.9	41.9	32.3	15.0	15.9	30.7
1953	21.1	12.5	22.3	25.6	35.1	50.9	56.5	56.4	47.9	34.4	26.9	13.6	33.6
1954	19.9	23.3	17.5	33.3	37.5	46.8	58.7	52.3	45.7	33.3	28.3	17.5	34.5
1955	12.4	11.9	15.3	29.1	38.3	44.1	50.8	56.1	44.7	33.0	19.6	18.7	31.2
1956	18.5	9.7	21.8	26.4	41.1	50.7	51.1	49.9	42.1	36.6	18.6	14.9	31.8
1957	5.9	23.5	21.6	26.5	39.6	45.9	54.2	54.0	38.5	34.5	17.9	19.2	31.8
1958	14.0	24.5	14.6	27.4	41.7	45.4	48.9	52.6	43.4	33.4	19.9	19.9	32.1
1959	12.9	14.6	20.0	29.7	35.4	48.6	51.5	52.5	41.2	31.4	16.5	17.6	31.0
1960	14.5	5.3	18.9	32.7	37.4	48.5	52.6	49.0	42.6	33.5	23.1	12.9	30.9
1961	14.2	19.1	24.2	28.0	38.9	49.7	51.8	53.2	38.3	30.6	19.2	12.7	31.7
1962	6.2	19.0	17.4	31.9	38.8	45.3	50.4	51.5	39.0	35.4	27.0	18.5	31.7
1963	2.4	20.6	20.8	28.6	40.6	46.3	53.1	53.8	46.2	37.2	26.7	15.8	32.7
1964	12.8	9.0	13.8	28.5	38.3	44.4	56.4	50.4	40.0	33.3	18.7	13.9	30.0
1965	19.3	16.4	10.4	32.6	36.1	46.5	52.9	49.8	35.0	34.3	28.8	19.2	31.8
1966	13.0	11.1	22.4	25.6	38.8	46.4	56.6	49.3	44.8	32.6	25.7	15.5	31.8
1967	14.5	17.8	27.4	29.3	35.6	45.3	52.8	52.0	46.2	34.2	22.8	7.0	32.1
1968	15.5	18.1	25.3	25.6	35.5	47.2	53.5	50.2	38.8	33.6	21.3	11.4	31.3
1969	19.8	18.2	14.1	34.2	39.8	42.2	53.5	55.7	46.8	27.7	25.1	19.8	33.1
1970	17.5	21.6	17.1	24.8	38.9	44.7	54.2	53.0	37.7	25.9	25.1	15.6	31.3
1971	18.9	16.3	22.3	28.5	35.3	46.8	49.9	54.0	40.5	28.7	20.7	13.1	31.3
1972	10.4	17.6	28.0	29.3	37.1	47.8	48.2	47.7	36.1	32.0	20.5	7.9	30.2
1973	7.1	10.1	19.2	23.0	35.0	45.7	52.8	53.3	40.8	32.0	23.3	16.8	29.9
1974	8.1	15.0	25.2	30.1	35.4	48.7	55.0	46.7	38.4	32.0	24.9	11.9	31.0
1975	13.2	13.0	20.3	24.7	32.0	43.1	57.0	49.9	37.8	32.6	19.6	17.9	30.1
1976	13.4	15.7	21.7	30.9	38.3	46.4	56.4	52.6	45.1	31.9	22.1	17.0	32.6
1977	9.6	18.5	17.5	32.6	39.2	52.2	55.5	49.6	43.8	33.6	21.7	15.8	32.5
1978	11.9	13.4	23.8	30.6	35.5	47.3	52.4	49.3	42.4	31.6	16.9	3.5	29.9
1979	1.0	15.4	24.3	28.8	36.1	43.2	51.4	49.9	45.3	32.7	13.1	14.7	29.7
1980	5.1	13.2	18.5	29.7	36.5	45.9	52.9	53.5	42.9	31.2	21.2	25.4	31.3
1981	18.0	16.7	24.0	31.8	38.5	47.1	53.1	50.7	47.6	31.9	23.4	17.7	33.4
1982	11.6	14.2	23.6	25.3	36.7	43.9	53.1	55.2	43.0	32.7	20.3	15.7	31.3
1983	21.4	18.6	23.8	24.0	33.8	46.0	52.7	56.8	43.2	34.8	22.8	3.3	31.8
1984	13.1	15.1	22.9	27.5	37.8	44.1	52.9	55.3	37.9	26.7	21.7	9.8	30.4
1985	8.5	11.0	21.4	29.2	39.2	44.9	54.0	49.1	39.5	32.0	15.1	13.0	29.7
1986	21.8	15.6	28.4	30.2	37.2	51.6	51.7	50.3	40.4	32.6	20.4	14.0	32.9
1987	10.7	16.1	21.4	32.4	41.5	47.8	53.0	49.0	40.8	32.5	24.7	12.7	31.9
1988	8.8	16.2	20.0	31.3	39.5	53.7	54.9	50.7	39.4	35.9	21.4	13.3	32.1
1989	13.9	5.6	25.8	30.1	38.5	45.3	55.6	50.8	42.7	34.6	25.0	13.5	31.8
1990	18.5	14.9	23.3	31.1	34.3	47.1	53.1	51.3	46.4	44.0	27.5	5.6	33.1
1991	11.8	21.7	23.9	29.4	39.2	47.1	53.1	52.7	41.8	31.3	19.1	15.9	32.3
1992	14.0	21.4	26.9	33.0	41.6	47.0	49.1	49.6	44.9	33.7	19.8	12.4	32.8
1993	11.1	11.3	24.0	29.8	40.5	43.3	46.6	48.5	41.0	33.0	17.3	17.0	30.3
1994	17.9	15.2	25.8	30.2	40.5	46.8	50.3	52.6	43.8	34.1	19.2	21.2	33.1
1995	15.3	22.3	22.9	29.0	33.8	43.6	49.9	54.4	43.4	32.9	25.4	19.4	32.7
1996	12.0	16.4	19.2	27.6	37.8	47.7	52.3	51.7	42.2	34.2	28.0	19.7	32.4
1997	0.4	15.4	24.4	25.6	38.6	49.2	52.3	52.6	48.7	33.4	19.4	12.4	31.0
1998	21.4	20.3	18.5	29.4	36.7	42.6	55.8	52.9	48.3	34.6	27.4	16.0	33.7
1999	19.3	21.9	22.6	27.7	38.6	47.9	56.4	55.4	39.7	34.4	32.9	18.1	34.6
Average	13.1	16.0	21.2	29.0	37.7	46.6	53.0	51.9	42.2	33.0	22.0	14.8	31.7

Table 1 - Climate Data for CUw Calculation

MUDDY GAP

Maximum Air Temperature, F

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	27.6	35.8	37.5	51.4	62.5	65.6	83.8	79.5	67.1	55.2	38.5	30.1	52.9
1952	28.9	31.8	32.5	54.7	66.5	76.4	82.7	83.0	76.3	67.4	38.6	33.5	56.0
1953	39.6	34.0	45.5	50.2	58.5	78.0	87.7	81.5	75.5	62.2	49.6	33.2	58.0
1954	36.5	45.5	39.2	60.2	67.9	75.7	86.9	82.9	75.4	59.6	50.7	32.6	59.4
1955	27.9	27.9	36.0	51.6	66.7	74.0	84.5	84.5	72.9	61.7	40.7	35.5	55.3
1956	35.7	29.6	45.5	56.1	68.5	82.5	83.5	78.8	78.5	61.9	38.4	34.1	57.8
1957	24.9	41.3	45.4	50.0	60.6	73.3	83.9	81.8	71.8	59.0	34.7	34.6	55.1
1958	31.2	42.5	37.5	51.9	71.1	77.1	81.9	84.1	75.4	64.2	46.3	37.9	58.4
1959	34.0	32.6	40.1	55.3	63.0	80.6	85.1	83.0	69.3	57.4	45.0	40.3	57.1
1960	28.4	24.9	45.0	59.7	67.6	79.1	86.7	83.2	76.7	60.5	41.1	34.2	57.3
1961	34.7	38.3	45.6	54.3	66.8	79.3	84.3	83.1	63.8	57.9	37.2	28.3	56.1
1962	24.2	34.6	37.1	61.7	66.0	75.3	81.9	82.7	75.8	64.7	51.0	40.1	57.9
1963	27.0	46.0	42.9	54.5	68.0	77.0	85.5	80.6	76.5	67.8	49.1	34.3	59.1
1964	28.6	27.6	33.7	51.3	65.2	70.6	87.2	80.2	72.9	64.7	40.9	30.6	54.5
1965	35.1	34.5	35.4	54.4	60.8	72.0	81.5	78.6	60.8	67.1	49.3	32.9	55.2
1966	29.1	29.5	45.9	54.4	70.4	74.9	87.1	80.9	74.7	57.4	45.8	29.9	56.7
1967	31.2	36.9	48.5	55.6	61.0	70.8	82.6	82.7	73.3	62.9	43.8	26.4	56.3
1968	30.6	36.4	45.8	51.1	62.0	76.0	82.7	77.8	71.9	62.1	41.9	29.3	55.6
1969	37.4	35.9	36.7	59.4	71.9	70.8	85.8	86.3	76.8	48.3	44.4	36.6	57.5
1970	34.1	44.3	40.9	45.1	68.3	75.3	83.9	85.3	70.1	55.0	43.1	31.6	56.4
1971	32.9	35.5	43.1	52.5	63.2	77.6	81.9	84.2	65.6	54.7	35.8	26.7	54.5
1972	27.8	34.7	50.9	55.1	66.1	76.9	82.2	80.3	70.8	57.9	35.8	25.8	55.4
1973	23.8	27.8	36.7	42.2	61.7	76.1	79.3	83.9	64.7	60.1	40.5	34.7	52.6
1974	26.2	31.3	45.4	54.7	67.0	75.9	85.0	77.7	71.6	61.2	44.0	30.4	55.9
1975	28.4	31.1	38.8	47.5	60.6	72.8	86.2	81.7	70.4	58.6	41.2	34.6	54.3
1976	30.6	34.3	42.3	55.8	68.3	71.8	86.3	81.6	74.0	58.3	44.3	36.1	57.0
1977	29.8	40.7	40.4	57.6	65.8	83.0	85.0	80.0	75.3	62.6	44.2	37.3	58.5
1978	31.3	33.1	46.6	56.7	58.9	76.1	83.9	79.2	72.0	64.8	40.7	22.6	55.5
1979	18.0	31.8	40.8	56.1	63.7	75.2	85.1	78.2	77.5	61.0	35.2	35.8	54.9
1980	27.5	33.4	39.3	53.8	60.5	78.1	86.5	81.7	74.4	58.8	43.8	45.3	56.9
1981	42.6	41.7	47.6	61.8	62.3	79.9	86.0	83.6	76.8	55.8	48.8	38.7	60.5
1982	32.7	35.2	46.7	53.5	63.8	73.9	84.9	87.8	68.8	55.4	39.0	30.0	56.0
1983	36.9	34.9	43.3	46.6	60.2	73.5	85.1	88.2	76.8	63.3	41.8	25.2	56.3
1984	26.3	31.6	39.0	49.1	69.2	77.0	86.7	85.7	71.2	53.7	44.3	30.4	55.4
1985	24.6	28.4	43.8	60.4	71.1	80.1	86.5	85.3	68.4	60.9	35.1	28.3	56.1
1986	36.8	36.9	54.1	56.9	66.0	84.3	81.7	85.0	68.6	57.2	43.3	34.6	58.8
1987	30.4	35.7	41.7	63.9	69.3	80.6	83.9	82.1	75.8	63.5	42.0	31.6	58.4
1988	28.1	38.1	41.4	61.6	70.3	86.6	89.8	85.9	72.8	65.9	44.3	31.4	59.7
1989	32.0	22.5	50.4	61.4	69.4	76.2	88.3	81.0	73.3	58.9	46.5	34.0	57.8
1990	35.7	37.8	48.2	59.6	64.4	80.5	83.8	84.1	77.6	73.6	44.2	26.1	59.6
1991	29.4	44.7	48.6	52.7	64.1	77.3	84.8	85.1	72.9	60.7	37.4	30.8	57.4
1992	29.8	39.1	50.8	64.3	70.8	76.4	80.6	83.2	74.9	64.9	36.3	27.5	58.2
1993	28.5	28.7	43.4	53.5	67.6	71.9	78.9	80.5	72.1	57.7	36.0	31.9	54.2
1994	35.7	33.3	50.8	58.6	73.5	82.7	87.2	87.7	75.8	57.2	38.5	37.3	59.9
1995	32.2	40.8	48.0	52.9	58.8	73.3	83.6	86.6	71.3	56.8	48.1	38.8	57.6
1996	32.1	40.3	46.8	57.8	64.5	80.7	86.7	87.2	72.3	58.0	44.2	35.1	58.8
1997	35.0	33.8	49.4	51.0	68.5	78.5	84.7	82.5	73.5	59.5	41.3	29.4	57.3
1998	36.1	36.0	40.6	55.0	65.9	68.1	86.7	84.4	74.5	57.2	45.6	34.6	57.1
1999	37.5	39.6	52.8	50.0	64.1	75.5	87.8	84.9	69.6	62.3	55.5	36.0	59.6
Average	31.1	35.2	43.4	54.8	65.6	76.4	84.7	82.9	72.6	60.4	42.6	32.8	56.9

Table 1 - Climate Data for CUw Calculation

MUDDY GAP															
Precipitation, inches															
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	50%	95%
1951	0.38	0.43	0.93	1.01	2.06	1.66	0.36	0.27	0.59	1.28	0.30	0.32	9.59		
1952	0.05	0.77	0.64	0.56	3.16	1.10	0.50	1.26	0.00	0.16	0.32	0.14	8.66	1.68	6.25
1953	0.21	0.86	0.85	1.50	2.78	0.60	0.07	2.51	0.02	0.00	0.52	0.47	10.39	1.27	7.11
1954	0.20	0.20	0.51	0.08	1.40	2.80	0.94	0.12	0.13	0.80	0.22	0.25	7.65	0.95	5.20
1955	0.43	0.73	0.07	0.33	0.63	0.30	0.76	0.39	1.02	0.20	0.63	0.94	6.43	1.25	3.26
1956	0.30	0.03	0.19	0.70	1.09	0.00	2.19	0.71	0.10	0.80	0.61	0.47	7.19	1.15	4.55
1957	0.07	0.21	0.91	2.53	4.50	1.24	3.01	1.64	0.57	1.45	0.77	0.20	17.10	1.54	12.82
1958	0.13	0.02	0.93	0.88	2.02	1.75	1.48	0.60	0.40	0.10	0.36	0.42	9.09	1.75	6.77
1959	0.28	0.94	0.86	0.47	3.04	0.78	0.00	0.28	2.87	0.30	0.14	0.12	10.08	1.48	7.07
1960	0.32	0.62	0.25	0.81	0.87	0.87	0.22	0.16	0.50	0.30	0.58	0.36	5.86	0.88	3.26
1961	0.07	0.71	0.33	0.62	1.42	0.92	0.66	0.48	1.34	1.15	0.20	0.04	7.94	1.18	5.17
1962	0.24	0.15	0.71	1.60	1.96	0.23	1.05	0.34	0.63	1.10	0.18	0.05	8.24	1.25	5.52
1963	0.31	0.14	1.03	1.28	0.16	2.48	0.52	1.27	0.87	0.21	0.22	0.43	8.92	1.41	6.25
1964	0.29	1.18	0.67	1.47	4.67	0.77	0.00	0.01	0.50	0.12	0.55	0.27	10.50	1.50	7.05
1965	0.27	0.22	0.07	1.64	3.37	1.54	1.27	0.81	1.34	0.17	0.00	0.83	11.53	0.75	9.47
1966	0.06	0.84	0.24	0.39	0.93	1.19	1.03	1.16	0.41	1.97	0.62	0.49	9.33	1.07	4.85
1967	0.70	0.29	0.23	0.56	2.62	2.11	0.66	0.09	0.76	0.78	0.62	1.10	10.52	2.15	6.46
1968	0.10	0.32	0.62	1.76	1.40	0.70	0.34	1.02	0.15	0.06	0.33	0.90	7.70	1.77	5.10
1969	0.00	0.20	0.59	0.87	0.51	0.51	0.09	0.15	0.05	0.95	0.46	0.16	4.54	1.04	2.07
1970	0.09	0.08	1.06	2.18	0.50	2.72	0.45	0.62	0.56	0.74	0.73	0.76	10.49	1.40	6.88
1971	0.36	0.49	0.11	1.40	4.05	0.19	0.33	0.25	1.89	2.26	0.40	0.25	11.98	1.60	7.70
1972	0.45	0.33	0.19	1.89	1.35	0.89	0.59	1.05	0.12	3.26	0.52	1.21	11.85	1.94	5.60
1973	0.78	0.25	0.40	2.37	0.10	0.06	2.60	0.00	2.39	0.34	0.88	0.94	11.11	3.21	7.14
1974	0.51	1.64	0.19	2.76	0.20	1.32	1.82	0.50	0.91	1.07	0.34	1.00	12.26	2.25	7.13
1975	0.61	0.41	0.78	0.43	4.32	0.60	2.18	0.00	0.48	0.55	0.11	0.29	10.76	2.11	7.61
1976	0.49	0.44	0.25	0.67	0.70	1.09	1.11	0.54	0.39	0.72	0.23	0.18	8.81	1.07	4.28
1977	0.59	0.55	1.15	1.90	1.83	0.23	1.26	1.07	0.29	0.61	0.95	0.18	10.61	1.71	6.25
1978	0.77	0.46	0.52	1.45	4.71	0.31	1.18	0.84	0.51	0.18	1.25	1.00	13.18	1.75	8.55
1979	0.30	0.17	1.08	0.97	2.85	1.27	0.38	3.69	0.02	1.20	0.78	0.42	13.13	1.99	8.72
1980	0.83	0.48	1.22	0.49	2.48	0.00	1.24	0.06	0.83	0.88	0.05	0.56	2.47	4.06	
1981	0.17	0.08	2.98	0.94	3.08	0.00	0.94	0.77	1.03	0.56	0.41	0.07	11.03	2.50	6.42
1982	0.25	0.09	0.46	0.57	1.58	1.17	0.62	0.14	4.28	1.07	1.01	0.54	11.78	0.92	7.94
1983	0.25	0.48	1.05	2.46	1.66	1.22	0.72	0.81	0.41	1.14	3.37	0.89	14.46	2.20	6.92
1984	0.41	0.56	0.79	2.57	0.68	0.57	2.65	0.59	0.55	0.43	0.27	0.32	10.39	3.58	7.23
1985	0.53	0.57	0.73	1.65	0.69	1.46	1.32	0.05	1.55	0.09	0.78	0.86	10.28	1.43	6.38
1986	0.17	0.70	1.98	2.05	1.94	1.56	0.68	0.65	0.44	1.94	0.95	0.06	13.12	2.29	6.95
1987	1.25	0.52	0.58	0.69	1.79	1.63	1.15	1.16	0.31	0.72	0.92	0.77	11.49	2.65	6.39
1988	0.60	0.27	1.35	0.87	1.87	0.06	0.10	0.31	2.30	0.00	0.26	1.01	9.00	2.32	5.23
1989	0.25	1.35	0.49	0.36	1.59	0.56	1.75	0.77	1.65	0.41	0.49	0.43	10.10	1.68	6.35
1990	0.06	0.42	1.31	1.22	1.66	1.15	1.64	0.03	1.63	1.19	1.80	0.74	12.85	1.56	6.96
1991	0.30	0.29	0.20	1.71	5.11	2.21	0.77	0.38	0.71	0.58	1.54	0.04	13.84	2.26	10.35
1992	0.26	0.24	1.22	0.76	4.29	1.16	1.15	0.52	0.24	0.14	1.74	0.74	12.46	1.94	7.71
1993	0.62	0.56	0.88	2.84	1.72	2.28	0.96	0.21	0.75	1.73	0.30	0.47	13.32	2.34	8.32
1994	0.28	0.39	0.18	0.97	0.28	0.25	0.70	0.22	0.72	2.17	1.08	0.08	7.32	1.68	2.98
1995	1.17	0.47	0.14	1.48	5.36	1.82	0.60	0.00	1.47	2.46	0.48	0.22	15.67	2.56	10.19
1996	0.56	0.15	0.89	1.50	3.54	0.54	0.02	0.13	0.73	1.64	1.01	0.52	11.23	2.38	6.14
1997	0.37	0.60	0.68	2.25	2.20	1.41	0.93	1.25	0.85	0.44	0.33	0.75	12.06	2.41	8.45
1998	0.07	0.70	3.85	0.53	0.80	2.80	1.31	0.28	1.06	2.15	0.54	0.41	14.50	3.07	6.44
1999	0.48	0.15	0.09	3.06	0.92	0.21	0.03	1.03	1.81	0.02	0.25	0.02	8.07	1.91	8.71
Average	0.37	0.46	0.76	1.31	2.09	1.07	0.92	0.66	0.86	0.87	0.66	0.47	10.51	1.82	6.58

