



State of Idaho

# DEPARTMENT OF WATER RESOURCES

STATE OFFICE, 450 W. State Street, Boise, Idaho

This Guidance Document is not new law but is an agency interpretation of existing law. For more information or to provide input on the document, please contact the Water Rights Section Manager at 208-287-4800. (Feb.2020)

JOHN V. EVANS  
Governor

A. KENNETH DUNN  
Director

Mailing address:  
Statehouse  
Boise, Idaho 83720  
(208) 334-4440

## ADMINISTRATOR'S MEMORANDUM

Amendment to Transfer Processing No. 7

TO: Regional Offices and Water Allocation Section

FROM: Norman C. Young *ncy*

DATE: October 29, 1984

RE: Sample Calculations for Change in Nature of Use.

The purpose of this memorandum is to amend the original version of the memorandum dated September 24, 1982, by replacing the table of data for consumptive irrigation requirements.

The original memorandum included a copy of Table 6 from "Consumptive Irrigation Requirements of Crops in Idaho," by R.J. Sutter and G.L. Corey, University Of Idaho Bulletin 516, July 1970, p.8. Recently a report has been released entitled "Estimating Consumptive Irrigation Requirements for Crops in Idaho," by R.G. Allen and C.E. Brockway, published by the University of Idaho Water and Energy Resources Research Institute, August, 1983. Information contained in this report has been utilized by Bill Ondrechen to prepare Table A, attached, which describes the Seasonal Crop Water Use Statistics for Alfalfa Hay. This table, which includes Consumptive Use (CU) and Consumptive Irrigation Requirement (CIR) data, should replace Table 6 in the above-referenced Administrator's Memorandum.

The column of data that should be utilized in the analysis of a change in nature of use transfer from irrigation to another use is the third column, Mean CIR.



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JOHN V. EVANS

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Mailing address:  
Statehouse  
Boise, Idaho 83720  
(208) 334-4440

September 11, 1984

MEMO

*DRT*  
TO: DAVE TUTHILL, WATER ALLOCATION SECTION  
FROM: BILL ONDRECHEN, HYDROLOGY SECTION *WTC*  
SUBJECT: NOTES ON DETERMINATION OF CONSUMPTIVE IRRIGATION  
REQUIREMENT AND CONSUMPTIVE USE

## GENERAL

The consumptive irrigation requirement (CIR) and consumptive use (CU) (same as evapotranspiration or ET) data used in this update of Department procedures are described in the publication "Estimating Consumptive Irrigation Requirements for Crops in Idaho" by R.G. Allen and C.E. Brockway, August 1983. The document, published by the University of Idaho Water and Energy Resources Research Institute, is the completion report for the research project. Allen and Brockway selected the FAO-Blaney-Criddle method for use, as it required the least adjustment to match measured values of consumptive use. The letters FAO derive from the United Nations Food and Agriculture Organization, the entity which helped develop it.

Using information in the report as well as Appendix E supplied by the authors, values of mean consumptive irrigation requirement were plotted on a map. Regions of similar irrigation requirement were delineated on the map, with boundaries generally following those of the "Climatic Areas" of U. of Idaho Bulletin 516, by Sutter and Corey. In addition to using a different method for determining consumptive use than that used in Bulletin 516, Allen and Brockway used data from a larger number of climatic stations. Consumptive use and consumptive irrigation requirement data are now available for several areas which were undefined in Bulletin 516. These areas are: Idaho City - Centerville, Anderson Dam - Prarie, and Stanley - Sawtooth Valley. Table A lists the mean or average consumptive use for alfalfa hay, the 80th percentile consumptive use, mean consumptive irrigation requirement, and 80th percentile irrigation requirement for 98 weather stations in the state. With the exception of Table A which is an attachment to this document, all references to tables and figures are to those in Allen and Brockway 1983.

TABLE A  
SEASONAL CROP WATER USE STATISTICS FOR ALFALFA HAY  
(Acre Inches/Acre/Season)