Table 1 - Climate Data for CUw Calculation

CASPER/GLENROCK/DOUGLAS

Average Minimum Air Temperature, F

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	9.4	18.5	16.8	26.4	40.6	43.8	54.0	52.1	39.8	33.9	22.7	10.1	30.7
1952	15.1	15.8	16.8	32.6	41.7	50.7	52.8	53.5	43.9	29.7	14.3	20.1	32.3
1953	24.2	14.7	24.6	26.9	36.4	50.2	57.5	55.0	43.7	33.9	27.2	14.2	34.0
1954	16.3	23.5	15.7	33.0	40.7	49.6	59.4	53.1	45.4	32.7	26.9	19.7	34.7
1955	10.5	10.0	15.6	30.1	40.5	47.6	56.2	56.8	44.2	33.8	15.4	16.7	31.5
1956	15.0	12.7	19.8	27.5	42.7	49.9	54.3	50.3	41.5	33.7	18.9	19.1	32.1
1957	5.0	19.5	22.0	28.0	40.2	47.3	54.9	55.7	40.1	35.2	21.4	23.3	32.7
1958	16.3	17.5	18.7	29.7	43.7	48.9	51.3	54.1	43.6	32.1	23.1	17.5	33.0
1959	12.9	15.1	23.0	28.4	38.7	50.1	51.7	52.2	42.6	30.2	16.0	17.5	31.5
1960	12.8	10.5	21.6	31.9	38.8	49.5	54.8	52.4	44.4	33.2	23.4	13.7	32.3
1961	17.7	20.9	26.4	29.8	41.6	50.0	53.7	56.3	39.0	31.1	19.7	12.9	33.3
1962	5.8	18.7	20.6	32.8	41.8	48.3	53.9	50.9	42.4	37.4	28.4	17.9	33.2
1963	1.4	22.3	23.7	30.6	40.8	50.0	56.4	55.9	48.2	39.4	25.7	13.4	34.0
1964	14.3	12.8	15.3	30.1	40.1	47.5	58.0	50.9	39.7	30.3	21.1	15.2	31.3
1965	20.3	12.6	9.6	36.0	39.8	48.8	55.0	50.2	36.3	34.4	27.0	19.3	32.4
1966	10.7	13.2	24.6	26.7	38.3	46.9	58.4	50.8	46.9	31.4	24.5	15.7	32.3
1967	18.2	18.3	26.5	29.7	38.2	46.5	54.4	51.8	45.8	34.7	18.6	8.3	32.6
1968	12.0	21.3	24.9	26.8	35.9	47.3	53.4	50.2	39.9	33.7	20.9	10.4	31.4
1969	14.2	17.4	17.9	34.2	40.4	45.3	54.7	54.5	46.6	28.7	24.0	16.4	32.9
1970	12.7	19.7	17.1	27.5	39.2	47.9	54.7	54.8	39.5	27.7	25.4	13.2	31.6
1971	15.8	14.9	20.4	29.8	37.6	48.4	50.3	52.8	39.1	29.7	22.0	17.0	31.5
1972	6.9	17.9	25.6	30.0	39.2	48.8	49.1	52.3	39.2	30.1	19.3	6.6	30.4
1973	10.0	14.7	21.6	25.4	35.7	46.7	52.9	53.1	41.4	33.3	23.0	17.6	31.3
1974	8.9	19.8	24.7	31.9	38.0	48.8	56.0	48.5	37.7	33.1	24.6	14.2	32.2
1975	12.4	11.6	21.0	27.4	37.8	45.7	58.1	52.1	39.7	32.4	21.0	18.9	31.5
1976	13.2	22.1	19.2	32.7	40.0	46.2	56.9	52.6	43.3	29.4	20.0	17.5	32.8
1977	6.9	19.7	22.3	33.1	41.8	53.1	57.1	51.9	43.7	34.5	22.5	15.6	33.5
1978	7.2	12.2	25.3	33.4	38.4	48.0	54.1	50.4	42.7	31.7	16.6	4.7	30.4
1979	-2.1	16.9	25.7	30.6	37.5	47.0	54.9	53.8	44.3	34.6	16.3	17.8	31.4
1980	6.4	16.4	21.1	30.2	38.2	47.4	55.8	51.4	42.8	31.0	23.4	23.0	32.2
1981	17.6	17.2	25.1	35.4	40.7	49.8	56.4	52.8	44.8	33.5	26.8	17.4	34.8
1982	9.8	14.1	23.8	27.6	39.1	47.5	54.5	57.1	43.5	32.8	23.1	17.4	32.5
1983	21.5	23.9	26.5	27.2	36.2	47.7	55.5	59.0	42.9	34.3	21.2	1.2	33.1
1984	13.4	20.4	25.3	27.0	38.6	46.7	56.4	55.1	38.4	29.4	23.1	12.4	32.2
1985	6.1	9.8	21.0	31.1	40.4	45.1	55.9	49.2	40.9	29.8	8.4	10.8	29.0
1986	22.0	18.8	30.5	32.2	36.9	51.8	52.7	52.7	43.8	34.2	22.0	17.6	34.6
1987	14.2	20.9	22.6	33.8	44.4	48.2	54.4	50.4	40.8	29.9	23.5	13.6	33.1
1988	9.8	15.1	22.8	29.5	39.9	55.6	55.4	51.9	41.6	33.0	23.7	16.8	32.9
1989	15.8	3.5	23.2	30.9	39.4	46.0	55.4	52.5	42.1	32.0	26.5	12.1	31.6
1990	20.5	17.1	22.5	31.3	37.1	48.6	54.7	51.6	45.6	31.0	25.5	4.8	32.5
1991	7.6	22.5	23.3	29.7	40.5	49.7	53.8	53.5	42.6	29.0	21.6	16.9	32.5
1992	18.4	23.2	27.1	33.3	41.1	49.1	52.6	51.6	42.1	33.9	19.3	10.5	33.5
1993	12.3	4.7	26.0	30.9	42.1	46.0	50.7	51.2	41.5	31.3	17.8	20.2	31.2
1994	17.7	13.7	27.4	31.6	45.0	50.8	54.1	55.8	44.7	33.2	23.1	20.8	34.8
1995	16.8	20.8	25.5	29.8	38.8	46.6	51.9	55.4	43.0	31.4	26.8	17.5	33.7
1996	10.2	17.9	19.2	31.5	39.3	48.4	53.7	50.6	41.7	30.7	22.3	17.8	31.9
1997	14.3	16.6	25.5	24.8	38.6	50.5	53.8	53.8	47.1	33.9	21.2	14.8	32.9
1998	15.4	23.4	21.3	30.9	40.6	45.0	56.6	53.6	49.1	34.3	31.6	14.7	34.7
1999	16.8	22.4	23.4	29.3	38.4	47.3	55.6	54.4	38.7	30.1	28.8	19.0	33.7
Average	12.9	16.9	22.2	30.2	39.6	48.3	54.7	52.9	42.5	32.3	22.2	15.2	32.5

Table 1 - Climate Data for CUw Calculation

GLENROCK

Average Minimum Air Temperature, F

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	10.0	19.3	17.9	26.5	40.3	43.1	54.8	51.3	40.1	33.6	24.0	10.5	31.0
1952	15.5	16.0	16.0	32.8	42.5	50.1	51.7	53.6	43.6	29.5	15.3	22.1	32.4
1953	25.7	15.9	25.8	27.4	36.4	50.2	58.1	55.5	44.6	33.8	27.7	14.9	34.7
1954	16.5	23.8	15.9	32.4	41.2	50.8	60.2	52.8	44.9	32.4	25.5	19.5	34.7
1955	11.4	10.0	15.5	30.6	41.0	47.8	57.1	56.6	44.5	34.3	17.2	18.4	32.0
1956	15.4	13.7	19.0	27.2	42.7	50.2	54.6	50.6	40.0	33.1	20.3	20.3	32.3
1957	5.7	20.6	22.2	27.5	39.3	47.2	54.9	55.5	40.0	35.9	22.4	25.7	33.1
1958	17.5	18.0	20.1	30.4	44.0	50.2	51.7	54.5	45.0	33.1	25.7	19.1	34.1
1959	16.1	17.8	24.3	29.2	39.5	50.1	51.1	50.7	42.0	31.8	17.7	18.5	32.4
1960	14.4	10.9	21.2	32.8	39.2	49.7	53.0	52.3	45.5	34.9	26.0	14.2	32.8
1961	21.7	22.1	28.3	32.3	43.2	50.7	53.3	57.7	41.7	31.0	20.6	14.2	34.7
1962	8.5	21.0	21.6	33.6	42.7	48.7	55.1	51.8	43.2	40.1	30.8	19.5	34.7
1963	4.9	26.0	26.4	31.6	42.2	50.9	57.3	57.0	49.0	41.4	28.7	16.4	36.0
1964	18.4	17.1	18.9	32.0	40.4	49.1	58.8	52.5	41.2	32.3	25.1	19.6	33.8
1965	23.8	15.4	11.4	38.4	41.8	51.1	56.5	52.0	38.4	36.6	29.5	22.7	34.8
1966	14.3	17.0	26.4	28.9	40.6	49.5	60.2	53.1	49.3	34.7	28.1	19.8	35.2
1967	21.6	21.0	29.8	32.4	41.0	48.3	55.9	54.1	47.8	38.2	22.4	11.8	35.4
1968	14.4	24.1	27.0	29.4	37.9	50.0	55.8	52.7	43.3	36.7	25.1	14.7	34.3
1969	16.0	19.0	20.2	37.2	43.2	48.0	57.7	57.3	50.1	31.8	28.4	20.0	35.7
1970	16.1	22.5	20.2	29.1	39.9	49.7	56.2	56.7	42.3	30.0	27.4	16.1	33.9
1971	18.0	15.9	21.4	32.4	38.1	49.0	51.7	53.6	38.8	30.5	25.2	20.5	32.9
1972	10.1	19.4	26.8	30.9	39.9	48.8	48.6	51.8	38.1	29.4	19.4	6.3	30.8
1973	11.3	17.3	19.0	26.3	36.6	48.5	53.1	54.1	40.9	34.5	22.5	21.2	32.1
1974	11.6	22.8	27.4	33.0	40.6	50.2	56.1	49.6	39.2	34.8	28.9	16.5	34.2
1975	14.9	14.7	23.3	28.9	40.4	48.6	61.2	53.8	40.6	35.5	24.6	21.9	34.0
1976	16.2	25.1	21.3	34.6	41.7	47.7	56.2	54.0	44.9	31.0	22.9	21.7	34.8
1977	10.9	23.1	25.0	34.5	43.9	54.2	59.2	53.6	45.9	37.7	25.0	19.4	36.0
1978	10.3	14.6	27.5	35.2	39.5	49.9	55.0	51.4	43.8	33.5	18.5	7.9	32.3
1979	2.1	21.8	28.2	33.0	39.9	49.8	56.9	55.5	46.0	37.4	19.1	20.3	34.2
1980	9.6	17.3	22.4	32.3	38.7	48.2	56.6	53.5	44.3	32.2	26.2	26.0	33.9
1981	19.4	19.8	26.5	36.7	42.0	51.3	57.8	54.5	45.8	34.7	28.4	21.1	36.5
1982	12.5	18.1	25.3	29.3	41.0	49.4	56.3	59.7	44.7	33.6	26.2	20.5	34.7
1983	22.5	26.4	28.0	28.8	38.0	48.8	57.9	60.4	43.9	35.8	24.0	4.2	34.9
1984	17.5	22.8	26.8	27.5	39.2	48.9	59.8	57.8	42.7	32.9	26.5	16.8	34.9
1985	10.0	13.4	21.4	32.5	41.4	46.1	58.0	51.1	42.0	30.6	8.3	11.3	30.5
1986	23.3	22.8	34.2	34.6	39.8	53.3	53.5	54.5	46.7	37.3	24.9	18.9	37.0
1987	17.8	23.2	25.7	36.0	46.2	50.0	56.3	52.0	42.4	33.2	24.2	19.1	35.5
1988	13.6	17.5	25.8	31.8	41.5	58.3	56.1	53.5	42.9	34.6	25.8	20.5	35.2
1989	19.8	6.3	24.8	33.0	40.8	46.8	55.4	53.1	42.7	33.1	28.2	14.6	33.2
1990	25.2	19.2	24.1	32.6	39.1	49.2	55.4	52.4	45.4	31.9	25.5	5.9	33.8
1991	7.9	22.2	23.4	28.4	39.3	48.7	52.6	51.8	40.7	27.0	22.7	20.0	32.1
1992	21.8	24.2	28.3	35.6	42.8	49.6	54.1	52.8	43.1	35.7	21.1	13.8	35.2
1993	14.3	7.3	26.9	30.8	42.2	46.3	51.5	50.9	42.2	32.3	19.1	22.8	32.2
1994	19.6	15.3	30.6	33.8	47.2	53.1	55.4	57.3	47.1	34.1	24.2	24.4	36.8
1995	20.2	22.0	28.0	32.6	40.3	48.8	55.5	59.2	45.9	34.3	29.8	19.5	36.3
1996	13.0	21.7	21.2	34.5	42.5	51.8	57.0	54.2	44.7	32.6	24.3	20.7	34.9
1997	17.8	19.6	28.6	27.2	41.6	54.7	56.5	56.0	49.0	36.2	23.2	15.9	35.6
1998	17.8	25.0	23.4	32.6	43.5	48.0	58.4	55.2	50.9	35.5	35.2	19.5	37.1
1999	20.3	27.5	23.6	31.0	40.1	48.8	57.1	57.1	39.2	30.7	31.7	20.9	35.7
Average	15.5	19.1	23.8	31.7	41.0	49.6	55.8	54.1	43.7	33.8	24.4	17.8	34.2

Table 1 - Climate Data for CUw Calculation

CASPER

Average Minimum Air Temperature, F

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	10.4	18.1	15.5	25.4	40.6	43.6	54.7	53.0	40.4	33.6	23.0	8.9	30.6
1952	15.5	16.7	16.9	33.6	41.2	51.0	53.9	55.3	46.7	33.9	16.9	20.2	33.5
1953	22.9	14.9	24.4	26.7	36.1	49.9	57.8	55.7	45.6	36.6	28.1	15.8	34.5
1954	16.4	25.2	14.5	32.6	39.7	47.5	59.3	54.7	46.3	33.0	28.8	21.4	35.0
1955	12.8	11.0	15.2	30.0	40.5	47.8	56.5	58.5	46.1	36.4	14.9	17.3	32.3
1956	17.9	13.3	20.7	28.5	43.0	51.1	55.9	51.9	44.0	35.8	19.4	19.3	33.4
1957	5.2	20.2	21.9	27.7	40.9	47.8	56.1	56.9	41.7	34.9	21.3	22.8	33.1
1958	18.3	18.9	17.5	28.8	44.5	48.4	51.4	55.0	44.2	34.1	22.0	18.9	33.5
1959	12.2	13.0	22.5	28.1	37.7	50.4	53.2	54.5	43.1	30.6	17.1	18.8	31.8
1960	13.3	8.3	21.3	29.6	38.4	47.6	55.3	51.1	46.6	34.1	24.0	15.2	32.1
1961	18.8	21.4	25.7	28.6	41.4	51.3	55.6	57.5	38.5	32.6	20.4	11.9	33.6
1962	5.3	16.9	19.4	32.5	41.4	47.8	53.4	51.8	42.7	37.9	28.9	19.5	33.1
1963	1.7	19.7	23.3	29.9	41.0	50.1	55.8	56.1	49.0	40.6	26.7	14.6	34.0
1964	13.6	11.6	14.6	28.6	40.6	47.6	58.1	50.9	39.4	30.8	19.8	13.8	30.8
1965	19.8	11.1	8.0	34.1	38.0	46.8	53.9	49.7	34.1	35.0	26.5	19.1	31.3
1966	11.1	14.5	23.2	25.5	37.4	44.9	57.1	49.7	46.0	31.1	23.3	15.1	31.6
1967	17.6	17.0	23.2	27.7	37.1	45.2	53.8	51.5	45.6	34.0	19.1	7.3	31.6
1968	12.7	20.2	25.2	26.0	34.4	45.7	52.0	49.4	39.3	33.1	20.3	8.0	30.5
1969	15.1	18.0	16.9	32.9	38.9	43.6	53.4	53.6	45.1	27.1	23.1	17.4	32.1
1970	11.6	19.5	15.8	27.5	39.1	47.2	53.9	54.4	38.9	27.3	24.7	15.2	31.3
1971	15.1	13.8	20.1	28.4	36.6	47.6	49.2	53.1	38.5	30.0	21.3	15.1	30.7
1972	6.5	17.6	24.9	29.6	38.1	48.6	48.4	52.4	39.6	31.0	21.1	8.8	30.6
1973	10.4	15.2	23.6	25.6	36.3	46.6	52.9	53.3	42.2	34.4	24.0	17.4	31.8
1974	8.8	18.2	23.5	31.6	36.5	48.4	56.9	48.0	38.7	34.6	24.2	15.9	32.1
1975	11.7	10.7	19.8	26.7	36.3	44.1	57.2	51.0	38.9	33.0	20.5	19.1	30.8
1976	13.6	21.0	19.0	31.3	38.9	44.8	58.0	52.3	44.2	30.6	21.6	18.1	32.8
1977	8.4	18.8	20.9	33.2	40.4	53.2	55.8	50.3	42.1	33.8	21.5	13.4	32.7
1978	6.5	12.8	24.9	31.4	38.0	47.8	53.0	51.5	43.4	32.2	15.7	2.5	30.0
1979	-2.4	13.8	25.2	29.4	35.8	44.6	52.8	52.9	42.9	32.6	16.0	18.9	30.2
1980	4.3	18.3	20.4	29.7	37.5	45.7	54.2	49.3	42.1	32.3	22.9	22.6	31.6
1981	18.5	16.9	24.5	33.9	39.3	47.9	54.9	51.3	44.2	32.7	26.9	15.7	33.9
1982	7.6	12.6	23.3	26.8	37.8	46.3	53.5	56.6	43.1	33.3	21.1	14.9	31.4
1983	21.5	22.3	26.3	26.7	34.7	46.8	53.8	57.8	42.3	34.4	20.8	-0.3	32.3
1984	14.1	19.4	24.6	26.4	38.7	45.0	53.9	53.9	35.7	26.5	23.4	11.0	31.1
1985	6.4	9.1	21.3	30.4	39.6	44.5	55.0	48.6	39.6	30.6	8.2	12.4	28.8
1986	23.0	17.8	28.8	30.7	35.0	51.7	53.0	52.0	42.5	34.2	21.0	16.6	33.9
1987	14.3	19.7	23.0	34.1	43.5	47.5	53.7	49.6	41.0	30.0	25.1	12.7	32.9
1988	10.6	15.6	21.2	29.2	38.7	55.3	55.4	51.6	42.3	33.0	22.7	17.1	32.7
1989	14.5	2.3	22.1	29.0	38.6	45.8	55.4	51.9	42.9	33.7	26.6	14.1	31.4
1990	17.6	16.4	22.2	30.6	35.0	46.7	53.9	51.4	46.3	31.5	26.2	4.8	31.9
1991	10.3	24.3	23.3	30.2	39.5	49.4	54.7	55.1	43.4	30.5	20.8	18.5	33.3
1992	18.3	24.4	27.8	32.7	40.6	48.7	52.1	52.3	43.3	34.8	22.6	11.0	34.1
1993	12.0	8.0	27.9	32.0	43.0	46.4	50.5	52.0	43.3	34.0	19.6	20.1	32.4
1994	18.8	14.1	28.4	32.1	44.0	50.1	54.4	56.4	45.8	34.1	22.8	22.4	35.3
1995	18.1	20.3	24.6	28.0	37.6	45.5	51.5	54.0	43.3	31.0	25.1	16.6	33.0
1996	9.2	15.7	17.9	29.7	36.6	45.5	50.9	47.7	39.2	29.8	20.3	15.9	29.9
1997	11.2	14.1	23.4	22.1	35.9	46.6	52.4	52.9	45.7	32.7	20.0	13.5	30.9
1998	16.1	21.9	21.5	30.1	38.7	43.8	55.8	52.7	48.5	32.7	28.6	13.0	33.6
1999	16.7	21.9	22.2	28.1	36.0	45.5	53.8	52.4	38.5	30.0	30.1	20.1	32.9
Average	12.9	16.5	21.7	29.5	38.8	47.5	54.2	52.8	42.6	32.8	22.2	15.2	32.2

Table 1 - Climate Data for CUw Calculation

DOUGLAS

Average Minimum Air Temperature, F

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	7.9	18.0	16.9	27.3	40.9	44.6	52.6	52.1	38.8	34.4	21.0	10.9	30.5
1952	14.4	14.8	17.4	31.3	41.5	51.0	52.9	51.6	41.5	25.6	10.7	17.9	30.9
1953	24.1	13.2	23.5	26.5	36.8	50.4	56.7	53.7	40.9	31.2	25.8	11.9	32.9
1954	15.9	21.5	16.8	33.9	41.1	50.5	58.6	51.8	45.0	32.6	26.5	18.2	34.4
1955	7.3	9.1	16.0	29.6	39.9	47.2	55.0	55.4	42.1	30.8	14.1	14.5	30.1
1956	11.6	11.0	19.6	26.7	42.4	48.4	52.5	48.3	40.4	32.2	17.1	17.6	30.7
1957	4.0	17.6	21.8	28.7	40.5	46.8	53.8	54.7	38.7	34.8	20.5	21.3	31.9
1958	13.1	15.5	18.5	30.0	42.5	48.1	50.8	52.9	41.7	29.1	21.5	14.5	31.5
1959	10.5	14.5	22.2	28.0	38.8	49.9	50.9	51.4	42.6	28.3	13.2	15.3	30.5
1960	10.7	12.3	22.4	33.4	38.8	50.9	56.0	53.8	41.2	30.5	20.2	11.8	31.8
1961	12.7	19.1	25.3	28.5	40.1	48.1	52.3	53.6	36.9	29.7	18.2	12.5	31.4
1962	3.5	18.3	20.7	32.2	41.3	48.5	53.1	49.0	41.4	34.1	25.6	14.6	31.9
1963	-2.5	21.2	21.4	30.2	39.2	49.1	56.2	54.5	46.5	36.2	21.7	9.3	31.9
1964	11.0	9.8	12.3	29.6	39.4	45.9	57.0	49.4	38.6	27.7	18.5	12.2	29.3
1965	17.2	11.3	9.5	35.5	39.5	48.4	54.5	48.9	36.4	31.6	24.9	16.2	31.2
1966	6.7	8.2	24.1	25.6	36.9	46.3	58.0	49.5	45.4	28.5	22.2	12.3	30.3
1967	15.4	16.9	26.4	29.1	36.5	46.0	53.4	49.8	44.0	32.0	14.2	5.8	30.8
1968	8.9	19.7	22.4	24.9	35.5	46.2	52.5	48.5	37.1	31.3	17.2	8.6	29.4
1969	11.6	15.3	16.6	32.4	39.2	44.3	53.0	52.6	44.6	27.1	20.6	11.8	30.8
1970	10.4	17.1	15.3	25.8	38.7	46.7	53.9	53.4	37.3	25.8	24.1	8.3	29.7
1971	14.4	14.9	19.6	28.7	38.1	48.6	50.0	51.7	40.0	28.5	19.4	15.5	30.8
1972	4.0	16.8	25.1	29.5	39.5	48.9	50.3	52.7	40.0	29.8	17.3	4.8	29.9
1973	8.2	11.6	22.3	24.4	34.3	45.1	52.8	51.8	41.2	31.1	22.5	14.2	30.0
1974	6.2	18.3	23.3	31.1	36.8	47.7	55.0	47.8	35.2	30.0	20.6	10.2	30.2
1975	10.7	9.3	19.8	26.7	36.8	44.4	56.0	51.4	39.5	28.7	17.8	15.6	29.7
1976	9.8	20.2	17.4	32.2	39.5	46.0	56.4	51.5	40.8	26.5	15.5	12.8	30.7
1977	1.3	17.2	21.0	31.6	41.0	52.0	56.2	51.8	43.2	31.9	20.9	13.9	31.8
1978	4.8	9.3	23.6	33.6	37.6	46.2	54.2	48.4	40.9	29.5	15.6	3.8	29.0
1979	-5.9	15.1	23.6	29.5	36.7	46.7	55.1	52.9	44.0	33.8	13.9	14.1	30.0
1980	5.3	13.5	20.6	28.5	38.3	48.2	56.5	51.3	42.0	28.4	21.2	20.5	31.2
1981	15.0	14.8	24.2	35.6	40.7	50.2	56.6	52.6	44.3	33.2	25.2	15.5	34.0
1982	9.2	11.5	22.9	26.8	38.5	46.9	53.7	55.0	42.6	31.6	22.0	16.8	31.5
1983	20.4	23.0	25.1	26.1	35.9	47.5	54.9	58.9	42.6	32.7	18.9	-0.4	32.1
1984	8.5	19.1	24.4	27.1	38.0	46.3	55.5	53.7	36.9	28.9	19.3	9.4	30.6
1985	1.8	7.0	20.3	30.5	40.1	44.8	54.7	47.8	41.1	28.1	8.7	8.6	27.8
1986	19.7	15.8	28.5	31.3	35.8	50.5	51.6	51.6	42.1	31.0	20.0	17.3	32.9
1987	10.5	19.9	19.2	31.4	43.6	47.1	53.3	49.5	38.9	26.4	21.1	9.0	30.8
1988	5.3	12.1	21.4	27.6	39.6	53.3	54.6	50.7	39.6	31.5	22.5	12.7	30.9
1989	13.1	1.8	22.6	30.7	38.9	45.3	55.4	52.5	40.6	29.2	24.8	7.5	30.2
1990	18.7	15.8	21.3	30.7	37.3	49.8	54.7	51.1	45.0	29.6	24.8	3.6	31.9
1991	4.5	21.0	23.3	30.4	42.6	50.9	54.0	53.6	43.7	29.6	21.2	12.2	32.3
1992	15.0	21.0	25.1	31.6	40.0	48.9	51.5	49.7	39.9	31.2	14.2	6.6	31.2
1993	10.6	-1.3	23.1	29.9	41.2	45.4	50.1	50.8	38.9	27.5	14.7	17.6	29.0
1994	14.7	11.7	23.3	28.8	43.9	49.3	52.4	53.6	41.1	31.3	22.4	15.5	32.3
1995	12.0	20.1	23.9	28.9	38.4	45.6	48.6	53.0	39.9	28.9	25.5	16.4	31.8
1996	8.3	16.3	18.6	30.2	38.9	47.8	53.2	49.9	41.3	29.8	22.3	16.9	31.1
1997	13.9	16.1	24.6	25.1	38.2	50.3	52.6	52.6	46.6	32.7	20.4	14.9	32.3
1998	12.3	23.2	19.1	30.1	39.6	43.2	55.6	53.0	48.0	34.6	30.9	11.7	33.4
1999	13.5	17.8	24.5	28.7	39.1	47.6	56.0	53.8	38.3	29.6	24.5	16.1	32.5
Average	10.2	15.0	21.2	29.5	39.2	47.8	54.0	51.8	41.2	30.4	20.1	12.6	31.1

Table 1 - Climate Data for CUw Calculation

CASPER/GLENROCK/DOUGLAS													
Year	Average Maximum Air Temperature, F												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1951	33.8	45.0	45.7	53.1	67.0	70.6	86.4	85.4	71.5	58.0	47.2	34.7	58.2
1952	38.9	40.4	39.6	63.5	68.5	83.2	87.1	85.7	81.6	67.9	42.4	40.3	61.6
1953	46.1	38.6	52.4	52.9	63.2	83.1	90.3	87.5	80.8	67.7	53.9	37.9	62.9
1954	42.6	52.3	41.6	63.3	68.8	80.2	93.6	88.2	79.4	61.7	54.5	42.0	64.0
1955	33.9	32.8	39.5	58.6	69.8	72.6	89.8	88.1	75.9	66.6	41.5	40.0	59.1
1956	38.7	37.3	47.8	53.7	70.1	86.8	86.8	82.6	79.6	66.1	41.2	40.3	60.9
1957	28.9	45.3	48.5	52.0	62.6	75.7	88.5	86.4	72.0	59.1	39.9	45.0	58.7
1958	41.2	43.3	39.8	52.4	74.4	79.2	81.6	88.3	77.9	66.7	48.2	40.1	61.1
1959	37.7	35.9	44.1	57.1	64.6	84.0	87.8	87.2	70.7	58.4	45.9	44.5	59.8
1960	34.0	31.4	46.6	61.1	70.1	80.7	89.5	86.0	77.5	63.6	45.1	38.1	60.3
1961	40.6	42.7	48.8	55.4	67.4	81.8	86.4	87.3	66.0	59.1	42.3	34.6	59.4
1962	29.5	39.1	43.2	63.4	69.2	75.9	83.5	85.4	75.9	66.2	53.0	43.0	60.6
1963	27.5	46.4	48.3	56.4	70.9	80.4	89.7	86.1	80.4	70.7	52.9	37.1	62.2
1964	36.0	33.5	39.1	52.9	68.6	76.0	91.7	83.4	76.2	66.2	46.2	36.5	58.9
1965	42.1	37.3	34.9	59.2	63.5	74.2	85.2	83.8	62.2	69.7	53.9	42.2	59.0
1966	35.1	36.3	51.8	54.0	75.3	79.4	93.1	84.8	77.9	61.0	50.2	38.5	61.4
1967	38.9	40.8	52.0	59.1	61.5	71.8	86.2	86.9	76.4	64.5	44.5	31.6	59.5
1968	38.0	42.8	50.5	52.9	63.2	77.7	87.2	81.5	74.9	64.6	46.0	33.5	59.4
1969	40.4	41.5	41.1	62.5	73.4	71.9	90.1	90.9	81.9	50.6	48.5	41.1	61.2
1970	36.6	47.0	41.6	50.8	69.9	79.7	89.3	91.0	72.5	56.8	46.4	39.1	60.1
1971	38.2	37.7	44.9	55.6	64.6	81.9	86.3	89.0	70.5	57.2	43.9	37.4	58.9
1972	32.1	42.6	54.1	57.6	67.4	81.4	84.9	84.7	75.0	60.8	42.0	30.3	59.4
1973	33.7	39.9	45.6	48.2	67.2	80.6	85.3	88.3	69.2	65.4	45.1	40.2	59.1
1974	31.8	40.8	50.5	56.6	68.8	82.1	89.4	83.1	72.5	64.5	47.9	36.6	60.4
1975	33.4	34.6	42.7	51.3	64.6	75.5	89.6	85.6	74.9	64.6	47.1	40.7	58.7
1976	35.0	42.7	46.7	57.6	69.7	76.6	87.3	85.6	75.9	58.7	47.2	41.5	60.4
1977	33.0	45.9	44.8	60.8	69.8	85.4	87.3	82.5	79.4	65.2	46.7	38.7	61.6
1978	29.3	32.2	51.4	58.3	62.6	79.7	86.3	82.3	77.7	64.9	40.0	27.2	57.7
1979	21.9	37.3	48.2	59.4	64.5	79.5	88.2	82.2	81.3	64.1	38.9	41.7	58.9
1980	30.7	37.0	43.3	58.8	65.0	82.9	90.3	84.2	77.9	61.6	46.7	47.4	60.5
1981	44.9	44.2	52.0	64.6	63.5	81.3	88.5	85.8	79.5	57.5	53.0	40.8	63.0
1982	34.9	40.8	50.1	56.3	64.5	72.8	87.1	89.7	71.4	57.4	43.1	34.9	58.6
1983	42.0	43.3	46.1	49.6	62.6	74.8	88.4	90.7	77.9	65.4	43.3	22.3	58.9
1984	33.7	39.3	44.9	51.2	70.2	78.0	87.2	87.8	70.7	56.4	48.7	36.8	58.7
1985	28.9	32.8	47.3	62.1	71.9	78.9	89.4	86.2	67.9	59.9	32.4	31.4	57.4
1986	42.7	40.8	57.9	58.2	68.0	83.7	85.7	86.9	69.3	59.3	45.4	38.7	61.4
1987	36.3	40.3	44.7	66.8	72.9	82.5	88.6	83.8	77.3	64.4	48.3	35.7	61.8
1988	32.6	41.0	45.1	64.6	72.2	90.1	92.4	89.2	76.2	67.6	46.9	39.0	63.1
1989	42.7	25.4	49.7	61.3	69.0	77.3	90.3	85.1	74.0	59.4	49.1	35.2	59.9
1990	41.8	40.7	47.6	58.3	66.1	82.9	85.0	85.0	79.2	61.4	49.3	29.0	60.5
1991	33.1	47.7	49.6	54.0	63.9	78.3	86.7	86.1	73.8	59.1	41.6	40.1	59.5
1992	42.2	50.1	54.4	65.6	72.9	78.7	81.8	83.3	78.9	65.8	42.1	33.9	62.5
1993	32.6	31.9	48.5	56.4	69.7	74.1	81.6	82.9	71.9	60.8	39.9	39.4	57.5
1994	39.6	37.5	54.5	61.0	77.1	85.7	87.5	88.6	79.8	59.3	44.3	42.7	63.1
1995	38.2	43.0	49.7	53.5	59.5	74.7	82.5	90.9	72.5	57.6	50.2	41.7	59.5
1996	34.3	43.4	45.1	59.2	64.5	82.8	88.2	87.6	73.9	60.9	46.4	38.2	60.4
1997	34.1	37.2	52.5	50.5	68.6	79.2	85.7	83.1	75.3	62.8	44.6	34.6	59.0
1998	37.4	41.7	44.4	58.0	71.8	71.9	88.1	87.0	81.1	57.8	49.6	38.6	60.6
1999	40.1	46.0	54.1	51.4	66.0	76.2	89.2	86.7	70.5	63.9	59.4	42.0	62.1
Average	36.2	40.2	47.1	57.2	67.8	79.1	87.6	86.1	75.2	62.2	46.3	37.9	60.2

Table 1 - Climate Data for CUw Calculation

CASPER													
Year	Average Maximum Air Temperature, F											Annual	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		Dec
1951	30.6	41.1	41.8	50.4	65.3	68.9	85.0	83.4	70.2	55.0	44.0	31.8	55.6
1952	35.4	36.4	37.0	61.6	66.2	81.4	86.2	85.5	79.7	65.3	39.2	36.3	59.2
1953	42.5	34.8	48.5	50.1	61.6	81.6	89.1	86.3	78.7	64.8	50.3	33.6	60.2
1954	37.8	49.3	37.8	61.1	66.6	78.6	92.8	87.5	78.3	59.0	51.6	38.2	61.6
1955	31.7	29.5	36.5	57.0	69.1	73.3	89.9	87.8	75.0	64.4	38.1	37.1	57.5
1956	36.4	34.9	46.1	52.9	69.2	85.3	85.6	82.1	78.3	63.8	40.2	37.4	59.4
1957	27.2	44.0	47.9	49.7	62.5	75.5	87.5	85.2	70.6	57.9	37.3	41.6	57.2
1958	38.2	43.6	39.3	51.7	73.5	78.9	81.2	87.5	75.9	65.3	45.9	39.1	60.0
1959	35.1	32.9	42.6	55.9	63.4	83.1	86.8	86.1	69.3	56.7	44.3	42.2	58.2
1960	30.9	28.6	45.2	59.5	68.7	79.6	87.4	83.4	74.8	61.2	43.3	35.9	58.2
1961	38.5	41.3	48.3	54.3	67.3	81.2	85.3	86.7	64.3	56.9	40.2	31.3	58.0
1962	25.4	37.0	41.5	61.8	67.8	75.2	82.4	83.6	74.7	65.2	51.3	41.2	58.9
1963	26.2	45.0	46.2	54.8	69.3	79.6	88.2	84.7	79.2	68.6	49.8	35.1	60.6
1964	32.3	30.8	35.6	50.8	67.6	74.5	90.0	81.2	73.7	63.4	42.8	33.0	56.3
1965	39.5	34.1	32.9	57.4	61.7	73.3	84.6	82.9	61.2	69.0	53.1	39.0	57.4
1966	32.5	34.1	49.2	52.3	74.1	78.7	92.6	83.9	78.3	59.2	48.8	35.5	59.9
1967	35.8	38.3	49.6	57.6	61.1	71.8	85.9	86.4	76.3	62.3	42.5	27.4	57.9
1968	34.2	40.3	48.2	50.7	61.7	75.8	86.1	80.3	73.6	62.6	43.6	29.6	57.2
1969	38.5	40.0	39.8	60.5	72.5	70.4	89.7	90.0	81.4	48.6	45.7	39.6	59.7
1970	35.7	45.8	39.4	48.8	67.5	78.3	88.4	90.1	70.5	55.7	45.1	35.2	58.4
1971	35.7	35.6	43.2	53.8	63.5	81.0	85.6	89.4	69.2	55.5	39.6	32.7	57.1
1972	28.9	39.4	52.0	56.4	66.1	81.4	83.4	83.6	73.8	57.9	40.0	26.5	57.5
1973	28.0	34.3	42.4	46.5	65.9	79.4	83.9	88.0	67.8	63.0	42.1	36.0	56.4
1974	28.5	36.9	48.8	54.5	66.3	81.4	88.2	80.8	70.0	62.4	44.3	32.7	57.9
1975	30.5	31.0	40.6	48.7	61.4	73.5	88.5	85.0	74.4	62.2	44.4	37.7	56.5
1976	32.4	39.3	45.0	56.7	68.3	76.6	87.5	84.4	74.7	56.9	46.9	38.4	58.9
1977	32.4	43.1	41.7	59.8	69.8	85.5	87.6	81.9	78.5	63.8	45.0	36.3	60.5
1978	27.6	31.8	49.4	57.8	61.5	79.4	86.2	82.1	76.9	63.6	38.0	23.8	56.5
1979	20.0	34.0	45.6	57.9	62.7	78.9	86.8	82.4	81.3	63.0	36.9	38.5	57.5
1980	28.4	36.7	42.1	58.7	65.6	83.1	89.9	83.5	77.2	60.6	44.7	46.0	59.7
1981	44.2	42.8	51.4	62.7	63.4	80.7	88.5	86.8	79.8	56.0	51.0	38.9	62.2
1982	32.5	38.8	49.9	55.4	64.4	74.3	87.9	90.7	71.2	57.1	43.2	32.5	58.2
1983	41.2	40.7	46.2	49.3	62.0	74.0	89.1	92.1	78.3	64.9	41.5	22.5	58.5
1984	29.6	35.9	44.1	51.8	70.3	78.0	86.9	88.4	69.3	53.7	46.1	34.8	57.4
1985	25.7	30.3	45.3	60.6	71.0	78.0	88.2	84.7	67.2	59.9	32.3	30.2	56.1
1986	40.1	39.1	56.8	58.0	66.7	83.1	85.0	86.6	69.0	57.6	43.5	35.7	60.1
1987	31.9	37.0	41.7	65.8	71.4	82.1	87.6	82.7	75.8	63.4	45.8	34.8	60.0
1988	29.9	39.2	42.8	62.7	69.6	89.8	91.6	87.9	73.6	67.2	45.2	35.5	61.3
1989	37.7	21.5	49.1	60.8	69.3	76.6	91.4	86.1	73.4	58.8	48.0	34.4	58.9
1990	40.5	39.4	48.5	57.9	66.0	82.4	85.4	85.4	80.1	61.0	47.6	26.8	60.1
1991	32.3	46.6	49.6	55.0	64.1	80.5	88.3	88.9	75.5	61.5	39.9	37.2	60.0
1992	38.0	48.1	53.5	65.2	71.7	78.7	82.0	84.5	78.9	66.5	42.0	32.0	61.8
1993	30.9	31.1	48.7	55.8	69.3	74.1	82.9	84.0	73.0	60.7	39.2	37.7	57.3
1994	39.2	36.3	54.5	61.4	78.0	86.7	88.4	90.3	79.8	57.0	41.4	41.1	62.8
1995	36.5	41.4	49.2	52.8	59.1	73.3	86.5	91.6	72.7	56.9	49.3	40.1	59.1
1996	32.5	40.9	43.6	56.8	64.0	83.0	88.9	87.6	72.4	58.3	44.7	36.0	59.1
1997	31.4	35.3	50.5	48.1	67.2	79.8	85.5	83.9	74.2	61.0	44.5	31.9	57.8
1998	34.6	40.4	44.0	56.8	70.7	71.2	89.5	87.1	80.9	56.8	48.1	35.9	59.7
1999	38.5	43.9	53.1	50.1	63.8	76.3	89.8	87.5	70.2	64.3	57.4	39.7	61.2
Average	33.6	37.8	45.4	55.9	66.7	78.5	87.3	85.8	74.3	60.7	44.3	35.2	58.8

Table 1 - Climate Data for CUw Calculation

GLENROCK													
Year	Average Maximum Air Temperature, F											Annual	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		Dec
1951	35.1	46.7	47.9	54.9	68.3	72.5	88.2	88.3	71.9	57.9	48.3	35.6	59.6
1952	38.8	41.8	40.6	64.3	69.5	83.8	88.4	86.3	84.0	70.2	45.4	43.3	63.0
1953	47.9	41.2	54.9	54.9	64.7	84.6	91.8	90.0	83.3	69.4	56.0	40.0	64.9
1954	44.4	53.3	44.1	64.7	70.7	81.4	94.8	88.9	80.1	63.6	57.2	44.6	65.7
1955	36.8	35.5	42.5	60.6	71.8	73.8	91.1	89.5	77.0	68.7	44.5	41.7	61.1
1956	40.8	39.4	49.6	55.6	72.2	88.3	89.2	84.0	80.8	67.7	41.3	40.9	62.5
1957	29.8	46.4	49.2	55.8	64.5	77.2	90.4	88.6	74.3	60.4	41.5	47.2	60.4
1958	43.3	44.3	41.3	54.3	76.0	80.7	83.6	90.2	80.3	67.8	49.3	42.0	62.8
1959	39.5	37.9	45.6	58.4	66.3	85.2	89.2	88.3	72.6	60.5	47.1	46.1	61.4
1960	35.5	31.9	46.7	62.2	70.8	82.4	90.8	87.5	78.2	64.7	46.3	39.5	61.4
1961	42.8	43.5	49.8	57.3	68.9	83.2	88.2	89.2	67.7	60.0	43.5	35.8	60.8
1962	30.6	39.5	43.5	63.0	70.1	75.6	83.9	87.0	77.6	67.1	55.2	44.2	61.4
1963	29.3	47.3	49.0	57.8	72.5	80.9	91.3	87.9	81.7	72.5	55.2	40.2	63.8
1964	38.0	34.5	41.1	55.2	70.7	77.3	93.6	85.6	77.4	67.5	46.8	38.9	60.6
1965	43.6	38.9	36.2	60.4	65.2	75.6	86.2	85.1	63.4	70.5	53.4	43.7	60.2
1966	36.7	37.7	54.3	56.6	77.3	80.4	94.0	86.1	77.8	62.3	50.8	40.3	62.9
1967	41.0	42.2	53.9	61.4	63.5	73.3	87.8	88.3	77.3	66.3	46.8	33.7	61.3
1968	40.1	44.7	51.6	55.5	66.0	81.2	88.9	82.8	77.0	66.6	47.2	35.5	61.4
1969	42.3	42.2	42.0	64.7	75.3	74.2	92.2	92.5	83.0	52.0	50.1	42.2	62.7
1970	38.1	48.9	43.3	52.8	72.9	82.3	91.6	93.5	75.3	58.1	47.8	41.9	62.2
1971	39.9	39.4	47.0	57.5	67.3	84.7	89.4	89.0	72.9	58.7	45.7	38.9	60.9
1972	33.5	44.2	55.0	60.1	69.6	83.1	89.1	87.2	77.6	63.5	43.8	32.9	61.6
1973	37.2	43.5	48.4	49.6	68.8	83.7	88.4	90.5	72.3	68.2	47.5	43.2	61.8
1974	33.3	42.0	50.7	58.2	71.1	83.6	90.8	86.1	75.6	66.0	50.6	37.6	62.1
1975	35.7	37.3	44.4	52.8	67.6	77.7	91.2	86.8	76.4	66.5	47.9	42.5	60.6
1976	36.5	44.3	47.4	59.2	71.9	77.8	86.9	86.9	77.5	60.2	47.3	43.0	61.6
1977	34.7	47.1	46.7	61.5	70.0	85.8	88.6	84.9	80.7	68.8	47.3	40.2	62.9
1978	31.7	33.4	53.0	59.2	64.4	80.8	88.2	83.4	78.7	66.4	40.7	28.4	59.0
1979	24.0	40.4	50.1	60.7	66.8	81.5	90.3	83.1	82.3	64.5	39.5	42.6	60.5
1980	30.9	37.1	43.3	58.3	64.3	83.1	92.1	85.8	79.3	62.7	47.1	48.7	61.1
1981	45.2	45.5	52.2	65.8	64.3	82.9	90.2	86.7	80.2	58.1	52.8	42.1	63.8
1982	36.2	41.6	50.1	56.8	65.6	72.5	88.5	91.2	72.5	58.3	44.2	36.6	59.5
1983	43.2	45.5	47.2	50.7	64.9	77.6	90.7	91.7	78.4	66.2	45.1	22.4	60.3
1984	35.7	40.3	45.5	51.6	70.5	79.1	87.1	87.7	72.0	57.1	49.3	37.1	59.4
1985	29.7	32.8	46.5	62.4	71.4	79.1	90.9	88.2	67.4	59.1	31.1	29.8	57.4
1986	41.6	41.9	59.4	59.4	70.7	87.2	86.8	88.2	70.0	61.5	47.3	41.2	62.9
1987	38.1	41.5	46.9	69.3	74.4	84.2	90.0	85.8	79.4	66.2	49.7	37.4	63.6
1988	34.6	42.9	46.9	66.7	74.9	92.2	95.8	92.0	79.8	69.0	48.1	41.3	65.4
1989	45.2	27.8	49.4	62.4	67.9	77.7	89.4	83.3	74.6	59.6	47.6	35.3	60.0
1990	42.3	41.5	46.9	58.5	66.2	83.4	85.0	83.9	76.8	58.4	47.0	27.5	59.8
1991	30.0	45.5	47.3	51.2	61.8	75.2	83.8	81.5	70.1	55.7	40.6	40.4	56.9
1992	43.3	50.7	55.7	66.0	74.2	78.5	82.1	83.0	79.0	66.0	42.1	34.6	62.9
1993	33.8	33.3	48.9	57.4	70.3	74.6	80.3	81.8	71.7	60.7	40.2	40.0	57.8
1994	40.7	37.8	54.3	60.6	77.0	86.0	88.5	87.5	79.7	60.4	45.3	44.1	63.5
1995	40.1	44.7	51.2	55.3	62.0	76.9	88.0	91.5	75.2	60.4	51.5	43.1	61.7
1996	36.9	45.6	46.8	61.8	66.0	84.6	89.7	89.0	75.9	62.9	48.4	40.6	62.4
1997	36.4	39.2	54.9	53.3	71.0	79.9	87.1	83.8	76.8	64.4	45.0	35.8	60.6
1998	37.9	41.8	44.8	57.7	71.8	72.3	88.6	86.9	81.8	58.5	50.1	39.5	61.0
1999	39.9	46.2	54.1	51.9	66.3	75.6	89.1	85.9	71.0	61.1	59.1	41.2	61.8
Average	37.6	41.5	48.2	58.5	69.2	80.3	89.0	87.2	76.5	63.3	47.3	39.3	61.5