| Station               | Mean<br>CU | 80th PCTL.<br>CU | Mean<br>CIR | 80th PCTL.<br>CIR |
|-----------------------|------------|------------------|-------------|-------------------|
| Aberdeen Exp. Sta.    | 37.5       | 40.4             | 33.6        | 38.4              |
| American Falls 1SW    | 38.2       | 40.5             | 33.2        | 37.7              |
| Anderson Dam          | 33.5       | 35.4             | 29.5        | 33.0              |
| Arbon 2NW             | 33.0       | 34.6             | 27.6        | 31.6              |
| Arco 3SW              | 31.6       | 33.8             | 28.0        | 32.9              |
| Ashton                | 33.1       | 35.5             | 25.9        | 31.0              |
| Bayview Model Basin   | 29.4       | 31.1             | 21.5        | 26.7              |
| Blackfoot 2SSW        | 37.4       | 40.2             | 32.5        | 37.6              |
| Bliss                 | 41.1       | 43.4             | 38.1        | 42.2              |
| Boise WSO AP          | 40.2       | 42.3             | 35.4        | 39.0              |
| Bonniers Ferry 1SW    | 31.5       | 33.4             | 24.3        | 28.6              |
| Bruneau               | 39.8       | 42.0             | 36.5        | 40.8              |
| Burley FAA AP         | 36.5       | 38.4             | 32.6        | 36.3              |
| Cabinet Gorge         | 30.9       | 32.8             | 21.4        | 26.6              |
| Caldwell              | 40.4       | 43.2             | 36.9        | 41.1              |
| Cambridge             | 37.5       | 40.4             | 32.4        | 37.7              |
| Cascade 1NW           | 28.6       | 30.3             | 23.1        | 26.7              |
| Castleford 2N         | 40.6       | 42.5             | 36.4        | 40.4              |
| Challis               | 34.7       | 37.1             | 30.7        | 34.4              |
| Chilly Barton Flat    | 29.9       | 32.9             | 25.2        | 30.3              |
| Coeur d'Alene 1E      | 32.5       | 34.4             | 24.6        | 29.8              |
| Cottonwood            | 31.1       | 33.5             | 22.2        | 28.1              |
| Council               | 37.5       | 39.5             | 30.4        | 35.8              |
| Deer Flat Dam         | 40.8       | 42.4             | 37.2        | 40.5              |
| Driggs                | 28.3       | 30.0             | 22.3        | 27.1              |
| Dubois Exp. Sta.      | 30.5       | 32.8             | 25.2        | 30.1              |
| Emmett 2E             | 40.7       | 43.2             | 36.7        | 41.1              |
| Fairfield Ranger Sta. | 29.4       | 31.0             | 26.3        | 29.9              |
| Fort Hall             | 38.2       | 40.4             | 33.3        | 37.8              |
| Garden Valley RS      | 35.3       | 37.3             | 29.2        | 33.9              |
| Glenns Ferry          | 38.4       | 40.9             | 35.6        | 39.0              |
| Grace                 | 34.8       | 37.3             | 28.0        | 33.2              |
| Grandview 2W          | 40.2       | 42.8             | 37.5        | 42.0              |
| Grangeville           | 30.5       | 33.0             | 20.1        | 27.1              |
| Hailey Ranger Sta.    | 29.0       | 31.1             | 25.6        | 30.1              |
| Hamer 4NW             | 34.1       | 35.9             | 29.9        | 33.5              |
| Hazelton              | 38.7       | 41.9             | 35.1        | 39.5              |
| Hill City             | 28.8       | 30.7             | 26.1        | 29.7              |
| Hollister             | 35.6       | 38.5             | 31.3        | 36.2              |
| Howe                  | 34.3       | 36.6             | 29.6        | 33.9              |
| Idaho City            | 30.2       | 32.4             | 25.6        | 30.8              |
| Idaho Falls 2ESE      | 36.8       | 39.0             | 31.6        | 36.0              |

TABLE A cont.