Table 1 - Climate Data for CUw Calculation

Year	DOUGLAS												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	Average Maximum Air Temperature, F												
1951	35.7	47.3	47.5	53.9	67.3	70.5	85.9	84.6	72.3	61.2	49.3	36.6	59.3
1952	42.5	42.9	41.3	64.6	69.8	84.3	86.8	85.3	81.1	68.3	42.5	41.4	62.6
1953	48.0	39.9	53.7	53.8	63.2	83.0	90.0	86.2	80.5	68.9	55.4	40.1	63.6
1954	45.5	54.4	42.8	64.1	69.2	80.5	93.2	88.1	79.9	62.6	54.6	43.3	64.9
1955	33.1	33.4	39.4	58.2	68.6	70.7	88.4	87.1	75.8	66.7	41.8	41.1	58.7
1956	38.9	37.5	47.6	52.7	68.8	86.7	85.5	81.8	79.6	66.9	42.2	42.7	60.9
1957	29.8	45.6	48.5	50.5	60.8	74.3	87.5	85.3	71.2	59.1	40.9	46.1	58.3
1958	42.0	42.0	38.9	51.3	73.6	78.0	79.9	87.1	77.5	67.0	49.4	39.3	60.5
1959	38.6	36.8	44.2	56.9	64.1	83.7	87.5	87.3	70.3	58.1	46.4	45.3	59.9
1960	35.7	33.7	48.0	61.7	70.8	80.2	90.2	87.2	79.6	64.9	45.6	39.0	61.4
1961	40.4	43.3	48.4	54.5	66.0	80.9	85.8	86.1	66.1	60.5	43.3	36.7	59.3
1962	32.4	40.9	44.6	65.4	69.7	76.8	84.3	85.5	75.5	66.3	52.6	43.6	61.5
1963	27.0	46.9	49.6	56.7	70.8	80.8	89.7	85.6	80.3	71.1	53.7	35.9	62.3
1964	37.8	35.2	40.7	52.7	67.4	76.2	91.6	83.3	77.5	67.6	49.0	37.6	59.7
1965	43.2	38.8	35.7	59.7	63.6	73.6	84.7	83.5	62.0	69.5	55.1	43.8	59.4
1966	36.2	37.1	51.9	53.0	74.5	79.0	92.7	84.5	77.5	61.4	51.0	39.6	61.5
1967	39.8	41.8	52.4	58.2	59.9	70.4	84.8	86.1	75.6	64.8	44.1	33.8	59.3
1968	39.6	43.4	51.7	52.6	61.9	76.1	86.7	81.3	74.2	64.6	47.2	35.4	59.6
1969	40.5	42.4	41.4	62.2	72.5	71.0	88.4	90.3	81.2	51.1	49.6	41.4	61.0
1970	36.0	46.4	42.1	50.7	69.2	78.6	87.9	89.4	71.6	56.7	46.4	40.3	59.6
1971	39.0	38.1	44.4	55.6	63.1	80.1	84.0	88.5	69.4	57.3	46.3	40.7	58.9
1972	33.8	44.2	55.3	56.2	66.5	79.6	82.3	83.2	73.5	60.9	42.3	31.6	59.1
1973	35.9	41.9	45.9	48.4	66.9	78.7	83.7	86.5	67.6	65.0	45.6	41.5	59.0
1974	33.6	43.6	52.0	57.0	68.9	81.4	89.3	82.3	71.9	65.1	48.9	39.6	61.1
1975	34.1	35.5	43.2	52.3	64.7	75.4	89.0	85.0	73.9	65.0	49.1	42.0	59.1
1976	36.2	44.5	47.8	56.9	68.9	75.5	87.4	85.4	75.5	59.1	47.5	43.0	60.6
1977	32.0	47.4	45.9	61.1	69.5	84.8	85.7	80.7	79.0	65.0	47.8	39.5	61.5
1978	28.5	31.3	51.9	57.6	62.0	78.8	84.6	81.3	77.6	64.7	41.3	29.3	57.4
1979	21.7	37.6	48.9	59.6	64.1	78.0	85.5	81.1	80.4	64.7	40.2	44.1	58.8
1980	32.9	37.3	44.4	59.3	65.2	82.5	88.9	82.2	77.3	61.6	48.3	47.5	60.6
1981	45.2	44.4	52.4	65.2	62.7	80.2	86.9	83.9	78.5	58.3	55.1	41.4	62.9
1982	36.1	41.9	50.2	56.6	63.6	71.5	84.9	87.2	70.6	56.7	41.9	35.6	58.1
1983	41.7	43.6	44.8	48.9	60.9	72.7	85.3	88.4	77.1	65.2	43.4	22.1	57.8
1984	35.8	41.6	45.2	50.1	69.7	76.9	87.6	87.2	70.8	58.4	50.7	38.6	59.4
1985	31.2	35.3	50.2	63.3	73.4	79.7	89.0	85.7	69.1	60.8	33.7	34.2	58.8
1986	46.4	41.4	57.5	57.2	66.7	80.7	85.3	85.9	68.9	58.8	45.4	39.3	61.1
1987	38.8	42.5	45.6	65.2	72.8	81.1	88.1	82.8	76.7	63.7	49.4	34.9	61.8
1988	33.4	41.0	45.5	64.5	72.1	88.4	89.7	87.7	75.1	66.6	47.5	40.1	62.6
1989	45.1	26.8	50.7	60.8	69.8	77.5	90.2	86.0	74.0	59.8	51.6	35.9	60.7
1990	42.7	41.1	47.5	58.4	66.2	83.0	84.7	85.6	80.8	64.7	53.2	32.8	61.7
1991	36.9	51.0	51.8	55.8	65.8	79.2	88.0	87.9	75.9	60.0	44.3	42.7	61.6
1992	45.3	51.6	53.9	65.7	72.9	79.0	81.4	82.5	78.9	64.9	42.2	35.2	62.8
1993	33.0	31.3	47.9	55.9	69.5	73.5	81.5	83.0	71.1	61.1	40.4	40.4	57.4
1994	39.0	38.4	54.7	60.9	76.2	84.3	85.6	87.9	79.8	60.4	46.1	42.9	63.0
1995	38.1	42.9	48.8	52.5	57.4	73.8	73.0	89.7	69.6	55.4	49.9	41.9	57.8
1996	33.5	43.7	44.9	59.0	63.5	80.9	86.1	86.1	73.5	61.6	46.1	38.0	59.7
1997	34.4	37.2	52.2	50.1	67.7	77.9	84.6	81.6	75.0	63.1	44.3	36.0	58.7
1998	39.6	42.9	44.3	59.5	72.8	72.1	86.3	87.1	80.7	58.2	50.6	40.5	61.2
1999	41.8	47.8	55.1	52.3	67.8	76.7	88.7	86.8	70.3	66.3	61.6	45.0	63.4
Average	37.3	41.2	47.6	57.1	67.4	78.4	86.5	85.4	74.9	62.6	47.2	39.2	60.4

Table 1 - Climate Data for CUw Calculation

CASPER/GLENROCK/DOUGLAS															
Average Precipitation, Inches															
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	50% Nov-Mar	95% Apr-Oct
1951	0.44	0.12	0.68	1.67	1.92	2.11	1.75	0.55	1.04	1.89	0.09	0.48	12.74	1.76	8.06
1952	0.38	1.16	1.40	0.28	4.22	1.51	0.84	0.89	0.44	0.32	0.94	0.11	12.37	1.76	8.06
1953	0.49	0.88	0.21	1.40	1.83	1.04	1.38	1.95	0.25	0.17	0.67	0.50	10.16	1.26	7.05
1954	0.28	0.22	2.08	0.44	1.32	0.56	0.42	0.66	0.33	1.45	0.19	0.35	8.32	1.88	4.92
1955	0.54	0.74	0.92	1.76	1.38	2.62	0.54	1.00	0.49	0.54	0.84	0.65	12.01	1.37	7.91
1956	0.30	0.40	0.49	1.68	2.38	0.45	0.74	0.78	0.18	0.26	1.27	0.56	9.46	1.34	6.12
1957	0.27	0.13	1.07	2.32	3.57	2.20	1.01	1.50	1.08	1.55	0.54	0.33	15.57	1.65	12.57
1958	0.22	0.35	1.59	1.83	1.04	1.32	1.88	0.49	0.29	0.05	0.86	0.37	10.08	1.52	6.56
1959	0.59	0.39	1.03	0.50	2.37	2.15	0.35	0.18	1.86	0.70	0.23	0.16	10.48	1.52	7.68
1960	0.48	0.47	0.49	0.63	1.19	0.84	1.05	0.67	0.26	0.24	1.40	0.48	8.20	0.92	4.63
1961	0.01	0.56	1.04	0.66	1.26	1.31	1.09	0.24	2.75	1.40	0.48	0.27	11.04	1.75	8.27
1962	0.70	0.51	0.30	0.77	4.67	3.42	1.84	0.43	0.74	2.02	0.48	0.26	16.15	1.12	13.21
1963	0.53	0.30	0.30	2.27	0.99	1.91	1.09	0.58	1.39	0.35	0.27	0.23	10.22	0.94	8.16
1964	0.68	0.62	0.57	2.84	2.29	1.12	0.59	0.28	0.28	0.21	0.27	0.44	10.20	1.19	7.23
1965	0.88	0.61	0.39	0.57	3.46	2.58	1.33	0.74	2.16	0.11	0.08	0.78	13.67	1.30	10.40
1966	0.26	0.55	0.41	1.10	0.37	1.21	0.50	0.66	0.71	1.38	0.30	0.39	8.13	1.03	5.91
1967	0.48	0.35	0.98	1.70	2.41	5.29	1.99	0.42	1.29	1.23	0.96	0.58	17.67	1.25	13.61
1968	0.33	0.40	0.94	1.71	2.85	2.63	0.52	0.76	0.45	0.47	0.39	0.55	11.91	1.56	8.93
1969	0.25	0.52	0.79	1.67	0.99	3.21	0.88	0.45	0.14	1.06	0.84	0.19	10.88	1.25	7.98
1970	0.71	0.28	1.53	1.70	1.45	2.92	1.60	0.10	0.34	1.27	1.08	0.65	13.60	1.77	8.90
1971	0.37	0.83	0.77	4.34	6.12	0.66	0.19	0.53	1.39	1.51	0.70	0.14	17.55	1.84	14.01
1972	1.08	0.29	1.02	1.91	1.72	1.88	1.28	2.27	0.62	1.69	0.44	0.50	14.68	1.61	10.78
1973	0.53	0.38	1.01	4.24	0.61	0.57	3.68	0.40	4.29	0.34	0.70	0.44	17.38	1.43	13.61
1974	0.52	0.39	0.27	2.38	0.38	0.60	0.50	0.96	0.78	0.96	0.23	0.33	8.21	1.16	6.14
1975	0.42	0.41	2.03	0.50	2.85	1.07	0.58	0.78	0.56	1.15	0.33	0.82	11.47	1.71	7.10
1976	0.30	0.62	0.96	2.75	3.21	1.63	0.84	0.18	1.41	1.15	0.13	0.20	12.78	1.21	10.62
1977	0.24	0.43	0.69	1.63	1.92	0.21	2.77	0.89	0.25	0.79	1.10	0.48	11.40	0.84	8.03
1978	0.48	0.48	0.59	1.26	5.62	0.85	1.70	1.10	0.18	0.73	0.64	0.84	14.47	1.57	10.87
1979	0.69	0.18	0.91	0.87	1.61	1.22	1.80	1.63	0.28	0.41	1.38	0.30	11.26	1.63	7.43
1980	0.74	0.56	0.84	0.30	3.17	0.03	0.44	0.93	0.11	0.46	0.62	0.32	8.54	1.90	5.17
1981	0.30	0.17	0.83	1.56	3.60	0.30	1.56	0.42	0.23	0.61	0.65	0.28	10.51	1.12	7.86
1982	0.40	0.18	0.34	1.52	2.64	3.54	1.74	0.67	2.61	1.12	0.74	2.07	17.57	0.93	13.14
1983	0.17	0.19	2.12	1.53	1.98	2.92	1.83	0.96	0.11	0.66	2.39	0.51	15.38	2.65	9.48
1984	0.55	0.37	1.04	1.89	1.46	0.84	1.91	0.51	0.58	0.76	0.32	0.58	10.80	2.43	7.54
1985	0.49	0.35	0.49	1.23	1.31	1.35	1.48	0.27	1.43	0.81	1.07	0.88	11.14	1.12	7.46
1986	0.18	0.73	0.55	2.01	1.26	3.68	0.98	0.27	1.17	1.80	1.14	0.18	13.96	1.71	10.61
1987	0.74	1.22	1.42	0.22	1.89	0.72	1.28	1.21	0.70	0.30	0.73	0.76	11.20	2.35	6.01
1988	0.18	0.68	0.86	0.35	1.28	0.54	0.82	0.34	0.77	0.10	0.61	0.39	6.92	1.61	3.99
1989	0.11	1.14	0.36	1.32	2.14	1.70	0.62	1.35	3.07	1.02	0.23	0.30	13.36	1.31	10.68
1990	0.43	0.54	1.27	2.01	1.79	0.55	2.76	1.15	0.40	0.67	1.17	0.41	13.36	1.39	9.06
1991	0.38	0.25	0.53	1.59	5.88	2.11	0.44	0.55	0.58	0.63	0.90	0.16	13.99	1.37	11.18
1992	0.17	0.35	1.64	0.20	1.95	2.16	1.55	0.78	0.42	0.65	0.85	0.83	11.53	1.61	7.31
1993	0.45	1.19	0.60	2.58	1.62	3.35	1.20	0.88	1.08	1.21	1.18	0.53	15.87	1.96	11.33
1994	0.47	0.59	0.35	1.44	0.63	0.24	2.10	0.85	0.81	3.43	1.18	0.39	12.27	1.56	8.82
1995	0.66	0.71	0.47	1.68	5.75	3.16	0.68	0.17	2.76	1.75	0.61	0.23	18.63	1.71	15.14
1996	0.56	0.10	0.88	2.40	2.08	0.67	0.80	0.21	0.58	1.65	0.86	0.55	11.12	1.09	7.99
1997	0.67	0.86	0.80	1.50	2.03	1.65	1.93	1.51	0.98	0.73	0.08	0.41	13.27	1.82	10.02
1998	0.68	1.02	1.16	1.14	1.05	2.42	1.53	1.26	1.14	4.94	0.41	0.20	16.95	1.68	12.81
1999	0.42	0.21	0.41	3.28	1.94	2.48	0.35	0.13	2.34	0.33	0.36	0.13	12.38	0.83	10.31
Average	0.45	0.51	0.84	1.58	2.28	1.70	1.24	0.74	0.98	1.00	0.69	0.46	12.47	1.49	9.01

Table 1 - Climate Data for CUw Calculation

CASPER															
Average Precipitation, inches															
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	50% Nov-Mar	95% Apr-Oct
1951	0.27	0.16	0.44	1.31	1.45	1.53	3.05	0.10	1.12	0.88	0.20	0.42	10.93		
1952	0.00	0.75	1.56	0.20	3.93	1.06	0.58	0.81	0.25	0.46	0.57	0.03	10.00	1.47	6.74
1953	0.53	1.00	0.25	0.94	1.80	1.07	1.52	0.98	0.21	0.16	0.72	0.74	9.72	1.19	6.16
1954	0.45	0.37	2.43	0.30	0.70	0.62	0.38	0.29	0.23	1.36	0.25	0.32	7.70	2.36	3.69
1955	0.59	1.01	0.99	1.44	0.73	2.07	0.27	0.81	0.65	0.47	1.19	1.04	11.26	1.58	6.12
1956	0.44	0.45	0.71	1.56	1.96	0.03	0.76	0.77	0.07	0.28	1.30	0.59	8.92	1.92	5.16
1957	0.42	0.15	0.91	2.45	3.85	1.93	1.00	1.13	1.08	1.99	0.77	0.43	16.11	1.69	12.76
1958	0.11	0.38	2.27	1.95	0.78	1.32	0.96	1.00	0.34	0.02	1.06	0.23	10.42	1.98	6.05
1959	0.58	0.61	1.32	0.74	1.99	1.79	0.27	0.23	1.99	0.71	0.27	0.25	10.75	1.90	7.33
1960	0.71	0.85	0.42	1.06	0.56	0.40	0.59	0.57	0.41	0.27	1.03	0.47	7.34	1.25	3.67
1961	0.04	0.51	1.16	0.95	0.71	0.54	1.21	0.08	2.46	1.12	0.56	0.62	9.98	1.61	6.72
1962	0.85	0.44	0.55	0.93	3.80	1.75	1.24	0.25	1.14	2.48	0.34	0.23	14.00	1.51	11.01
1963	0.38	0.49	0.35	2.07	0.80	0.94	1.20	0.39	0.33	0.33	0.31	0.31	7.90	0.90	5.76
1964	0.75	0.72	0.86	3.09	2.17	0.59	0.72	0.47	0.34	0.23	0.66	0.47	10.87	1.38	7.23
1965	0.78	0.37	0.52	0.96	2.64	2.47	1.16	0.21	2.07	0.00	0.07	0.87	12.12	1.40	9.03
1966	0.30	0.43	0.49	1.29	0.30	1.12	0.46	1.03	0.39	1.33	0.43	0.57	8.14	1.08	5.62
1967	0.58	0.65	0.66	1.24	1.62	3.75	1.46	0.41	1.67	1.37	1.09	0.82	15.32	1.45	10.94
1968	0.33	0.46	0.92	1.18	3.35	1.86	1.02	0.61	0.30	0.58	0.56	0.71	11.88	1.61	8.46
1969	0.08	0.55	1.10	1.52	0.85	2.39	0.70	0.78	0.16	1.43	0.96	0.16	10.68	1.50	7.44
1970	0.59	0.27	1.53	1.57	2.03	2.01	0.73	0.16	0.21	1.01	1.01	0.89	12.01	1.76	7.33
1971	0.19	0.80	1.17	3.40	5.59	0.17	0.11	0.11	0.74	1.73	0.61	0.34	14.96	2.03	11.26
1972	0.98	0.41	1.41	1.43	0.76	0.83	1.04	1.52	0.37	2.04	0.66	0.41	11.86	1.88	7.59
1973	0.63	0.57	0.52	3.65	1.02	0.66	2.28	0.34	3.28	0.80	0.80	0.55	15.08	1.40	11.41
1974	0.69	0.42	0.37	3.90	0.62	0.80	0.75	1.00	0.53	1.15	0.46	0.22	11.01	1.42	8.41
1975	0.51	0.51	2.01	0.97	3.88	0.94	0.63	0.12	0.11	1.01	0.51	0.72	11.92	1.96	7.28
1976	0.44	0.89	0.50	1.52	2.89	1.68	1.07	0.31	1.15	1.21	0.09	0.38	11.91	1.53	9.13
1977	0.35	0.69	1.05	1.07	1.93	0.19	1.88	0.34	0.30	0.71	0.79	0.71	10.01	1.28	6.10
1978	0.70	0.75	0.93	1.06	6.46	1.40	2.62	0.93	0.28	0.40	0.94	1.20	17.64	1.94	12.46
1979	0.81	0.39	1.31	0.83	2.24	1.31	1.22	2.66	0.18	0.50	0.75	0.36	12.56	2.33	8.49
1980	0.81	0.63	1.19	0.35	2.82	0.10	0.85	0.65	0.10	0.64	0.74	0.37	9.25	1.87	5.23
1981	0.46	0.23	0.77	1.56	3.51	0.37	1.27	0.50	0.23	0.76	0.75	0.43	10.84	1.29	7.79
1982	0.41	0.33	0.60	1.25	2.10	4.15	1.92	0.88	3.40	1.18	0.55	3.71	20.48	1.26	14.14
1983	0.42	0.35	2.29	2.28	1.40	3.76	2.61	0.75	0.20	0.88	2.71	0.75	18.40	3.66	11.29
1984	1.19	0.48	1.59	2.23	1.33	1.34	2.24	0.25	0.50	0.71	0.70	0.78	13.34	3.36	8.17
1985	0.79	0.61	0.52	1.25	1.37	1.32	1.57	0.99	1.09	0.46	1.56	1.05	11.83	1.70	6.79
1986	0.38	0.89	0.55	1.89	1.33	4.04	0.86	0.27	1.31	2.63	1.48	0.27	15.90	2.21	11.73
1987	1.41	1.42	1.43	0.35	1.40	0.70	1.91	1.80	0.59	0.55	0.77	0.63	12.96	3.01	6.94
1988	0.28	0.79	0.71	0.71	1.24	0.28	0.55	0.16	0.74	0.12	0.48	0.50	6.56	1.59	3.61
1989	0.16	1.37	0.49	0.72	2.77	1.95	0.28	1.00	3.22	1.16	0.34	0.31	13.77	1.50	10.55
1990	0.27	0.70	1.13	1.35	1.09	0.66	2.15	1.89	0.52	0.90	1.27	0.61	12.54	1.38	8.13
1991	0.54	0.38	0.45	1.42	4.75	1.70	0.09	0.61	0.40	0.55	1.18	0.34	12.41	1.63	9.04
1992	0.17	0.35	1.27	0.08	2.05	0.79	1.51	0.86	0.29	0.22	0.90	0.88	9.37	1.66	5.51
1993	0.72	1.00	0.52	2.37	2.85	2.79	0.86	1.14	0.87	1.14	0.87	0.68	15.91	2.01	11.51
1994	0.60	0.82	0.57	0.90	0.37	0.22	2.66	0.85	0.68	4.17	1.79	0.37	14.00	1.77	9.36
1995	0.84	0.94	0.50	1.86	6.31	3.62	0.43	0.04	2.58	1.07	0.62	0.34	18.93	2.22	14.91
1996	0.94	0.24	0.56	1.72	1.29	0.83	1.26	0.32	0.47	1.62	1.06	0.51	10.82	1.35	7.13
1997	0.57	0.69	0.92	1.79	1.99	1.21	1.46	0.76	1.21	0.83	0.06	0.53	12.04	1.86	6.79
1998	0.49	0.56	0.52	1.00	0.73	2.67	1.96	0.59	0.79	4.62	0.42	0.10	14.48	1.09	11.77
1999	0.22	0.30	0.45	1.53	2.29	1.78	0.24	0.11	1.30	0.25	0.36	0.10	8.93	0.75	7.13
Average	0.53	0.59	0.93	1.45	2.12	1.45	1.18	0.65	0.88	1.03	0.77	0.58	12.15	1.72	8.31

Table 1 - Climate Data for CUw Calculation

GLENROCK															
Average Precipitation, inches															
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	50% Nov-Mar	95% Apr-Oct
1961	0.48	0.02	0.72	1.84	2.18	2.05	1.01	0.78	1.10	2.88	0.00	0.61	13.27	2.14	10.00
1962	0.90	1.50	1.27	0.28	5.32	2.43	0.89	0.99	0.84	0.18	0.76	0.36	15.02	8.89	9.37
1963	0.31	0.53	0.11	1.51	3.31	0.94	1.42	2.13	0.31	0.24	0.34	0.28	11.43	0.89	9.37
1964	0.22	0.06	1.73	0.64	2.10	0.49	0.52	0.46	0.16	1.56	0.12	0.25	8.31	1.32	5.63
1965	0.47	0.66	0.71	2.63	1.53	2.97	0.55	1.30	0.37	0.77	0.49	0.33	12.78	1.11	9.61
1966	0.24	0.46	0.43	1.77	2.76	0.57	0.65	0.82	0.36	0.31	1.31	0.47	10.15	0.98	6.88
1967	0.15	0.12	1.28	2.37	3.11	2.43	0.95	1.58	0.91	1.37	0.19	0.21	14.67	1.67	12.08
1968	0.50	0.31	1.22	1.58	0.96	1.34	1.78	0.04	0.20	0.09	0.58	0.28	8.86	1.22	5.69
1969	0.57	0.20	0.84	0.31	2.69	2.20	0.44	0.09	1.83	0.86	0.11	0.08	10.22	1.23	8.00
1960	0.45	0.26	0.52	0.57	1.31	0.61	1.33	0.69	0.25	0.37	2.06	0.57	8.99	0.71	4.87
1961	0.00	0.67	1.35	0.69	1.79	1.23	1.46	0.32	3.20	1.80	0.69	0.08	13.28	2.33	9.87
1962	0.55	0.48	0.18	0.69	5.51	4.27	2.57	0.60	0.30	2.24	0.81	0.25	18.25	0.99	15.37
1963	0.48	0.12	0.37	2.12	1.11	3.55	0.52	0.98	3.22	0.17	0.35	0.15	13.94	0.82	10.99
1964	1.05	0.79	0.66	2.97	2.63	1.34	0.85	0.33	0.45	0.29	0.09	0.43	11.88	1.50	8.42
1965	1.02	1.21	0.43	0.11	3.93	3.38	1.25	0.98	2.38	0.11	0.02	0.76	15.58	1.59	11.53
1966	0.22	0.67	0.40	1.04	0.45	1.72	0.62	1.29	0.79	1.37	0.19	0.35	8.11	1.04	6.92
1967	0.51	0.20	1.20	1.73	2.87	6.41	2.94	0.72	1.12	1.52	0.84	0.49	20.55	1.23	16.44
1968	0.42	0.32	0.88	1.78	2.29	3.25	0.21	0.81	0.39	0.44	0.26	0.67	11.72	1.48	8.71
1969	0.16	0.59	0.67	1.66	1.12	4.30	0.46	0.26	0.25	0.92	0.69	0.15	11.23	1.18	8.52
1970	0.97	0.28	1.78	1.68	0.94	3.70	2.10	0.00	0.20	1.73	0.89	0.60	14.87	1.94	9.83
1971	0.54	1.08	0.71	5.28	7.70	1.06	0.19	0.94	1.92	1.69	0.72	0.00	21.83	1.91	17.84
1972	1.10	0.26	0.41	2.22	2.28	3.09	0.67	2.04	0.80	1.98	0.30	0.80	15.95	1.25	12.43
1973	0.84	0.29	1.33	5.67	0.90	0.46	4.16	0.35	5.43	0.31	0.59	0.48	20.81	1.78	16.42
1974	0.36	0.57	0.25	1.78	0.30	0.00	0.50	1.00	0.90	1.00	0.00	0.50	7.06	1.13	5.11
1975	0.18	0.27	3.02	0.24	1.97	1.16	0.54	1.07	0.45	1.42	0.37	0.80	11.47	1.98	6.51
1976	0.15	0.39	0.29	3.19	3.84	1.57	1.05	0.12	1.70	1.50	0.09	0.07	13.96	1.00	12.32
1977	0.06	0.50	0.55	1.84	2.24	0.15	4.24	1.23	0.26	1.12	1.41	0.33	13.93	0.64	10.53
1978	0.26	0.38	0.52	1.73	8.18	0.56	1.27	1.50	0.19	0.95	0.30	0.88	14.72	1.45	11.76
1979	0.51	0.06	0.98	1.03	1.49	0.85	1.41	1.30	0.36	0.39	2.54	0.17	11.11	1.38	6.49
1980	0.92	0.41	0.48	0.33	2.30	0.00	0.15	1.00	0.16	0.22	0.84	0.29	7.10	2.26	3.95
1981	0.32	0.10	0.89	1.86	4.02	0.24	1.60	0.35	0.36	0.61	0.63	0.28	11.26	1.22	8.59
1982	0.63	0.08	0.13	2.69	2.80	4.28	0.24	0.14	1.91	0.77	0.91	1.25	15.81	0.88	12.17
1983	0.00	0.13	1.99	1.22	1.87	2.91	0.37	0.63	0.06	0.69	2.44	0.39	12.70	2.14	7.36
1984	0.10	0.21	0.73	1.75	1.44	0.00	1.25	0.85	0.68	1.12	0.15	0.32	8.80	1.94	6.74
1985	0.19	0.03	0.45	1.39	1.51	1.56	0.90	0.34	1.34	1.18	0.66	1.08	10.81	0.57	7.79
1986	0.01	0.51	0.88	1.48	1.40	2.39	0.49	0.20	0.87	1.55	0.79	0.17	10.50	1.46	7.64
1987	0.49	1.41	1.65	0.13	1.55	0.47	0.87	0.50	0.11	0.52	0.98	0.53	2.26	4.28	3.85
1988	0.11	0.77	0.48	0.07	1.33	0.65	0.78	0.40	0.66	0.18	0.78	0.30	8.47	1.42	3.85
1989	0.15	1.20	0.21	1.85	2.06	1.52	0.01	1.12	3.59	0.96	0.11	0.20	13.91	1.31	11.44
1990	0.36	0.31	0.87	2.14	1.52	0.49	3.31	0.90	0.21	1.19	1.08	0.38	12.76	0.93	9.27
1991	0.31	0.22	0.38	1.47	5.40	1.91	0.58	0.69	0.30	0.77	0.54	0.00	12.57	1.19	10.56
1992	0.20	0.38	1.65	0.15	1.83	2.32	1.74	0.48	0.76	1.85	0.92	0.67	12.85	1.39	8.58
1993	0.27	1.08	0.58	1.55	0.81	2.85	1.68	0.42	1.08	0.92	1.55	0.60	13.27	1.75	8.84
1994	0.37	0.57	0.25	1.24	0.27	0.29	1.83	0.06	0.69	1.97	0.79	0.27	8.60	1.62	8.03
1995	0.66	0.67	0.51	1.52	5.30	2.39	0.53	0.09	2.83	1.99	0.78	0.12	17.39	1.45	13.92
1996	0.28	0.02	0.79	3.35	2.27	0.31	0.30	0.02	0.74	1.58	0.84	0.58	11.06	0.99	8.14
1997	0.73	1.33	0.53	1.23	1.81	1.42	1.38	2.09	0.81	0.54	0.11	0.21	11.99	2.01	8.63
1998	0.34	0.39	1.11	1.17	0.82	1.66	0.99	0.82	1.05	3.43	0.32	0.01	12.21	1.08	9.54
1999	0.09	0.09	0.15	3.17	1.37	2.84	0.37	0.08	2.78	0.31	0.14	0.05	11.44	0.33	10.37
Average	0.41	0.47	0.80	1.64	2.38	1.81	1.16	0.74	1.06	1.04	0.65	0.38	12.54	1.38	9.30

Table 1 - Climate Data for CUw Calculation

DOUGLAS

Average Precipitation, Inches

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	50% Nov-Mar	95% Apr-Oct
1951	0.57	0.18	0.88	2.07	2.14	2.74	1.18	0.76	0.89	2.12	0.08	0.42	14.03		
1952	0.23	1.24	1.38	0.31	3.40	1.03	1.28	1.07	0.42	0.33	1.18	0.23	12.06	1.68	7.43
1953	0.62	1.11	0.27	1.74	0.58	1.12	1.20	0.95	0.23	0.10	0.95	0.47	9.34	1.71	5.62
1954	0.18	0.24	2.08	0.37	1.16	0.57	0.38	1.23	0.61	1.44	0.21	0.49	8.94	1.96	5.45
1955	0.55	0.55	1.05	1.20	1.89	2.83	0.79	0.89	0.46	0.37	0.84	0.58	12.00	1.43	8.01
1956	0.21	0.30	0.32	1.72	2.42	0.74	0.82	0.68	0.10	0.18	1.19	0.62	9.30	1.13	6.33
1957	0.25	0.11	1.01	2.15	3.74	2.23	1.08	1.80	1.28	1.28	0.66	0.35	15.92	1.59	12.86
1958	0.05	0.35	1.29	1.97	1.37	1.31	2.90	0.43	0.32	0.04	0.35	0.59	10.97	1.35	7.92
1959	0.62	0.38	0.94	0.44	2.43	2.45	0.35	0.15	1.75	0.54	0.31	0.14	10.48	1.43	7.70
1960	0.28	0.30	0.54	0.25	1.71	1.51	1.22	0.75	0.11	0.08	1.12	0.40	8.27	0.78	5.35
1961	0.00	0.49	0.62	0.34	1.28	2.15	0.61	0.31	2.58	1.28	0.13	0.10	8.69	1.32	8.12
1962	0.69	0.61	0.17	0.70	4.71	4.25	1.71	0.43	0.78	1.35	0.49	0.31	16.20	0.85	13.23
1963	0.73	0.29	0.19	2.63	1.07	1.25	1.54	0.48	0.63	0.54	0.14	0.22	9.71	1.01	7.73
1964	0.25	0.36	0.40	2.47	2.06	1.44	0.21	0.03	0.05	0.10	0.06	0.43	7.86	0.69	6.04
1965	0.85	0.24	0.23	0.64	3.82	1.88	1.57	1.03	2.02	0.22	0.08	0.72	13.30	0.91	10.62
1966	0.25	0.55	0.35	0.96	0.37	0.79	0.41	0.61	0.94	1.37	0.29	0.25	7.14	0.98	5.18
1967	0.34	0.21	1.08	2.14	2.73	5.70	1.58	0.12	1.09	0.79	0.95	0.42	17.15	1.09	13.44
1968	0.25	0.43	0.71	2.17	2.90	2.79	0.34	0.66	0.67	0.39	0.34	0.27	12.12	1.38	9.61
1969	0.51	0.42	0.60	1.82	1.00	2.93	1.48	0.32	0.00	0.84	0.86	0.26	11.04	1.07	7.97
1970	0.58	0.29	1.29	1.86	1.38	3.04	1.96	0.13	0.61	1.06	1.29	0.46	13.93	1.63	9.54
1971	0.39	0.61	0.42	4.34	5.07	0.75	0.27	0.55	1.51	1.11	0.76	0.07	15.85	1.59	12.92
1972	1.15	0.21	1.25	2.07	2.13	1.71	2.08	3.25	0.69	1.04	0.35	0.29	16.22	1.72	12.32
1973	0.12	0.28	1.18	3.19	0.52	0.58	4.81	0.50	4.16	0.12	0.72	0.28	16.26	1.11	13.00
1974	0.51	0.18	0.20	1.46	0.23	1.19	0.28	0.58	0.70	0.74	0.22	0.28	8.55	0.65	4.90
1975	0.58	0.44	1.07	0.30	2.70	1.12	0.58	1.09	1.11	1.02	0.11	0.93	11.03	1.30	7.51
1976	0.30	0.58	0.30	3.55	3.11	1.87	0.40	0.10	1.39	0.73	0.20	0.14	12.47	1.11	10.40
1977	0.31	0.10	0.48	1.97	1.58	0.30	2.18	1.10	0.20	0.54	1.11	0.40	10.27	0.62	7.48
1978	0.48	0.31	0.32	1.00	4.22	0.59	1.20	0.87	0.09	0.85	0.69	0.44	11.06	1.31	8.38
1979	0.76	0.07	0.44	0.74	1.09	1.51	2.77	0.94	0.30	0.33	0.80	0.36	10.11	1.20	7.30
1980	0.50	0.64	0.86	0.21	4.40	0.00	0.31	1.15	0.07	0.53	0.28	0.31	9.26	1.58	8.34
1981	0.12	0.17	0.82	1.25	3.28	0.29	1.80	0.40	0.11	0.46	0.58	0.14	9.42	0.85	7.21
1982	0.15	0.13	0.30	0.61	3.02	2.21	3.07	0.99	2.51	1.41	0.77	1.25	16.42	0.65	13.13
1983	0.10	0.10	2.07	1.08	2.88	2.09	2.51	1.50	0.06	0.40	2.01	0.38	14.96	2.15	9.80
1984	0.37	0.42	0.79	1.70	1.80	1.18	2.23	0.42	0.55	0.44	0.11	0.64	10.45	1.99	7.71
1985	0.49	0.42	0.50	1.04	1.04	1.18	1.91	0.38	1.86	0.81	1.00	0.51	11.14	1.08	7.61
1986	0.17	0.80	0.45	2.68	1.05	4.60	1.56	0.35	1.34	1.23	1.14	0.10	15.47	1.47	12.17
1987	0.33	0.83	1.19	0.19	2.73	0.98	1.05	0.96	1.01	0.25	0.80	0.69	11.11	1.80	6.81
1988	0.15	0.47	1.40	0.27	1.26	0.70	1.14	0.48	0.82	0.00	0.60	0.37	7.74	1.81	4.51
1989	0.03	0.85	0.37	1.40	1.58	1.62	0.67	1.92	2.41	0.82	0.24	0.39	12.40	1.11	9.99
1990	0.67	0.61	1.81	2.55	2.75	0.51	2.83	0.65	0.47	0.52	1.17	0.24	14.78	1.86	9.77
1991	0.30	0.14	0.78	1.87	7.48	2.71	0.85	0.35	1.04	0.58	0.98	0.14	17.00	1.31	13.95
1992	0.15	0.31	2.01	0.38	1.87	3.37	1.39	0.95	0.21	0.07	0.74	0.93	12.38	1.80	7.83
1993	0.38	1.50	0.69	3.82	1.21	4.40	1.07	1.09	1.20	1.56	1.12	0.41	18.43	2.11	13.83
1994	0.45	0.37	0.23	2.17	1.24	0.20	1.80	1.83	0.46	4.16	0.97	0.53	14.21	1.29	11.08
1995	0.49	0.53	0.41	1.79	5.65	3.46	1.09	0.39	2.89	2.20	0.44	0.24	15.58	1.47	16.60
1996	0.48	0.05	0.68	2.12	2.67	0.88	0.83	0.29	0.53	1.74	0.67	0.55	11.49	0.95	8.61
1997	0.71	0.85	0.36	1.79	2.50	2.34	2.95	1.99	0.93	0.82	0.08	0.48	15.78	1.57	12.65
1998	1.22	2.11	1.84	1.26	1.50	2.93	1.61	2.37	1.57	6.77	0.50	0.48	24.18	2.88	17.11
1999	0.94	0.25	0.83	5.14	2.15	2.82	0.45	0.20	2.94	0.43	0.58	0.23	16.76	1.40	13.42
Average	0.42	0.47	0.80	1.83	2.34	1.85	1.38	0.83	0.99	0.94	0.64	0.41	12.70	1.37	9.43

Table 3 - Crop Yield Data for CUW Calculation
Carbon County - Above Pathfinder

Year	NASS Annual Reports					Calculated Y _{CUW}	
	Alfalfa ton/acre	Other Hay ton/acre	Grains bu/acre	Com bu/acre	Potatoes cwt/acre	Alfalfa ton/acre	Other Hay ton/acre
1952	1.50	0.78	34.6		90	1.85	0.83
1953	1.60	0.75	35.3		150	1.89	0.85
1954	1.05	0.64	30.9		80	1.92	0.87
1955	1.50	0.72	26.0		56	1.96	0.89
1956	2.00	0.61	38.7		90	1.99	0.91
1957	2.00	0.93	48.2		60	2.02	0.92
1958	2.30	0.98	45.0		50	2.06	0.94
1959	1.58	0.91	34.7		75	2.09	0.96
1960	1.35	0.73	39.0			2.12	0.98
1961	1.75	0.90	39.5			2.15	1.00
1962	1.60	0.93	41.7			2.18	1.02
1963	1.70	0.82	42.0			2.20	1.04
1964	1.68	0.93	41.4			2.23	1.06
1965	2.41	0.90	42.2			2.26	1.08
1966	2.16	1.01	39.2			2.28	1.10
1967	2.32	1.24	48.5			2.31	1.12
1968	1.92	0.95	46.3			2.33	1.14
1969	2.27	1.11	47.1			2.35	1.16
1970	1.92	1.07	50.1			2.38	1.18
1971	2.20	1.16	50.9			2.40	1.20
1972	1.90	1.11	51.6	70		2.42	1.22
1973	1.90	1.13	44.5	74		2.44	1.24
1974	1.90	1.19	41.3	78		2.46	1.27
1975	2.06	1.10	42.2	63		2.48	1.29
1976	1.50	1.20	47.4	55		2.49	1.31
1977	1.60	0.98	44.4	55		2.51	1.33
1978	1.60	1.30	62.5	61		2.53	1.35
1979	2.00	1.40	47.3			2.54	1.36
1980	2.10	1.30	68.3			2.56	1.40
1981	2.20	1.40	46.4			2.57	1.42
1982	2.47	1.59	56.4			2.58	1.44
1983	2.67	1.62	55.2			2.59	1.47
1984	2.20	1.60	59.5			2.60	1.49
1985	2.29	1.66	53.9			2.61	1.51
1986	1.71	1.37	63.6			2.62	1.54
1987	1.64	1.57	59.1			2.63	1.56
1988	2.12	1.36	54.1			2.64	1.59
1989	2.24	0.87	54.2			2.65	1.61
1990	1.65	1.27	57.7			2.65	1.64
1991	2.10	1.34	52.3			2.66	1.66
1992	2.10	1.30	45.4			2.66	1.68
1993	2.10	1.80	61.3			2.67	1.71
1994	2.00	1.42	48.3			2.67	1.73
1995	2.40	1.70	49.0			2.67	1.76
1996	2.10	1.50	76.7			2.68	1.79
1997	2.60	1.60	57.2			2.68	1.81
1998	2.30	1.80	71.0			2.68	1.84
1999	2.20	1.70	70.0			2.67	1.86

Table 3 - Crop Yield Data for CUw Calculation
 Natrona County Yield Data

Year	NASS Annual Reports						
	Alfalfa ton/acre	Other Hay ton/acre	Grains bu/acre	Corn bu/acre	Beans lbs/acre	Beets ton/acre	Potatoes cwt/acre
1952	2.00	0.75	26.8	10	1,400		90
1953	2.00	0.79	27.7		1,429		140
1954	1.79	0.55	24.9	10	1,167		135
1955	2.00	0.90	19.7		933		120
1956	2.10	1.09	38.6		1,100		120
1957	2.05	1.20	37.6		1,200		105
1958	2.10	1.04	32.8	40	1,400		150
1959	1.71	0.87	27.5	49	1,377		160
1960	1.30	1.02	37.5	38	1,400		160
1961	1.91	0.97	33.9	43	1,700		140
1962	2.30	0.96	38.3	65	1,100		
1963	2.40	0.77	37.9	50	1,600		
1964	2.08	0.89	35.9	46			
1965	2.14	1.02	47.3	50		8.5	
1966	2.09	0.87	35.2	60			
1967	2.40	1.12	47.0	64			
1968	1.95	1.00	50.8	60			
1969	1.84	1.12	37.6	58			
1970	2.00	1.10	56.3	60			
1971	2.25	1.07	53.3	73			
1972	2.42	1.00	54.8	70			
1973	2.46	1.60	48.8	73			
1974	2.21	0.80	45.6	50			
1975	2.50	1.30	49.2	55			
1976	2.57	1.00	59.5	55			
1977	2.10	0.80	49.9	55			
1978	2.19	1.30	59.9	61			
1979	2.24	1.20	63.5	75			
1980	2.60	0.90	54.9	85			
1981	2.60	1.20	48.4	74			
1982	3.54	2.40	65.8	87			
1983	2.90	1.85	61.3	78			
1984	2.30	1.20	55.2	65			
1985	1.21	1.24	50.6	60			
1986	2.27	1.90	53.2	76			
1987	2.04	1.67	51.1	80			
1988	1.93	1.55	37.3	90			
1989	2.18	0.78	51.8	85			
1990	2.25	1.01	46.6	90			
1991	2.30	1.70	54.6	94			
1992	2.50	0.90	66.2	38			
1993	2.80	1.80	66.7	89			
1994	2.40	0.90	56.3	89			
1995	3.00	1.80	90.7	89			
1996	2.60	1.30	57.3	103			
1997	3.10	1.60	70.0	120			
1998	2.10	2.00	80.1				
1999	2.80	1.60	82.6				

Table 3 - Crop Yield Data for CUw Calculation
Converse County Yield Data

Year	NASS Annual Reports						Potatoes cw/acre
	Alfalfa ton/acre	Other Hay ton/acre	Grains bu/acre	Corn bu/acre	Beans bs/acre	Beets ton/acre	
1952	2.10	0.94	33.9	23	1,458	11.0	220
1953	1.50	1.00	32.5	0	1,418	5.0	250
1954	1.27	0.67	19.0	30	1,100	6.5	60
1955	1.60	1.10	32.8	30	1,000	12.0	140
1956	1.70	0.63	20.9	25	1,300	12.3	140
1957	1.90	1.30	33.5	35	1,040	11.7	130
1958	1.70	0.90	37.7	38	1,563	12.9	150
1959	1.49	0.95	32.1	39	1,096	12.9	70
1960	1.50	1.10	24.8	38	1,200	12.2	115
1961	1.75	0.98	39.4	54	1,600	12.0	110
1962	1.70	0.99	41.8	25	943	11.6	
1963	1.80	0.93	41.6	37	1,825	13.8	
1964	1.55	0.95	38.7	40	1,060	9.7	
1965	2.09	1.04	39.0	24	1,100	6.8	
1966	2.14	1.03	33.1	40	1,300	9.1	
1967	2.18	1.28	46.2	41	1,600	11.9	
1968	1.94	0.99	50.0	40	1,500	8.7	
1969	2.29	1.07	48.9	28	1,500	18.1	
1970	2.62	1.24	48.6	50	1,541	12.5	
1971	2.66	1.15	45.3	59	1,657	13.2	
1972	2.03	1.16	56.3	57	1,775	14.7	
1973	2.30	1.20	48.7		1,750	10.3	
1974	2.20	1.40	35.7	68	1,720		
1975	2.30	0.90	43.0	68	1,540		
1976	2.40	1.10	52.3	71	1,600		
1977	1.90	1.00	29.7	81	1,423		
1978	2.10	0.90	54.7	91	1,580		
1979	2.20	0.90	37.9	80	1,900		
1980	2.00	1.39	47.4	90	1,880		
1981	2.20	1.40	44.5	84	1,700		
1982	2.03	1.70	57.1	84	1,500		
1983	2.24	2.20	54.9	85	1,460		
1984	2.00	1.40	51.5	94	1,900		
1985	1.64	1.27	55.2	94	1,800		
1986	2.24	0.90	56.6	94	1,800		
1987	2.00	1.36	45.0	92	1,900		
1988	1.65	0.75	36.7	126	2,000		
1989	1.83	0.70	45.3	91	1,700		
1990	2.36	1.00	52.4	120	1,750		
1991	2.40	1.60	63.1	99	1,700		
1992	2.00	1.30	60.0	97			
1993	2.70	1.90	58.3	80			
1994	2.10	1.20	51.3	96			
1995	2.80	1.70	86.0	96			
1996	2.40	1.60	57.0	96			
1997	2.60	1.80	57.2	110			
1998	2.20	1.60	73.3	90			
1999	2.60	1.90	67.0	100			