| Station                | Mean<br>CU | 80th PCTL.<br>CU | Mean<br>CIR | 80th PCTL.<br>CIR |
|------------------------|------------|------------------|-------------|-------------------|
| Idaho Falls 16SE       | 33.7       | 35.5             | 26.9        | 30.9              |
| Idaho Falls FAA AP     | 35.7       | 38.1             | 31.2        | 35.5              |
| Idaho Falls 46W        | 32.8       | 35.0             | 28.6        | 32.8              |
| Island Park Dam        | 24.8       | 26.5             | 18.1        | 24.9              |
| Jerome                 | 39.5       | 41.9             | 36.2        | 40.2              |
| Kellogg                | 32.1       | 34.1             | 22.5        | 28.1              |
| Kilgore                | 24.5       | 25.6             | 17.8        | 23.3              |
| Kooskia                | 35.2       | 37.3             | 23.3        | 29.5              |
| Kuna 2NNE              | 41.7       | 44.4             | 37.2        | 41.4              |
| Lewiston WSO AP        | 37.3       | 39.6             | 30.9        | 35.3              |
| Lifton Pumping Station | 27.5       | 29.0             | 23.9        | 27.4              |
| Mackay RS              | 33.7       | 36.3             | 29.1        | 33.6              |
| Malad                  | 35.4       | 37.8             | 29.2        | 34.5              |
| Malad City             | 34.4       | 36.5             | 28.5        | 33.6              |
| Malta 2E               | 36.4       | 37.9             | 30.9        | 35.0              |
| May                    | 28.9       | 31.1             | 24.8        | 28.0              |
| McCall                 | 27.8       | 29.9             | 21.1        | 25.6              |
| Minidoka Dam           | 38.5       | 40.6             | 34.6        | 39.1              |
| Montpelier             | 26.6       | 28.7             | 22.4        | 26.2              |
| Moscow - U of I        | 33.7       | 36.0             | 25.0        | 30.2              |
| Mountain Home          | 38.0       | 40.3             | 34.6        | 38.8              |
| New Meadows RS         | 28.6       | 30.1             | 22.6        | 26.9              |
| Nez Perce              | 30.6       | 32.3             | 21.1        | 25.3              |
| Oakley                 | 36.4       | 38.7             | 30.9        | 35.6              |
| Ola 4S                 | 36.5       | 38.3             | 30.9        | 35.1              |
| Orofino                | 37.6       | 39.8             | 27.5        | 32.4              |
| Palisades Dam          | 33.5       | 35.6             | 25.0        | 29.4              |
| Parma Exp. Sta.        | 40.4       | 43.0             | 36.7        | 41.6              |
| Paul 1ENE              | 38.0       | 40.6             | 34.0        | 38.4              |
| Payette                | 41.0       | 43.0             | 37.4        | 40.9              |
| Picabo                 | 29.9       | 31.9             | 26.8        | 31.2              |
| Pocatello WSO AP       | 37.0       | 39.3             | 32.4        | 36.9              |
| Porthill               | 30.2       | 31.7             | 23.1        | 27.8              |
| Potlatch               | 32.4       | 35.6             | 23.2        | 28.1              |
| Preston                | 34.7       | 37.1             | 27.8        | 33.2              |
| Reynolds               | 30.0       | 31.7             | 26.2        | 29.7              |
| Richfield              | 37.0       | 39.3             | 33.7        | 37.9              |
| Riggins                | 39.1       | 41.4             | 30.4        | 35.3              |
| Rupert                 | 38.8       | 41.5             | 35.7        | 39.3              |
| St. Anthony 1WNW       | 29.6       | 31.4             | 25.2        | 28.3              |
| Saint Maries           | 32.5       | 34.7             | 22.5        | 28.0              |
| Salmon                 | 32.2       | 33.9             | 27.2        | 30.6              |
| Sandpoint Exp. Sta.    | 30.3       | 32.1             | 21.0        | 26.0              |
| Shoshone 1WNW          | 39.1       | 42.0             | 35.9        | 40.3              |
| Stanley *              | 22.7       | 23.6             | 18.8        | 21.9              |
| Strevell               | 32.8       | 35.4             | 27.6        | 32.7              |

\* Values are for irrigated pasture, not alfalfa hay

TABLE A cont.

| Station           | Mean<br>CU | 80th PCTL.<br>CU | Mean<br>CIR | 80th PCTL.<br>CIR |
|-------------------|------------|------------------|-------------|-------------------|
| Swan Falls        | 42.3       | 44.4             | 38.9        | 42.5              |
| Swan Valley       | 32.2       | 33.8             | 23.9        | 28.0              |
| Tensed            | 31.1       | 32.7             | 22.4        | 27.0              |
| Tetonia Exp. Sta. | 28.2       | 29.8             | 22.3        | 26.9              |
| Three Creek       | 26.5       | 28.3             | 22.5        | 26.6              |
| Twin Falls 2NNE   | 39.1       | 41.4             | 35.6        | 39.8              |
| Twin Falls 3SE    | 39.2       | 41.6             | 35.6        | 40.1              |
| Weiser            | 39.2       | 41.7             | 35.8        | 39.9              |

TABLE A  
SEASONAL CROP WATER USE STATISTICS FOR ALFALFA HAY  
(Acre Inches/Acre/Season)