Table 3 - Crop Yield Data for CUW Calculation
 Pathfinder to Guernsey Yield Data

Year	Acreage-Weighted Average from NASS Annual Reports						Calculated Y _{crop}					
	Alfalfa ton/ac	Other Hay ton/ac	Small Grains bu/ac	Corn bu/ac	Beans lbs/ac	Beets ton/ac	Potatoes cwt/ac	Alfalfa ton/ac	Other Hay ton/ac	Grains bu/ac	Corn bu/ac	Beans lbs/ac
1952	2.07	0.87	32.4	22.4	1,450	11.0	199	1.88	1.00	32.5	21.7	1,446
1953	1.65	0.93	31.7	0.0	1,420	5.0	234	1.91	1.01	33.4	24.5	1,463
1954	1.51	0.60	19.7	28.2	1,121	6.5	130	1.94	1.01	34.2	27.3	1,481
1955	1.79	0.99	31.2	30.0	980	12.0	123	1.96	1.02	35.1	30.1	1,498
1956	1.89	0.88	29.9	25.0	1,260	12.3	122	1.98	1.02	35.9	32.8	1,515
1957	1.97	1.25	35.7	35.0	1,067	11.7	108	2.01	1.03	36.8	35.5	1,532
1958	1.85	0.96	35.3	38.7	1,545	12.9	150	2.03	1.04	37.6	38.1	1,548
1959	1.57	0.91	30.3	42.1	1,138	12.9	149	2.06	1.05	38.5	40.7	1,565
1960	1.43	1.05	30.3	38.0	1,260	12.2	155	2.08	1.06	39.4	43.2	1,581
1961	1.81	0.97	37.0	48.5	1,640	12.0	136	2.11	1.07	40.3	45.7	1,597
1962	1.92	0.98	40.3	39.5	1,000	11.6		2.13	1.08	41.2	48.2	1,612
1963	2.03	0.84	40.4	46.8	1,738	13.8		2.15	1.09	42.1	50.6	1,628
1964	1.76	0.92	37.8	45.3	1,060	9.7		2.18	1.10	43.0	53.0	1,643
1965	2.11	1.03	41.9	43.5	1,100	7.0		2.20	1.12	44.0	55.4	1,659
1966	2.12	0.94	34.0	55.4	1,300	9.1		2.22	1.13	44.9	57.7	1,674
1967	2.27	1.20	46.5	60.7	1,600	11.9		2.24	1.14	45.9	59.9	1,688
1968	1.95	1.00	50.3	54.5	1,500	8.7		2.27	1.16	46.8	62.1	1,703
1969	2.07	1.10	43.7	47.7	1,500	18.1		2.29	1.17	47.8	64.3	1,718
1970	2.32	1.17	51.9	56.5	1,541	12.5		2.31	1.19	48.7	66.4	1,732
1971	2.46	1.11	49.0	68.3	1,657	13.2		2.33	1.20	49.7	68.5	1,746
1972	2.22	1.10	55.6	66.3	1,775	14.7		2.36	1.22	50.7	70.6	1,760
1973	2.37	1.35	48.7	73.0	1,750	10.3		2.38	1.24	51.7	72.6	1,773
1974	2.20	1.16	38.5	56.8	1,720			2.40	1.26	52.7	74.6	1,787
1975	2.39	1.09	45.0	61.9	1,540			2.42	1.27	53.7	76.5	1,800
1976	2.47	1.05	54.6	62.7	1,600			2.44	1.29	54.7	78.4	1,813
1977	1.98	0.90	35.7	64.1	1,423			2.46	1.31	55.8	80.2	1,826
1978	2.14	1.11	56.3	74.1	1,580			2.49	1.33	56.8	82.0	1,839
1979	2.22	1.03	43.9	77.5	1,900			2.51	1.35	57.9	83.8	1,851
1980	2.25	1.19	49.3	86.9	1,880			2.53	1.38	58.9	85.5	1,864
1981	2.38	1.32	45.9	79.3	1,700			2.55	1.40	60.0	87.2	1,876
1982	2.73	2.02	60.9	85.4	1,500			2.57	1.42	61.1	88.9	1,888
1983	2.50	2.01	57.7	81.8	1,460			2.59	1.44	62.1	90.5	1,899
1984	2.11	1.28	52.8	85.8	1,900			2.61	1.47	63.2	92.0	1,911
1985	1.46	1.25	53.3	79.6	1,800			2.63	1.49	64.3	93.5	1,922
1986	2.25	1.53	55.1	85.0	1,800			2.65	1.52	65.4	95.0	1,933
1987	2.01	1.49	47.3	88.5	1,900			2.67	1.54	66.5	96.4	1,944
1988	1.75	1.08	36.9	116.5	2,000			2.69	1.57	67.7	97.8	1,955
1989	1.95	0.73	48.0	88.2	1,700			2.71	1.60	68.8	99.2	1,966
1990	2.32	1.00	49.8	105.9	1,750			2.73	1.62	69.9	100.5	1,976
1991	2.36	1.65	58.9	97.1	1,700			2.75	1.65	71.1	101.8	1,986
1992	2.17	1.08	62.5	66.7				2.76	1.68	72.2	103.0	1,996
1993	2.75	1.84	63.1	84.8				2.78	1.71	73.4	104.2	2,006
1994	2.24	0.96	53.3	91.6				2.80	1.74	74.6	105.3	2,016
1995	2.89	1.78	90.2	93.9				2.82	1.77	75.8	106.4	2,025
1996	2.48	1.39	57.2	98.9				2.84	1.80	76.9	107.5	2,034
1997	2.81	1.70	64.0	114.8				2.86	1.83	78.1	108.5	2,043
1998	2.15	1.87	77.4	90.0				2.87	1.86	79.4	109.5	2,052
1999	2.69	1.74	74.8	100.0				2.89	1.90	80.6	110.5	2,061

Table 4a - Irrigated, Non-harvested Acreage for CUw Calculation
U.S. Census of Agriculture

Year	Albany	Carbon	Natrona	Converse	Platte	Notes
1949	42,945	58,595	3,052	8,815	6,852	entry for "irrigated pasture"; data from 1954 report
1954	27,414	52,081	5,474	6,830	1,028	entry for "irrigated pasture"
1959	67,000	47,572	7,815	9,518	15,975	entry for "land irrigated" minus "irrigated cropland harvested"; data from 1964 report
1964	45,564	68,058	10,989	9,535	3,500	entry for "irrigated pasture or grazing land"
1969	34,925	57,815	7,382	9,390	9,605	sum of "used only for pasture", and "pasture, other than cropland pasture"
1974	49,931	50,065	7,687	7,852	13,607	sum of "cropland pasture irrigated", "other cropland irrigated" and "pasture irrigated, other than cropland pasture"
1978	82,179	71,692	8,977	13,502	16,679	sum of "pastureland irrigated" and "other land irrigated", Converse and Carbon values from 1982 report
1982	84,352	44,471	7,343	7,081	9,222	entry for "pastureland and other land"
1987	46,797	40,362	11,079	7,666	12,632	entry for "pastureland and other land"
1992	54,901	63,377	7,992	3,692	9,537	entry for "pastureland and other land"
1997	71,495	87,087	23,511	11,526	10,112	entry for "pastureland and other land"

Table 4b - Crop Acreage and Distribution for CUw Calculation
Carbon County

Year	NASS Crop Acreage					Irr Harv Crops Total Acres	Cens. of Ag Irrigated Non-Harv Pasture Acres	TOTAL Irrigated Acres	Calculated Crop Distribution					% Irr Non-Harv Pasture		
	Irr Harv Corn Acres	Irr Harv Potatoes Acres	Irr Harv Alfalfa Acres	Irr Harv Other Hay Acres	Irr Harv Grains Acres				% Irr Harv Corn	% Irr Harv Potatoes	% Irr Harv Alfalfa	% Irr Harv Other Hay	% Irr Harv Grains			
1952		20	9,000	115,800	2,000	126,820	76,287	203,107								
1953		20	9,100	107,900	1,680	118,700	71,402	190,102		0.01%	4.8%	56.8%	0.88%	37.6%		
1954		10	11,500	74,090	980	86,580	52,081	138,661		0.01%	8.3%	53.4%	0.71%	37.6%		
1955		10	12,900	80,400	770	94,080	56,593	150,673		0.01%	8.6%	53.4%	0.51%	37.6%		
1956		20	13,400	80,800	2,600	96,820	58,241	155,061		0.01%	8.6%	52.1%	1.68%	37.6%		
1957		20	13,800	87,800	3,000	104,620	62,933	167,553		0.01%	8.2%	52.4%	1.79%	37.6%		
1958		20	13,600	75,200	2,900	91,720	55,173	146,893		0.01%	9.3%	51.2%	1.97%	37.6%		
1959		10	10,800	77,750	3,270	91,830	47,572	139,402		0.01%	7.7%	55.8%	2.35%	34.1%		
1960			11,000	77,200	3,900	92,100	47,712	139,812			7.9%	55.2%	2.79%	34.1%		
1961			11,300	82,100	3,650	97,050	50,276	147,326			7.7%	55.7%	2.48%	34.1%		
1962			11,300	91,600	3,650	106,550	55,198	161,748			7.0%	56.6%	2.26%	34.1%		
1963			10,400	89,600	3,050	103,050	53,384	156,434			6.6%	57.3%	1.95%	34.1%		
1964			10,600	94,750	1,840	107,190	68,058	175,248			6.0%	54.1%	1.05%	38.8%		
1965			8,200	98,600	2,050	108,850	69,112	177,962			4.6%	55.4%	1.15%	38.8%		
1966			8,700	88,100	1,750	98,550	62,572	161,122			5.4%	54.7%	1.09%	38.8%		
1967			9,000	95,300	1,850	106,150	67,398	173,548			5.2%	54.9%	1.07%	38.8%		
1968			12,000	93,000	1,450	106,450	67,588	174,038			6.9%	53.4%	0.83%	38.8%		
1969			12,100	92,100	1,750	105,950	57,815	163,765			7.4%	56.2%	1.07%	35.3%		
1970			12,200	98,800	1,600	112,600	61,444	174,044			7.0%	56.8%	0.92%	35.3%		
1971			13,200	101,600	1,700	116,500	63,572	180,072			7.3%	56.4%	0.94%	35.3%		
1972		100	12,500	96,000	1,700	110,300	60,189	170,489		0.06%	7.3%	56.3%	1.00%	35.3%		
1973		200	12,000	86,000	1,750	99,950	54,541	154,491		0.13%	7.8%	55.7%	1.13%	35.3%		
1974		600	12,000	81,500	2,200	96,300	50,065	146,365		0.41%	8.2%	55.7%	1.50%	34.2%		
1975		400	14,000	86,000	2,100	102,500	53,268	155,768		0.26%	9.0%	55.2%	1.35%	34.2%		
1976		400	11,500	100,300	2,200	114,100	59,319	173,419		0.23%	6.6%	57.7%	1.27%	34.2%		
1977		400	10,000	77,500	1,700	89,600	46,582	136,182		0.29%	7.3%	56.9%	1.25%	34.2%		
1978		300	10,000	95,000	1,200	106,500	71,692	173,192		0.17%	5.6%	53.3%	0.67%	40.2%		
1979			11,000	92,000	1,900	104,900	70,615	175,515			6.3%	52.4%	1.08%	40.2%		
1980			9,000	100,000	1,400	110,400	74,317	184,717			4.9%	54.1%	0.76%	40.2%		
1981			10,500	101,000	1,800	113,300	76,270	189,570			5.5%	53.3%	0.95%	40.2%		
1982			9,500	92,100	1,200	102,800	44,471	147,271			6.5%	62.5%	0.81%	30.2%		
1983			9,500	90,000	1,300	100,800	43,606	144,406			6.6%	62.3%	0.90%	30.2%		
1984			11,000	83,000	1,500	95,500	41,313	136,813			8.0%	60.7%	1.10%	30.2%		
1985			8,000	61,000	1,400	70,400	30,455	100,855			7.9%	60.5%	1.39%	30.2%		
1986			9,000	73,000	2,100	84,100	36,381	120,481			7.5%	60.6%	1.74%	30.2%		
1987			8,500	56,000	2,100	66,600	40,362	106,962			7.9%	52.4%	1.96%	37.7%		
1988			9,500	61,500	1,400	72,400	43,877	116,277			8.2%	52.9%	1.20%	37.7%		
1989			7,500	70,000	1,300	78,800	47,756	126,556			5.9%	55.3%	1.03%	37.7%		
1990			8,000	57,500	1,300	66,800	40,483	107,283			7.5%	53.6%	1.21%	37.7%		
1991			15,500	74,000	1,000	90,500	54,846	145,346			10.7%	50.9%	0.69%	37.7%		
1992			9,000	85,000	500	94,500	63,377	157,877			5.7%	53.8%	0.32%	40.1%		
1993			10,500	88,000	400	98,900	66,328	165,228			6.4%	53.3%	0.24%	40.1%		
1994			8,500	77,000	300	85,800	57,542	143,342			5.9%	53.7%	0.21%	40.1%		
1995			8,000	95,000	100	103,100	69,145	172,245			4.6%	55.2%	0.06%	40.1%		
1996			16,000	85,600	700	102,300	68,608	170,908			9.4%	50.1%	0.41%	40.1%		
1997			14,900	81,000	500	96,400	87,087	183,487			8.1%	44.1%	0.27%	47.5%		
1998			15,500	68,000	400	83,900	75,795	159,695			9.7%	42.6%	0.25%	47.5%		
1999			15,700	80,000	100	95,800	86,545	182,345			8.6%	43.9%	0.05%	47.5%		

Table 4b - Crop Acreage for CUw Calculation
 Natrona County

Year	NASS Crop Acreage								Cens. of Ag	
	Irr Harv Com Acres	Irr Harv Beets Acres	Irr Harv Beans Acres	Irr Harv Potatoes Acres	Irr Harv Alfalfa Acres	Irr Harv Other Hay Acres	Irr Harv Grains Acres	Irr Harv Crops Total Acres	Irri- gated Non-Harv Pasture Acres	TOTAL Irri- gated Acres
1952	10			50	4,400	9,600	1,600	15,760	4,893	20,653
1953	0		140	40	5,000	8,600	970	14,750	4,580	19,330
1954	10		150	150	11,200	5,760	360	17,630	5,474	23,104
1955	0		150	140	12,400	7,700	390	20,780	6,452	27,232
1956	0		100	150	13,300	7,100	2,260	22,930	7,120	30,050
1957	0		100	140	13,800	8,300	3,400	25,740	7,992	33,732
1958	100		100	150	13,800	5,400	2,900	22,450	6,971	29,421
1959	100		130	150	10,300	5,600	1,840	18,120	7,815	25,935
1960	100		150	150	10,500	6,000	1,850	18,750	8,087	26,837
1961	300		200	150	10,700	6,600	1,750	19,700	8,496	28,196
1962	200		200		11,700	8,400	1,960	22,460	9,687	32,147
1963	300		250		12,600	9,200	1,650	24,000	10,351	34,351
1964	210				14,600	10,700	1,480	26,980	10,989	37,979
1965	450	85			14,000	10,600	1,900	27,035	11,007	38,042
1966	500				13,800	9,900	2,000	26,200	10,667	36,867
1967	600				15,500	10,700	2,200	29,000	11,807	40,807
1968	800				18,700	10,400	2,300	32,200	13,110	45,310
1969	1,150				18,800	10,300	3,250	33,500	7,382	40,882
1970	1,300				18,600	11,100	3,050	34,050	7,503	41,553
1971	1,000				18,900	11,400	3,350	34,650	7,635	42,285
1972	1,000				17,500	7,000	3,050	28,550	6,291	34,841
1973	900				17,000	7,000	2,350	27,250	6,005	33,255
1974	2,000				15,500	5,200	1,600	24,500	7,687	32,187
1975	900				16,000	7,800	2,000	26,700	8,377	35,077
1976	1,300				14,000	9,800	2,000	27,100	8,503	35,603
1977	1,300				15,000	8,500	2,000	26,800	8,409	35,209
1978	900				15,000	10,000	1,900	27,800	8,977	36,777
1979	700				15,000	6,500	1,200	23,400	7,556	30,956
1980	1,100				15,500	7,000	1,400	25,000	8,073	33,073
1981	900				18,500	6,500	1,600	27,500	8,880	36,380
1982	900				20,500	5,500	2,300	29,200	7,343	36,543
1983	1,300				15,500	8,500	2,900	28,200	7,082	35,282
1984	600				15,000	9,600	1,700	26,800	6,739	33,539
1985	1,000				14,500	8,000	1,900	25,400	6,387	31,787
1986	1,000				15,000	10,000	2,100	28,100	7,066	35,166
1987	500				11,500	12,000	2,000	26,000	11,079	37,079
1988	500				13,500	10,500	1,100	26,600	10,909	36,509
1989	1,400				13,300	8,500	1,200	24,400	10,397	34,797
1990	1,500				15,500	7,500	1,500	26,000	11,079	37,079
1991	800				16,000	15,000	1,900	32,700	13,934	46,634
1992	1,900				13,000	10,000	1,400	26,300	7,992	34,292
1993	2,200				22,500	12,000	1,200	37,900	11,517	49,417
1994	1,700				21,500	16,500	800	40,500	12,307	52,807
1995	500				20,500	21,000	2,300	44,300	13,462	57,762
1996	700				20,000	13,600	2,000	36,300	11,031	47,331
1997	1,100				17,500	7,500	1,700	27,800	23,511	51,311
1998	0				19,800	13,000	1,100	33,900	28,670	62,570
1999	0				21,700	11,000	700	33,400	28,247	61,647

Table 4b - Crop Acreage for CUw Calculation
Converse County

Year	NASS Crop Acreage								Irr Harv Crops Total Acres	Cens. of Ag Irrigated Non-Harv Pasture Acres	TOTAL Irrigated Acres
	Irr Harv Corn Acres	Irr Harv Beets Acres	Irr Harv Beans Acres	Irr Harv Potatoes Acres	Irr Harv Alfalfa Acres	Irr Harv Other Hay Acres	Irr Harv Grains Acres	Irr Harv Crops Total Acres			
1952	200	286	590	260	12,200	15,200	5,630	34,366	11,773	46,139	
1953	100	197	550	230	12,200	15,700	5,190	34,167	11,705	45,872	
1954	100	436.5	340	10	12,800	3,550	2,700	19,937	6,830	26,767	
1955	100	462	350	20	14,000	6,800	2,840	24,572	8,418	32,990	
1956	200	565.5	400	20	14,300	6,000	2,200	23,686	8,114	31,800	
1957	200	702.8	500	20	15,000	8,000	2,900	27,323	9,360	36,683	
1958	200	545.3	800	20	22,500	7,900	3,100	35,065	12,013	47,078	
1959	220	593	730	20	18,500	5,400	2,900	28,363	9,518	37,881	
1960	200	534.2	350	20	18,900	4,300	2,400	26,704	8,961	35,666	
1961	300	580.2	300	20	19,800	6,200	2,350	29,530	9,910	39,440	
1962	350	602	350		20,400	8,900	2,800	33,402	11,209	44,611	
1963	100	850.4	400		20,600	7,700	3,500	33,150	11,125	44,275	
1964	30	745.5	630		22,800	8,700	2,950	35,856	9,535	45,391	
1965	150	730	600		19,000	9,600	3,600	33,680	8,956	42,636	
1966	150	450	600		18,800	7,400	3,100	30,500	8,111	38,611	
1967	100	375	550		22,200	10,100	3,750	37,075	9,859	46,934	
1968	300	390	520		18,600	10,300	3,850	33,960	9,031	42,991	
1969	600	415	280		18,900	10,300	3,800	34,275	9,390	43,665	
1970	700	380	370		19,400	11,700	4,100	36,550	10,041	46,691	
1971	500	450	350		19,600	11,700	3,800	36,400	9,572	46,372	
1972	400	500	400		19,000	12,000	3,800	36,100	9,890	45,990	
1973	0	210	400		20,000	12,000	3,750	36,380	9,861	46,321	
1974	1,200		500		21,000	8,000	4,500	35,200	7,852	43,052	
1975	1,000		800		21,000	9,000	4,100	35,900	8,008	43,908	
1976	1,200		800		21,000	8,500	4,100	35,600	7,941	43,541	
1977	700		800		23,000	7,800	4,700	37,000	8,254	45,254	
1978	700		800		22,000	9,400	4,400	37,300	13,502	50,802	
1979	700		1,200		23,000	9,000	3,900	37,800	13,683	51,483	
1980	700		700		22,000	10,000	4,100	37,500	13,574	51,074	
1981	1,000		500		23,000	9,000	2,900	36,400	13,176	49,576	
1982	1,000		200		24,000	6,700	3,000	34,900	7,081	41,981	
1983	1,500		200		24,000	7,500	3,600	36,800	7,466	44,266	
1984	1,600		400		24,500	6,000	3,200	35,700	7,243	42,943	
1985	1,400		300		21,000	3,000	2,600	28,300	5,742	34,042	
1986	1,300		300		29,000	6,000	2,900	39,500	8,014	47,514	
1987	1,200		300		21,500	17,000	3,200	43,200	7,666	50,866	
1988	1,400		400		26,000	15,000	2,300	45,100	8,003	53,103	
1989	1,600		600		26,000	12,000	1,700	41,900	7,435	49,335	
1990	1,700		600		29,000	13,000	1,800	46,100	8,181	54,281	
1991	1,300		200		26,000	13,000	2,000	42,500	7,542	50,042	
1992	1,800				26,000	8,000	2,100	37,900	3,692	41,592	
1993	1,900				26,500	7,000	900	36,300	3,536	39,836	
1994	1,000				26,000	4,000	1,200	32,200	3,137	35,337	
1995	1,200				26,000	6,000	300	33,500	3,263	36,763	
1996	1,000				29,000	6,000	1,500	37,500	3,653	41,153	
1997	1,200				24,000	8,000	1,500	34,700	11,526	46,226	
1998	1,200				22,000	6,500	700	30,400	10,098	40,498	
1999	1,000				25,000	10,000	700	36,700	12,190	48,890	

Table 4b - Crop Distribution for CUw Calculation
 Pathfinder to Guernsey Acreage-Weighted Crop Mix

Year	Corn	Beets	Beans	Potatoes	Alfalfa	Other Hay	Small Grains	Non-Harv Pasture
1952	0.3%	0.4%	1.0%	0.5%	24.9%	37.1%	10.8%	25.0%
1953	0.2%	0.3%	1.1%	0.4%	26.4%	37.3%	9.4%	25.0%
1954	0.2%	0.9%	1.0%	0.3%	48.1%	18.7%	6.1%	24.7%
1955	0.2%	0.8%	0.8%	0.3%	43.8%	24.1%	5.4%	24.7%
1956	0.3%	0.9%	0.8%	0.3%	44.6%	21.2%	7.2%	24.6%
1957	0.3%	1.0%	0.9%	0.2%	40.9%	23.1%	8.9%	24.6%
1958	0.4%	0.7%	1.2%	0.2%	47.5%	17.4%	7.8%	24.8%
1959	0.5%	0.9%	1.3%	0.3%	45.1%	17.2%	7.4%	27.2%
1960	0.5%	0.9%	0.8%	0.3%	47.0%	16.5%	6.8%	27.3%
1961	0.9%	0.8%	0.7%	0.3%	45.1%	18.9%	6.1%	27.2%
1962	0.7%	0.8%	0.7%	0.0%	41.8%	22.5%	6.2%	27.2%
1963	0.5%	1.1%	0.8%	0.0%	42.2%	21.5%	6.6%	27.3%
1964	0.3%	0.9%	0.8%	0.0%	44.9%	23.3%	5.3%	24.6%
1965	0.7%	1.0%	0.7%	0.0%	40.9%	25.0%	6.8%	24.7%
1966	0.9%	0.6%	0.8%	0.0%	43.2%	22.9%	6.8%	24.9%
1967	0.8%	0.4%	0.6%	0.0%	43.0%	23.7%	6.8%	24.7%
1968	1.2%	0.4%	0.6%	0.0%	42.2%	23.4%	7.0%	25.1%
1969	2.1%	0.5%	0.3%	0.0%	44.6%	24.4%	8.3%	19.8%
1970	2.3%	0.4%	0.4%	0.0%	43.1%	25.8%	8.1%	19.9%
1971	1.7%	0.5%	0.4%	0.0%	43.4%	26.1%	8.1%	19.9%
1972	1.7%	0.6%	0.5%	0.0%	45.2%	23.5%	8.5%	20.0%
1973	1.1%	0.3%	0.5%	0.0%	46.5%	23.9%	7.7%	20.1%
1974	4.3%	0.0%	0.7%	0.0%	48.5%	17.5%	8.4%	20.7%
1975	2.4%	0.0%	1.0%	0.0%	46.8%	21.3%	7.7%	20.7%
1976	3.2%	0.0%	1.0%	0.0%	44.2%	23.1%	7.7%	20.8%
1977	2.5%	0.0%	1.0%	0.0%	47.2%	20.3%	8.3%	20.7%
1978	1.8%	0.0%	0.9%	0.0%	42.2%	22.2%	7.2%	25.7%
1979	1.7%	0.0%	1.5%	0.0%	46.1%	18.8%	6.2%	25.8%
1980	2.1%	0.0%	0.8%	0.0%	44.6%	20.2%	6.5%	25.7%
1981	2.2%	0.0%	0.6%	0.0%	48.3%	18.0%	5.2%	25.7%
1982	2.4%	0.0%	0.3%	0.0%	56.7%	15.5%	6.7%	18.4%
1983	3.5%	0.0%	0.3%	0.0%	49.6%	20.1%	8.2%	18.3%
1984	2.9%	0.0%	0.5%	0.0%	51.6%	20.3%	6.4%	18.3%
1985	3.6%	0.0%	0.5%	0.0%	53.9%	16.7%	6.8%	18.4%
1986	2.8%	0.0%	0.4%	0.0%	53.2%	19.4%	6.0%	18.2%
1987	1.9%	0.0%	0.3%	0.0%	37.5%	33.0%	5.9%	21.3%
1988	2.1%	0.0%	0.4%	0.0%	44.1%	28.5%	3.8%	21.1%
1989	3.6%	0.0%	0.7%	0.0%	46.7%	24.4%	3.4%	21.2%
1990	3.5%	0.0%	0.7%	0.0%	48.7%	22.4%	3.6%	21.1%
1991	2.2%	0.0%	0.2%	0.0%	42.4%	29.0%	4.0%	22.2%
1992	4.9%	0.0%	0.0%	0.0%	51.4%	23.7%	4.6%	15.4%
1993	4.6%	0.0%	0.0%	0.0%	54.9%	21.3%	2.4%	16.9%
1994	3.1%	0.0%	0.0%	0.0%	53.9%	23.3%	2.3%	17.5%
1995	1.8%	0.0%	0.0%	0.0%	49.2%	28.6%	2.8%	17.7%
1996	1.9%	0.0%	0.0%	0.0%	55.4%	22.2%	4.0%	16.6%
1997	2.4%	0.0%	0.0%	0.0%	42.5%	15.9%	3.3%	35.9%
1998	1.2%	0.0%	0.0%	0.0%	40.6%	18.9%	1.7%	37.6%
1999	0.9%	0.0%	0.0%	0.0%	42.2%	19.0%	1.3%	36.6%

Table 5a
Irrigated Acreage Data Used in CUw calculations

Year	WSEC-reported irrigated acreage				WSEO-reported Ringsby "acreage"	reservoir-supply acreage	original-groundwater-supply irrigated acreage	assumed original and additional-supply groundwater-irrigated acres
	Above-Medicine		Sweetwater					
	Sinclair	Bow						
1952	77,078	40,332	8,351			1,224	74	130
1953	66,147	34,813	8,351			1,224	165	290
1954	55,658	29,124	7,678			1,224	369	805
1955	58,440	30,580	8,440			1,224	732	1,445
1956	61,362	32,109	8,440			1,224	770	1,512
1957	81,420	42,605	8,598			1,224	861	1,672
1958	83,762	43,830	8,598			1,224	861	1,787
1959	78,344	40,995	8,469			1,224	882	2,136
1960	82,366	43,099	8,469			1,224	882	2,871
1961	81,087	42,431	8,700			1,224	882	2,871
1962	82,449	43,143	8,810			1,224	882	2,891
1963	81,300	42,541	8,500			1,224	1,097	3,663
1964	85,032	44,495	9,721			1,224	1,097	3,663
1965	92,724	48,520	9,721			1,224	1,097	3,663
1966	83,452	43,868	8,749			1,224	1,123	4,100
1967	92,823	48,571	9,721			1,224	1,173	4,449
1968	93,099	48,715	9,721			1,224	1,173	4,639
1969	85,318	46,214	5,809			1,224	1,173	4,740
1970	88,971	43,473	6,589	3,082		1,224	1,445	5,220
1971	89,004	43,490	6,589	3,082		1,224	1,487	5,295
1972	87,888	42,906	6,589	3,082		1,224	1,515	5,345
1973	89,053	43,516	6,589	3,082		1,224	1,515	5,345
1974	87,740	42,829	6,589	3,082		1,224	1,515	5,345
1975	88,226	43,083	9,690	3,082		1,224	1,515	5,345
1976	81,959	50,614	9,690	3,082		1,224	1,518	5,425
1977	62,735	45,386	9,690	3,082		1,224	1,538	6,530
1978	79,798	47,481	9,690	3,082		1,224	1,553	6,950
1979	84,191	43,980	9,690	3,082		1,224	1,687	7,395
1980	84,464	44,071	8,951	3,082		1,224	1,687	7,395
1981	86,345	43,131	14,092	3,082		1,224	1,694	7,407
1982	88,468	45,635	13,791	3,082		1,224	1,694	7,407
1983	88,351	42,826	11,236	3,082		1,224	1,740	7,596
1984	88,054	43,594	10,410	3,082		1,224	1,742	7,837
1985	88,030	41,300	9,352	830		1,224	1,742	7,837
1986	88,366	42,438	11,269	0		1,224	1,742	7,837
1987	88,646	41,013	11,338	1,310		1,224	1,742	7,837
1988	88,621	40,932	10,713	3,639		1,224	1,742	7,837
1989	77,822	39,421	6,783	1,682		77	1,944	8,192
1990	87,989	40,119	8,860	3,227		63	1,963	8,226
1991	88,108	40,239	10,911	4,083	253		1,963	8,246
1992	88,391	38,272	8,972	1,896	397		1,963	8,246
1993	88,461	39,421	11,070	6,578	587		1,963	8,246
1994	85,489	38,166	10,424	5,199	495		1,963	8,246
1995	88,878	45,214	11,446	6,143	1,378		1,963	8,246
1996	89,510	42,616	11,632	2,400	2,771		1,963	8,246
1997	89,986	43,245	11,521	4,041	2,573		2,000	8,311
1998	91,747	44,361	11,029	2,123	1,860		2,000	8,311
1999	96,634	42,988	10,355	608	3,005		2,000	8,311
maximum	96,634	50,614	14,092	6,578	3,005		2,000	8,311
average	83,891	42,320	9,446	3,000	1,224		1,412	5,528
minimum	55,658	29,124	5,809	0	63		74	130

Table 5b
Irrigated Acreage Data Used in CUW calculations

Year	BELOW PATHFINDER			
	WSEO- reported mainstem irrigated acreage	NASS- based tributary irrigated acreage	"mainstem groundwater" acreage	assumed original and additional- supply groundwater- irrigated acres
1952	14,626	50,242	0	1,860
1953	14,221	49,119	86	1,860
1954	13,815	31,201	172	2,212
1955	14,505	38,369	258	2,492
1956	14,814	38,545	344	2,818
1957	15,136	44,623	430	3,552
1958	13,033	53,157	517	3,757
1959	13,033	46,474	603	3,757
1960	13,033	44,396	689	3,767
1961	13,150	48,074	775	3,767
1962	13,150	53,160	861	3,769
1963	13,075	53,370	947	3,769
1964	13,145	54,039	1,033	3,778
1965	13,145	51,908	1,119	3,778
1966	13,145	48,274	1,205	3,784
1967	13,145	56,859	1,291	3,842
1968	13,145	55,719	1,377	3,858
1969	16,283	54,537	1,464	4,284
1970	16,502	57,505	1,550	4,860
1971	16,502	57,092	1,636	5,610
1972	14,195	53,386	1,722	5,708
1973	14,800	53,662	1,808	6,139
1974	15,995	52,005	1,894	7,758
1975	15,455	53,720	1,980	8,446
1976	15,852	54,113	2,066	8,784
1977	16,483	54,978	2,152	10,147
1978	16,594	60,514	2,238	10,212
1979	16,323	59,805	2,324	10,464
1980	16,426	59,389	2,411	10,971
1981	16,613	60,417	2,497	11,159
1982	16,254	53,813	2,583	11,529
1983	15,948	54,914	2,669	11,853
1984	15,978	52,728	2,755	11,878
1985	16,061	44,931	2,841	11,918
1986	15,996	58,052	2,927	12,043
1987	15,358	61,629	3,013	12,043
1988	15,386	62,813	3,099	12,053
1989	15,202	59,785	3,185	12,196
1990	14,866	64,274	3,271	12,244
1991	12,913	64,897	3,358	12,274
1992	14,369	52,187	3,444	12,498
1993	12,746	56,946	3,530	12,498
1994	13,194	53,809	3,616	12,578
1995	11,873	56,895	3,702	12,612
1996	12,798	56,679	3,788	13,349
1997	13,077	62,406	3,788	13,689
1998	13,376	62,462	3,788	13,692
1999	13,062	69,338	3,788	13,692
maximum	16,613	69,338	3,788	13,692
average	14,537	54,110	2,012	8,033
minimum	11,873	31,201	0	1,860

Table 5c
Irrigated Acreage Data Used in CUw calculations

Year	National Agricultural Statistics Service (NASS) and U.S. Census of Agriculture Crop Acreage							
	Albany County		Narona County		Converse County		Platte County	
	NASS	Census of Ag.	NASS	Census of Ag.	NASS	Census of Ag.	NASS	Census of Ag.
1952	88,140	62,243	15,760	4,893	34,366	11,773	43,686	3,686
1953	79,330	56,021	14,750	4,580	34,167	11,705	41,692	3,518
1954	38,820	27,414	17,630	5,474	19,937	6,630	12,183	1,028
1955	40,960	28,925	20,780	6,452	24,672	8,418	18,067	1,524
1956	43,710	30,867	22,930	7,120	23,686	8,114	18,816	1,588
1957	54,010	38,141	25,740	7,992	27,323	9,360	25,259	2,131
1958	74,310	52,476	22,450	6,971	35,065	12,013	40,762	3,439
1959	85,080	67,000	18,120	7,815	28,363	9,518	41,120	15,975
1960	84,310	66,394	18,750	8,087	26,704	8,961	37,260	14,475
1961	86,560	68,165	19,700	8,496	29,530	9,910	39,430	15,318
1962	87,550	68,945	22,480	9,687	33,402	11,209	38,611	15,000
1963	82,000	64,575	24,000	10,351	33,150	11,125	36,922	14,344
1964	81,700	45,564	26,990	10,989	35,856	9,535	36,690	3,500
1965	83,400	46,512	27,035	11,007	33,680	8,956	36,200	3,453
1966	72,200	40,266	26,200	10,667	30,500	8,111	35,600	3,396
1967	78,000	43,501	29,000	11,807	37,075	9,859	41,600	3,968
1968	77,400	43,166	32,200	13,110	33,960	9,031	42,740	4,077
1969	76,550	34,925	33,500	7,382	34,275	9,390	40,750	9,605
1970	81,900	37,366	34,050	7,503	36,650	10,041	43,560	10,267
1971	84,500	38,552	34,650	7,635	36,400	9,972	42,410	9,996
1972	78,100	35,632	28,550	6,291	36,100	9,890	38,600	9,098
1973	73,700	33,625	27,250	6,005	36,360	9,961	43,500	10,253
1974	70,600	49,931	24,500	7,687	35,200	7,852	48,520	13,607
1975	94,100	66,551	26,700	8,377	35,900	8,008	47,630	13,357
1976	108,100	76,452	27,100	8,603	35,600	7,941	50,600	14,190
1977	101,300	71,643	26,800	8,409	37,000	8,254	48,950	13,728
1978	100,500	82,179	27,800	8,977	37,300	13,502	50,200	16,679
1979	112,900	92,318	23,400	7,556	37,800	13,683	56,000	18,606
1980	111,900	91,501	25,000	8,073	37,500	13,574	49,900	16,579
1981	108,200	88,475	27,500	8,880	36,400	13,176	56,400	18,739
1982	85,300	84,352	29,200	7,343	34,900	7,081	59,250	9,222
1983	103,100	101,954	28,200	7,092	36,800	7,466	57,000	8,872
1984	84,100	83,165	26,800	6,739	35,700	7,243	54,450	8,475
1985	75,700	74,859	25,400	6,387	28,300	5,742	51,900	8,078
1986	69,500	68,728	28,100	7,066	39,500	8,014	64,900	10,101
1987	56,900	46,797	26,000	11,079	43,200	7,666	66,300	12,632
1988	55,300	45,481	25,600	10,909	45,100	8,003	64,000	12,194
1989	46,600	38,326	24,400	10,397	41,900	7,426	68,400	13,032
1990	50,800	41,780	26,000	11,079	46,100	8,181	68,840	12,735
1991	81,800	67,276	32,700	13,934	42,500	7,542	67,400	12,842
1992	75,000	54,901	26,300	7,992	37,900	3,692	56,170	9,537
1993	62,000	45,385	37,900	11,517	36,300	3,536	59,960	10,180
1994	48,200	35,283	40,500	12,307	32,200	3,137	52,830	8,970
1995	67,300	49,264	44,300	13,462	33,500	3,263	52,900	8,982
1996	71,800	52,559	36,300	11,031	37,500	3,653	55,600	9,440
1997	86,300	71,495	27,800	23,511	34,700	11,526	57,100	10,112
1998	91,000	75,389	33,900	28,670	30,400	10,098	58,300	10,325
1999	90,700	75,140	33,400	28,247	36,700	12,190	64,800	11,476
maximum	112,900	101,954	44,300	28,670	46,100	13,683	68,400	18,739
average	77,942	57,530	27,169	9,907	34,730	8,857	47,537	9,840
minimum	38,820	27,414	14,750	4,580	19,937	3,137	12,183	1,028

Table 5d
Irrigated Acreage Data Used in CUw calculations

Permit-based distribution of reported county irrigated acreage totals									
Year	Percent of total county irrigation water rights on North Platte River tributaries between Pathfinder and Guernsey				County total irrigation water right acres				
	Albany (%)	Natrona (%)	Converse (%)	Platte (%)	Albany	Natrona	Converse	Platte	
1952	0.37	36.73	78.79	12.14	211,804	55,849	76,569	110,452	
1953	0.37	36.58	78.42	12.34	211,844	56,164	77,610	110,888	
1954	0.37	36.57	78.00	12.33	211,879	56,187	78,519	111,178	
1955	0.37	36.61	77.96	12.38	211,879	56,233	79,263	111,423	
1956	0.37	36.62	77.83	12.35	211,879	56,274	79,488	111,723	
1957	0.37	36.96	77.52	12.34	211,879	56,723	79,803	111,792	
1958	0.37	36.94	77.26	12.34	211,879	56,765	80,081	111,792	
1959	0.37	36.94	77.23	12.40	211,879	56,765	80,103	112,039	
1960	0.37	36.94	77.17	12.38	211,879	56,765	80,452	112,174	
1961	0.37	36.94	76.87	12.37	211,999	56,765	80,799	112,282	
1962	0.37	36.96	76.39	12.36	212,004	56,783	81,311	112,347	
1963	0.37	36.96	76.39	12.32	212,004	56,783	81,315	112,735	
1964	0.37	36.96	76.20	12.32	212,026	56,783	81,875	112,773	
1965	0.37	37.06	76.12	12.31	212,026	56,918	81,963	112,884	
1966	0.37	37.08	76.18	12.25	212,038	56,945	82,166	113,377	
1967	0.37	37.02	76.18	12.25	212,038	57,080	82,166	113,377	
1968	0.37	37.02	76.25	12.23	212,038	57,080	82,401	113,607	
1969	0.37	37.08	75.21	12.17	212,038	57,159	82,401	114,119	
1970	0.36	37.14	75.24	12.10	212,702	57,234	82,470	114,814	
1971	0.36	37.14	75.23	11.54	212,923	57,234	82,511	120,367	
1972	0.36	37.14	75.24	11.38	212,984	57,234	82,511	122,058	
1973	0.36	37.19	75.24	11.30	212,984	57,288	82,519	123,168	
1974	0.36	37.19	75.98	11.08	212,984	57,300	83,112	125,888	
1975	0.36	37.19	76.00	11.01	213,050	57,300	83,191	126,944	
1976	0.36	37.19	76.02	10.95	213,050	57,300	83,278	127,650	
1977	0.36	37.19	76.02	10.93	213,050	57,300	83,278	127,957	
1978	0.36	37.50	76.28	10.93	213,050	57,688	83,388	127,957	
1979	0.36	37.58	76.28	10.93	213,050	57,800	83,388	127,957	
1980	0.36	37.59	76.29	10.91	213,050	57,808	83,413	128,149	
1981	0.36	37.59	76.29	10.92	213,050	57,814	83,413	128,160	
1982	0.36	37.59	76.29	10.85	213,050	57,814	83,413	128,939	
1983	0.36	37.61	76.29	10.82	213,050	57,837	83,413	129,381	
1984	0.36	37.61	76.29	10.71	213,050	57,837	83,438	130,627	
1985	0.36	37.61	76.30	10.76	213,050	57,837	83,477	130,877	
1986	0.36	37.61	76.30	10.76	213,050	57,837	83,477	130,877	
1987	0.36	37.61	76.31	10.76	213,050	57,837	83,477	130,877	
1988	0.36	37.61	76.31	10.75	213,050	57,837	83,494	130,921	
1989	0.36	37.61	76.32	10.73	213,050	57,837	83,494	130,921	
1990	0.36	37.62	76.32	10.76	213,050	57,842	83,532	131,222	
1991	0.36	37.66	76.32	10.72	213,064	57,903	83,532	131,480	
1992	0.36	37.71	76.32	10.72	213,064	57,957	83,532	132,019	
1993	0.36	37.71	76.32	10.72	213,064	57,957	83,532	132,101	
1994	0.36	37.71	76.32	10.72	213,064	57,957	83,532	132,101	
1995	0.36	37.71	76.32	10.72	213,064	57,957	83,859	132,101	
1996	0.36	37.71	76.32	10.72	213,064	57,957	83,859	132,101	
1997	0.36	37.71	76.32	10.72	213,064	57,957	83,859	132,101	
1998	0.36	37.71	76.32	10.72	213,064	57,957	83,859	132,101	
1999	0.36	37.71	76.32	10.72	213,064	57,957	83,859	132,101	

Table 8a - Total Annual Consumptive Use
Above Pathfinder

Year	Calculated CUw (ac-ft)	Ringsby Transfer CU (ac-ft)	Non-Ag Transfers CU (ac-ft)	TOTAL Above Pathfinder CU (ac-ft)	10-yr run. average rounded CU (ac-ft)
1952	113,976	0	0	113,976	
1953	85,531	0	43	85,575	
1954	75,349	0	43	75,392	
1955	83,848	0	43	83,892	
1956	62,563	0	43	62,606	
1957	91,802	0	43	91,845	
1958	134,452	0	2,843	137,296	
1959	121,518	0	2,843	124,361	
1960	96,611	0	2,843	99,454	
1961	85,563	0	2,843	88,406	96,000
1962	107,507	0	2,843	110,351	96,000
1963	93,686	0	2,843	96,530	97,000
1964	103,555	0	2,843	106,399	100,000
1965	50,956	0	2,843	53,799	97,000
1966	136,936	0	2,937	139,873	105,000
1967	92,137	0	2,937	95,075	105,000
1968	76,112	0	2,937	79,050	99,000
1969	139,739	0	2,937	142,677	101,000
1970	98,277	4,377	2,937	105,591	102,000
1971	137,636	4,377	2,937	144,950	107,000
1972	116,994	4,377	2,937	124,308	109,000
1973	62,936	4,377	2,937	70,250	106,000
1974	117,047	4,377	2,937	124,361	108,000
1975	88,695	4,377	2,937	96,009	112,000
1976	108,213	4,377	2,937	115,528	110,000
1977	69,574	4,377	2,937	76,888	108,000
1978	126,337	4,377	2,937	133,651	113,000
1979	144,623	4,377	2,937	151,937	114,000
1980	138,079	4,377	2,937	145,393	118,000
1981	124,481	4,377	2,937	131,795	117,000
1982	114,361	4,377	2,937	121,676	117,000
1983	91,623	4,377	3,014	99,014	120,000
1984	90,762	4,377	3,045	98,184	117,000
1985	150,079	1,179	3,045	154,303	123,000
1986	86,237	0	3,059	89,296	120,000
1987	142,525	1,860	3,068	147,454	127,000
1988	134,521	5,167	3,068	142,757	128,000
1989	43,889	2,388	3,068	49,345	118,000
1990	98,308	4,582	3,068	105,958	114,000
1991	80,412	5,798	3,068	89,278	110,000
1992	49,133	2,692	3,068	54,893	103,000
1993	92,834	9,341	3,068	105,242	104,000
1994	119,497	7,383	3,068	129,948	107,000
1995	51,761	8,723	3,068	63,552	98,000
1996	115,240	3,408	3,068	121,716	101,000
1997	87,023	5,738	3,068	95,829	96,000
1998	115,974	3,015	3,068	122,056	94,000
1999	98,942	863	3,068	102,873	99,000
Maximum	150,079	9,341	3,068	154,303	128,000
Average	100,997	2,662	2,603	106,262	108,103
Minimum	43,889	0	0	49,345	94,000

Table 8b - Total Annual Consumptive Use
Below Pathfinder

Year	Calculated CUw (ac-ft)	Non-Ag Transfers CU (ac-ft)	TOTAL Below Pathfinder CU (ac-ft)	10-yr run. average rounded CU (ac-ft)
1952	78,110	0	78,110	
1953	79,275	0	79,275	
1954	47,007	0	47,007	
1955	64,064	0	64,064	
1956	72,732	819	73,551	
1957	51,627	819	52,447	
1958	82,001	819	82,820	
1959	60,795	819	61,614	
1960	77,358	819	78,178	
1961	67,572	3,128	70,700	69,000
1962	48,261	3,128	51,389	66,000
1963	76,926	3,128	80,054	66,000
1964	69,366	3,128	72,494	69,000
1965	59,021	3,128	62,149	69,000
1966	90,148	3,128	93,276	71,000
1967	56,199	3,128	59,327	71,000
1968	63,316	3,128	66,444	70,000
1969	90,578	3,128	93,706	73,000
1970	96,246	3,128	99,374	75,000
1971	61,912	3,128	65,040	74,000
1972	71,568	5,913	77,481	77,000
1973	67,693	5,913	73,606	76,000
1974	98,269	5,913	104,182	79,000
1975	85,029	5,913	90,942	82,000
1976	72,013	5,913	77,927	81,000
1977	69,528	5,913	75,442	82,000
1978	60,060	6,177	66,237	82,000
1979	79,493	6,177	85,669	82,000
1980	104,511	6,177	110,687	83,000
1981	98,135	6,177	104,312	87,000
1982	69,207	6,177	75,384	86,000
1983	74,475	6,177	80,652	87,000
1984	69,928	6,177	76,105	84,000
1985	55,501	6,359	61,860	81,000
1986	77,058	6,359	83,417	82,000
1987	103,733	6,359	110,092	85,000
1988	97,065	6,359	103,424	89,000
1989	37,019	6,496	43,516	85,000
1990	65,692	6,552	72,244	81,000
1991	70,454	6,552	77,006	78,000
1992	62,637	9,589	72,226	78,000
1993	67,997	9,589	77,586	78,000
1994	62,382	9,589	71,972	77,000
1995	47,761	9,589	57,350	77,000
1996	83,052	9,589	92,642	78,000
1997	75,794	9,589	85,383	75,000
1998	59,017	9,589	68,607	72,000
1999	82,851	9,589	92,441	77,000
Maximum	104,511	9,589	110,687	89,000
Average	72,092	4,979	77,071	77,795
Minimum	37,019	0	43,516	66,000

Appendix to Exhibit A to NPDC Charter - Exhibit 6

Example Calculation
Grass Hay - Encampment Area - One Cutting with
Additional Irrigation - 1978

This appendix presents step-by-step calculations for one crop in one area in one year to illustrate the calculation procedures presented in the text. Comments describe variations for other crops, areas, and years, and those items for which future calculations will be done differently than for the historical period.

I. Input Data

A. Encampment Weather Station (monthly averages - 1978; source: High Plains Regional Climate Center). This one of the seven weather stations needed for complete calculations above Guernsey.

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
precip (in)	0.77	1.22	0.32	0.72	0.83	1.01	0.68	3.03	0.68	0.25	0.20	1.07
max. temp (°F)							56.3	59.9	73.7	80.1	78.2	72.9
min. temp (°F)							22.2	30.0	34.1	44.1	42.2	35.7

B. Crop Yields (Carbon County - 1978; source: National Agricultural Statistics Service - Wyoming). Units are tons per acre.

Grass Hay 1.30 (“grass hay” and “other hay”
are used synonymously in this
example and in Exhibit A.)

C. Crop Distribution (Carbon County - 1978; source:
National Agricultural Statistics Service (NASS) - Wyoming
for 1978 and U.S. Census of Agriculture for 1978. Units are
acres.

Alfalfa	10,000 = 6%
Other Hay	95,000 = 53%
Minor Crops	
Corn	300 = 0.2%
Small Grains	1,200 = 0.7%
Potatoes	0 = 0.0%
<u>Irrigated Pasture</u>	<u>71,692 = 40%</u>
TOTAL	178,192 = 100%

D. Acreage (source: Wyoming State Engineer’s Office
annual irrigated acreage accounting)

Above Sinclair	79,798 (58%)
Medicine Bow	47,481 (35%)
<u>Sweetwater</u>	<u>9,690 (7%)</u>
TOTAL	136,969

These are the actually irrigated acres. “Equivalent” acreage
for the Ringsby or other transfers is not included. For 1978,
1224 reservoir-supplied irrigated acres are assumed to have
been present, but not to have been included in the reported
totals. For 1978, 1553 groundwater-supplied (original-
supply) acres are assumed to have been present, but not to
have been included in the reported totals. Total irrigated
acreage for which consumptive use is calculated is thus
 $136,969 + 1,224 + 1,553 = 139,746$.

In the future, all reservoir-supplied and original-supply groundwater acres will be included in the reported total, so no adjustments to that total will be necessary. However, it will be necessary to estimate the “reservoir-supply” acreage in order to account for its improved water supply (see below).

There is no equivalent for “reservoir-supply” or “original-supply groundwater” in the calculations below Pathfinder.

II. Unit Reference ET_o Calculation

For grass hay, the growing season is assumed to extend from April to September, inclusive (see Table 2). ET_o is calculated as presented on page [210] of Exhibit A:

$$ET_o = 0.0023 R_A TD^{0.5} (T + 17.8)(calib.factor)$$

For the 1978 growing season at Encampment:

	Apr	May	Jun	Jul	Aug	Sept
R_A (in/mo)	16.26	19.44	19.96	20.15	18.04	14.29
calibration factor	1.060	0.958	0.964	0.935	0.937	0.967
Temp. Difference (°C)	18.94	16.61	22.00	20.00	20.00	20.67
Average Temp. (°C)	4.03	7.19	12.17	16.72	15.67	12.39
reference ET_o (in/mo)	3.77	4.36	6.22	6.69	5.82	4.36

The conversion from °F (example section I.A.) to °C for these calculations is:

$$^{\circ}C = (^{\circ}F - 32) / 1.8$$

temperature difference in °C = temperature difference in °F / 1.8

The same ET_o calculations are used for all crops for each of the 5 weather stations. (Monthly climate data are averaged for the Casper, Glenrock, and Douglas stations to create a single, composite “station” before ET_o calculation.)

III. Unit $ET_{c(max)}$ Calculation

Table 2 provides the crop coefficients (K_{c_o}) for grass hay under conditions of one cutting with further irrigation (Crop E).

$$ET_{c(max)} = ET_o * K_{c_o}$$

Thus (units are inches of water),

	Apr	May	Jun	Jul	Aug	Sept	TOTAL
K_{c_o}	0.383	0.577	1.028	0.862	0.777	0.777	
$ET_{c(max)}$	1.44	2.52	6.39	5.77	4.52	3.39	24.03

The same procedure is used for each of the major crops grown above Pathfinder, i.e. crops A, B, E, F, I, and J in Table 2. For those crops with “precip” listed in Table 2, $ET_{c(max)}$ is set equal to the month’s precipitation and no further calculations are made.

IV. Yield-based Calculation of $ET_{c(i)}$

The yield adjustment is made as explained on p. [214] of Exhibit A:

$$ET_{c(i)} = \left[\frac{1}{ky} \frac{Y_i}{Y_{env(i)}} + 1 - \frac{1}{ky} \right] ET_{c(max)}$$

Table 3 lists the envelope yields ($Y_{env(i)}$) for each crop and year. For grass hay in Carbon County, $Y_{env(i)} = 1.35$ tons/acre. The reported grass hay yield (Y_i) in 1978 was 1.30 tons/acre, so

$$Y_i/Y_{env(i)} = 0.96$$

(If the computed ratio exceeds 1.0, it is set to = 1.0) The key term is 1.05 for grass hay, so the 1978 $ET_{c(i)}$ for grass hay with additional irrigation at Encampment is 23.12 inches (1.93 ft).

V. Effective Precipitation and Unit CU_w Calculation

The total precipitation from October, 1977 to March, 1978 was 4.87 inches. The Exhibit A method assumes that 50% of this (2.44 inches) is stored in the soil for use by crops during the subsequent growing season.

A total of 5.91 inches of precipitation fell from April to September, 1978. The Exhibit A method assumes that 95% of this (5.61 inches) is available for use by crops during the growing season.

Thus, the total effective precipitation for the year is 8.05 inches. This quantity is subtracted from the $ET_{c(i)}$ value calculated above (23.12 in.) to determine the consumptive use of water supplied by irrigation. Thus,

$$CU_w = 15.07 \text{ inches} = 1.26 \text{ feet}$$

This calculation is made in the same manner for all crops, with the exception that effective precipitation is calculated as explained on p.[216] for non-forage crops (corn, beans, small grains, etc.) below Pathfinder. (No specific calculations of CU_w are made for non-forage crops above Pathfinder.)

VI. Crop Mix Calculations

All irrigated acres above Pathfinder are assumed to have the same mix of crops as reported for Carbon County. 95,000 acres of other hay / 178,192 total acres = 53.3% other hay.

VII. Acreage Calculations

A. Total Irrigated Acreage

The method assumes that growing conditions for 50% of the reported acreage “above Sinclair” is best represented by the Encampment weather data. Reservoir-supply and original-supply groundwater acreage is assumed to be distributed in the same proportions as the historically reported irrigated acreage, i.e. 58% of it “above Sinclair” and 50% of that around Encampment. Thus, the total Encampment acreage is:

$$\begin{array}{r}
 39,899 \text{ (50\% of the “above Sinclair” value)} \\
 356 \text{ (50\% of 58\% of the total reservoir-supply} \\
 \text{acreage)} \\
 + \underline{452} \text{ (50\% of 58\% of the original-supply} \\
 \text{groundwater acreage)} \\
 40,707 \text{ acres}
 \end{array}$$

In the future, all of these acreages will be directly accounted by the Wyoming State Engineer’s Office; it will not be necessary to add similar acreage increments.

B. Normal and Limited Water Supply

All reservoir-supplied acreage is assumed to have enough water supply that irrigation occurs after the cutting of forage crops. Groundwater acreage, whether under original or

additional-supply permits, is also assumed to have enough water supply that irrigation occurs after the cutting of forage crops. All remaining acreage is assumed to be split 50:50 between conditions which allow and do not allow irrigation after cutting.

This “groundwater” acreage is different from the original-supply groundwater acreage discussed above. Here, “groundwater” irrigation includes both original and additional-supply and it is estimated based solely on permit data (see Exhibit A, p. [222]). In 1978, 100% of all adjudicated groundwater irrigation permit acreage plus 50% of all unadjudicated groundwater irrigation permit acreage above Pathfinder totaled 6,950 acres. This is proportioned to the Encampment sub-area as above, i.e. 2,016 acres.

Thus:

assumed post-cutting <u>irrigation</u>	assumed no post-cutting <u>irrigation</u>	
356		reservoir-supply acres
2,016		groundwater acres
+ <u>19,167</u>	<u>19,167</u>	50:50 split of remainder
21,539	19,167	

All acreage is assumed to have the same crop proportions:

Other hay = 53.3% of the 21,539 acres with post-cutting irrigation = 11,480 acres

The minor crops above Pathfinder (i.e. other than alfalfa, grass hay and irrigated pasture) are assumed to have the same unit CU_w as normally-irrigated grass hay. Thus, the 0.9% of both the 21,539 and the 19,167 representing the minor crops is assigned to the same unit CU_w .

VIII. Total Consumptive Use Calculations

A. Total consumptive use of irrigation water (CU_w)

The individual crop acreages are then multiplied by the appropriate unit CU_w to produce an acre-ft total. For the grass hay (“other hay”), one cutting, with additional irrigation of this example:

$$CU_w = 11,480 \text{ acres} * 1.26 \text{ ft. unit } CU_w = 14,465 \text{ acre-ft.}$$

Calculations are completed in the same manner for each crop type and weather station, resulting in the total CU_w (in acre-ft) for each crop and station. Values for the Encampment, Saratoga, Medicine Bow, and Muddy Gap stations are then combined into a single CU_w value for above Pathfinder Dam. For 1978, that value is 126,337 acre-ft.

To this CU_w for irrigated lands are added two additional consumptive use components:

B. The Ringsby transfer.

In 1978, the Wyoming State Engineers Office did not report equivalent acreage for Ringsby. Therefore, a value equal to the average of the reported values for 1985 - 1996 was assumed. This value (3,082 acres) is multiplied by 1.43 acre-ft per acre to provide the total equivalent consumptive use of irrigation water (4,377 acre-ft).

In the future, the annually reported Ringsby equivalent acreage will be used for this calculation.

C. Transfers from Agricultural Use

In 1978, there had been total transfers amounting to 2,937 acre-ft approved by the Wyoming Board of Control (see Table 7). This quantity is added to the historical 1978 CU_w.

In the future, the quantity of consumptive use for each transfer will be calculated on an annual basis, as explained in a separate procedure. This value will be used instead of the total on Exhibit A, Table 7 for future calculations of consumptive use.

D. Total Consumptive Use

The total consumptive use above Pathfinder Dam for 1978 is:

$$126,337 + 4,377 + 2,937 = 133,651 \text{ acre ft}$$

(see Exhibit A, Table 8)

**EXHIBIT B - PROCEDURES TO EVALUATE
CONSUMPTIVE USE CALCULATIONS
ABOVE GUERNSEY RESERVOIR, WYOMING**

I. Background

Exhibit A provides the procedures to be used to calculate the historical and future consumptive use of irrigation water in the North Platte Basin of Wyoming above Guernsey Reservoir. In recognition of possible deficiencies in the procedures described in Exhibit A to estimate current consumptive use rates and to capture changes in agricultural conditions that may change the amount of irrigation water consumption per unit area, this exhibit (Exhibit B) presents a program for data collection and analysis and the review of consumptive use calculation methods. Like Exhibit A, the program described in this exhibit applies to the portion of the North Platte Basin in Wyoming above Guernsey Reservoir. If the North Platte Decree Committee (NPDC) concludes that alternate methodologies provide more reliable measures of consumptive use than the method presented in Exhibit A, a new methodology will be adopted by the NPDC and the consumptive use caps developed previously will be adjusted accordingly. An initial data collection, analysis, and review period of five years is established. This data collection, analysis and review will occur during the first ten years following court approval of the Final Settlement Stipulation.

II. Data Collection

A. Climate Data

The NPDC will install and operate 4 - 6 automated weather stations to collect precipitation, temperature, humidity, wind speed, solar radiation and soil temperature (at the 4-inch depth) data. These stations will be located to be as representative as possible of agricultural conditions in the Encampment, Saratoga, Medicine Bow, Sweetwater, and Casper to Guernsey areas of the North Platte River Basin. The specific locations will be determined by the NPDC with consideration given to the data needs of item III (below) to minimize the need for additional stations in the water balance subareas.

The requirements for continuous data collection will be evaluated after five years of operation. Procedures and contracts for the construction, operation, sensor calibration, general maintenance, and data retrieval and distribution for these stations will be developed by the NPDC. Standard methods typical of such weather station networks will be used in establishing the weather data network.

B. Irrigation Inventory

Beginning in the first year of implementation of this procedure and every 5 years thereafter, an inventory of irrigation systems throughout the Wyoming North Platte Basin above Guernsey will be conducted under guidelines established by the NPDC to provide a baseline and periodic comparisons for determining if changes in farming and irrigation practices over time may impact consumption of irrigation water. This inventory will include identification of the types of irrigation systems used (e.g. earthen head ditch with flood irrigation, center pivot sprinkler, gated pipe, etc.),

methods of conveyance (earthen canals, lined canals, pressurized pipe, etc.), number and types of runoff reuse systems, and drainage facilities present. To the extent feasible, observations of crop type and irrigations system type will be recorded in conjunction with the annual irrigated acreage accounting performed by Wyoming State Engineer's Office personnel pursuant to other NPDC procedures.

In conjunction with the facilities inventory, a representative survey of irrigation practices will be conducted every five years until such time as the NPDC may decide such surveys are no longer necessary. This survey will consist of operator questionnaires to acquire information on the number and dates of cuttings of forage crops, beginning and ending irrigation dates, grazing practices, crop rotations, plant species, fertilizer practices, crop yields, and land leveling activities.

In addition to the periodic irrigation inventories, the NPDC may obtain supplemental information by acquisition and interpretation of remote-sensing data to assess the uniformity of crop growth as influenced by irrigation in key areas.

C. Diversion Data

Information on irrigation diversions in the area above Guernsey Reservoir will be compiled annually from the records of the Wyoming State Engineer's Office (WSEO) and other available sources as appropriate. Such diversion records may include, for example, the spot measurements and gage readings recorded by WSEO personnel in the course of routine water administration, available data from automatically recording gages, and measurements and readings by USGS or USBR personnel.

If data beyond that which can be compiled from existing sources are necessary to assess the statistical variation in unit diversions (acre-ft per irrigated acre) for the basin above Guernsey Reservoir, additional diversion monitoring will be established. Specifically, sufficient diversion data will be collected to allow prediction of the number of diversion measurements that would be necessary to achieve an accuracy of $\pm 5\%$ at a 90% confidence level for the total irrigation diversions above Guernsey Reservoir.

D. Database Maintenance

A database including all data collected in accordance with this exhibit will be maintained by the NPDC in a manner and format that facilitates access by all members of the NPDC and calculation of consumptive use by both Exhibit A and potential alternative methods.

III. Water Balance Study Sites

The NPDC will select a minimum of two subareas (study sites) below Pathfinder Reservoir and three subareas above Pathfinder Reservoir in which it appears feasible to directly monitor inflow and outflow as a means to examine calculations of consumptive use of irrigation water based on other parameters. Calculations of consumptive use and effective precipitation based on climate and crop data will be supplemented with measurements of irrigation water diversion and application to fields within each subarea selected. For these detailed study sites, the NPDC will locate subareas in which water inflows and outflows can be carefully measured, irrigation conditions are representative of the larger irrigated areas of the basin, critical irrigation efficiency parameters can be effectively isolated, non-agricultural consumptive uses are minimal, and groundwater underflow and surface storage is minimal.

Within each subarea selected:

1. All major irrigation diversions will be measured.
2. Irrigation field deliveries will be measured under representative systems to assess conveyance losses.
3. Streamflow entering and exiting the subarea will be gaged. Protocols for operation and maintenance of such gages and the processing of flow records will be based on USGS stream-gaging procedures.
4. Groundwater underflow, if any, will be estimated.
5. All potential sources of streamflow depletion will be inventoried and appropriate estimates of consumptive use will be developed (e.g. from natural vegetation).
6. Precipitation will be measured.
7. Groundwater levels will be monitored if necessary to assess changes in groundwater storage.
8. Changes in surface water storage, if any, will be measured.
9. Soil water content at representative sites will be measured on or about April 1 and again on or about November 1 to evaluate storage of precipitation outside the growing season relative to total measured precipitation and any net change in soil moisture storage over the growing season.
10. Additional measurements and observations may be made from time to time as directed by the

NPDC (e.g. use of a modern Bowen Ratio or eddy-correlation instrumentation to verify estimates of evapotranspiration).

The water balance for a study site can be written as:

$$CU = IN + P \pm GW_n - OUT \mp S - ET_{ni} \quad (1)$$

where

- CU = total actual consumptive use on irrigated land
- IN = volume of surface water that enters the study site
- P = volume of precipitation
- GW_n = net ground water extraction
- OUT = volume of surface water flowing out of the area
- S = volume of water stored in the study site, and
- ET_{ni} = evapotranspiration from non-irrigated lands.

The water balance will be conducted over a five year period to develop a database for estimation of actual consumptive use. These data will be used with methods for calculation of consumptive use, for example, to estimate representative on-farm and conveyance efficiencies for the study sites.

IV. Methodology Review

The data collection described above will be used to review methods for calculation of consumptive use of irrigation water, including the Exhibit A procedures, improved versions of the Exhibit A procedures, and procedures which

incorporate additional or different parameters (e.g. as discussed below).

Calculations using alternative methods will be made as data acquisition allows. Where possible, consumptive use calculations will be made in parallel with procedures in Exhibit A. For example, it is anticipated that the calibration of the Hargreaves equation used in Exhibit A will be compared with a new, local calibration using the Penman-Monteith equation as recently standardized by the American Society of Civil Engineers¹ as soon as the automated weather stations (II.A.) are in place. Similarly, it may be possible to begin evaluating the application of other approaches, e.g. tying consumptive use to the total days of diversion or to the total volume of diversions, after the first year's investigations under section III above.

The objective of the methodology review program is to evaluate alternatives to Exhibit A in the calculation of the past, present, and future consumptive use of irrigation water. Although it is not possible to anticipate all the alternatives which may prove viable, at a minimum, the alternative calculation methods described below (IV.A and IV.B.) will be evaluated. The final methodology selected should be acceptable to science and engineering communities, and may require periodic training of staff who will collect data and make calculations. Alternate calculation procedures will be statistically evaluated with respect to the confidence intervals associated with the calculated consumptive use of irrigation water. Alternate calculation procedures will also be evaluated in relation to the Exhibit A procedures with respect to accuracy, reliability, and suitability for appropriate re-calculation of the consumptive use caps established using the Exhibit A procedures.

¹ ASCE Committee on Evapotranspiration in Irrigation and Hydrology, 2000, *Standardized Reference Evapotranspiration Equation*.

Other technology not yet developed may become available to estimate evapotranspiration (ET) over irrigated areas such as those in the North Platte River Basin in Wyoming in a cost effective manner. The NPDC will consider future new technology as it becomes available to improve methodology described in Exhibit A and as described above.

A. Exhibit A Method - Modified

During the initial five year period, local re-calibration of the Hargreaves equation used to calculate historical consumptive use and the future use of the Penman-Monteith equation will be investigated. The crop coefficients of Exhibit A will be refined to reflect annually varying climate and irrigation dates. For example, representative ending dates of diversions, followed by a delay of about two weeks, may be substituted for fixed conditions to reflect the beginning of dryland ET conditions. Annual observations of crop growth stage and uniformity will be used to refine the maximum crop coefficients.

For the area below Pathfinder, irrigated acreage is assessed under the Exhibit A method based on annual NASS surveys. Beginning with implementation of the settlement agreement, actual inventories of irrigated acreage will be conducted for this area by WSEO personnel in the same manner as has historically been done above Pathfinder. The relationship between WSEO inventory acreage and NASS survey acreage will be investigated with a goal of converting all irrigated acreage accounting to the WSEO inventories. This may require adjustment of the consumptive use cap, but no such adjustment will reflect acreage or technological changes that occurred after 2000.

B. Diversion - Efficiency Adjusted Method

A method that uses measured water diversions, rather than estimated crop yields, to adjust for variations in the annual water supply and that includes provisions to quantify the

impact of technological and production practice changes on consumptive use will be evaluated to predict consumptive use in the future. The method depends on the computed consumptive use per unit land area when water supplies are not limiting, similar to the method described in Exhibit A for the quantity ($CU_{w(max)}$). The consumptive use for well-watered conditions is reduced by a factor determined from the efficiency of water use on farms, the conveyance efficiency of the systems that supply water, and the annual variation of irrigation water supplies.

The consumptive use of irrigation water under a full water supply is the difference between the evapotranspiration for well-watered conditions (ET_m) and the amount of the precipitation that is effective in meeting crop water requirements (P_e):

$$CU_{w(max)} = ET_m - P_e \quad (2)$$

Under this method, the well-watered evapotranspiration can be computed with the Penman-Monteith equation for reference crop evapotranspiration and crop coefficients as used in Exhibit A. The effective precipitation can be estimated similarly to the procedures described in Exhibit A. As indicated in Exhibit A and earlier in Exhibit B, the procedures for computing these quantities may be reviewed and improved over time.

A consumptive use ratio (R) can be defined as the ratio of the consumptive use of irrigation water for actual water supplies to the consumptive use of irrigation water for well-watered conditions (using the terminology from Exhibit A, $R = CU_w/CU_{w(max)}$). The ratio depends on the measured diversion of surface and ground water, the well-watered consumptive use and estimates of the well-watered on-farm

(E_f) and conveyance (E_c) efficiencies. The ratio can be computed by the following equation:

$$R = 1 - \left[1 - E_f E_c \left(\frac{D_v}{CU_{w(\max)}} \right) \right]^{1/E_f} \quad (3)$$

For example, suppose that the annual well-watered consumptive use of irrigation water is 1.5 acre-feet/acre and that an irrigator diverted 3 acre-feet. The ratio of diversion to well-watered consumptive use is therefore 2.0. Furthermore, if the well-watered on-farm efficiency is 0.6 and the conveyance efficiency is 0.5, then the consumptive use ratio is 0.78. (A similar consumptive use ratio can be calculated for any given set of efficiencies and diversion divided by $CU_{w(\max)}$.) Using this ratio the actual consumptive use would be $0.78 \times 1.5 = 1.17$ acre-feet/acre. The realized on-farm efficiency is assumed to be somewhat greater than the well-watered on-farm efficiency (E_f) whenever the diversion is inadequate to fully meet the crop water requirement.

To use this method, diversions of surface and ground water would be measured, and the on-farm and conveyance efficiencies would be estimated. These values may be determined from selected areas (study sites) that represent typical soils, irrigation systems, cropping systems, management practices and other factors for the areas above the Guernsey Reservoir.

Direct measurement of on-farm and conveyance efficiencies is difficult. Efficiencies change throughout the year and vary from location to location. Also such measurements often only apply to areas near the measurement site. A representative average for the study site is needed instead of locally measured values. To avoid complications in direct measurement of efficiencies, the water balance

measurements will be used to attempt to quantify the actual consumptive use for each study site. Then, the average on-farm and conveyance efficiency may be determined through calibration to water-balance based consumptive use. Estimates of the conveyance efficiency will be compared to measurements of diversion and delivery on some canals/ditches.

If this method were implemented basin-wide, the average efficiencies determined from the water balance procedures would be used on similar lands throughout the irrigated region above Guernsey Reservoir.