| Station               | Mean<br>CU | 80th PCTL.<br>CU | <del>Mean</del><br>CIR | 80th PCTL.<br>CIR |
|-----------------------|------------|------------------|------------------------|-------------------|
| Aberdeen Exp. Sta.    | 37.5       | 40.4             | 33.6                   | 38.4              |
| American Falls 1SW    | 38.2       | 40.5             | 33.2                   | 37.7              |
| Anderson Dam          | 33.5       | 35.4             | 29.5                   | 33.0              |
| Arbon 2NW             | 33.0       | 34.6             | 27.6                   | 31.6              |
| Arco 3SW              | 31.6       | 33.8             | 28.0                   | 32.9              |
| Ashton                | 33.1       | 35.5             | 25.9                   | 31.0              |
| Bayview Model Basin   | 29.4       | 31.1             | 21.5                   | 26.7              |
| Blackfoot 2SSW        | 37.4       | 40.2             | 32.5                   | 37.6              |
| Bliss                 | 41.1       | 43.4             | 38.1                   | 42.2              |
| Boise WSO AP          | 40.2       | 42.3             | 35.4                   | 39.0              |
| Bonnors Ferry 1SW     | 31.5       | 33.4             | 24.3                   | 28.6              |
| Bruneau               | 39.8       | 42.0             | 36.5                   | 40.8              |
| Burley FAA AP         | 36.5       | 38.4             | 32.6                   | 36.3              |
| Cabinet Gorge         | 30.9       | 32.8             | 21.4                   | 26.6              |
| Caldwell              | 40.4       | 43.2             | 36.9                   | 41.1              |
| Cambridge             | 37.5       | 40.4             | 32.4                   | 37.7              |
| Cascade 1NW           | 28.6       | 30.3             | 23.1                   | 26.7              |
| Castleford 2N         | 40.6       | 42.5             | 36.4                   | 40.4              |
| Challis               | 34.7       | 37.1             | 30.7                   | 34.4              |
| Chilly Barton Flat    | 29.9       | 32.9             | 25.2                   | 30.3              |
| Coeur d'Alene 1E      | 32.5       | 34.4             | 24.6                   | 29.8              |
| Cottonwood            | 31.1       | 33.5             | 22.2                   | 28.1              |
| Council               | 37.5       | 39.5             | 30.4                   | 35.8              |
| Deer Flat Dam         | 40.8       | 42.4             | 37.2                   | 40.5              |
| Driggs                | 28.3       | 30.0             | 22.3                   | 27.1              |
| Dubois Exp. Sta.      | 30.5       | 32.8             | 25.2                   | 30.1              |
| Emmett 2E             | 40.7       | 43.2             | 36.7                   | 41.1              |
| Fairfield Ranger Sta. | 29.4       | 31.0             | 26.3                   | 29.9              |
| Fort Hall             | 38.2       | 40.4             | 33.3                   | 37.8              |
| Garden Valley RS      | 35.3       | 37.3             | 29.2                   | 33.9              |
| Glenns Ferry          | 38.4       | 40.9             | 35.6                   | 39.0              |
| Grace                 | 34.8       | 37.3             | 28.0                   | 33.2              |
| Grandview 2W          | 40.2       | 42.8             | 37.5                   | 42.0              |
| Grangeville           | 30.5       | 33.0             | 20.1                   | 27.1              |
| Hailey Ranger Sta.    | 29.0       | 31.1             | 25.6                   | 30.1              |
| Hamer 4NW             | 34.1       | 35.9             | 29.9                   | 33.5              |
| Hazelton              | 38.7       | 41.9             | 35.1                   | 39.5              |
| Hill City             | 28.8       | 30.7             | 26.1                   | 29.7              |
| Hollister             | 35.6       | 38.5             | 31.3                   | 36.2              |
| Howe                  | 34.3       | 36.6             | 29.6                   | 33.9              |
| Idaho City            | 30.2       | 32.4             | 25.6                   | 30.8              |
| Idaho Falls 2ESE      | 36.8       | 39.0             | 31.6                   | 36.0              |

1 acre X

TABLE A cont.

| Station                | Mean<br>CU | 80th PCTL.<br>CU | Mean<br>CIR | 80th PCTL.<br>CIR |
|------------------------|------------|------------------|-------------|-------------------|
| Idaho Falls 16SE       | 33.7       | 35.5             | 26.9        | 30.9              |
| Idaho Falls FAA AP     | 35.7       | 38.1             | 31.2        | 35.5              |
| Idaho Falls 46W        | 32.8       | 35.0             | 28.6        | 32.8              |
| Island Park Dam        | 24.8       | 26.5             | 18.1        | 24.9              |
| Jerome                 | 39.5       | 41.9             | 36.2        | 40.2              |
| Kellogg                | 32.1       | 34.1             | 22.5        | 28.1              |
| Kilgore                | 24.5       | 25.6             | 17.8        | 23.3              |
| Kooskia                | 35.2       | 37.3             | 23.3        | 29.5              |
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| Lewiston WSO AP        | 37.3       | 39.6             | 30.9        | 35.3              |
| Lifton Pumping Station | 27.5       | 29.0             | 23.9        | 27.4              |
| Mackay RS              | 33.7       | 36.3             | 29.1        | 33.6              |
| Malad                  | 35.4       | 37.8             | 29.2        | 34.5              |
| Malad City             | 34.4       | 36.5             | 28.5        | 33.6              |
| Malta 2E               | 36.4       | 37.9             | 30.9        | 35.0              |
| May                    | 28.9       | 31.1             | 24.8        | 28.0              |
| McCall                 | 27.8       | 29.9             | 21.1        | 25.6              |
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| Ola 4S                 | 36.5       | 38.3             | 30.9        | 35.1              |
| Orofino                | 37.6       | 39.8             | 27.5        | 32.4              |
| Palisades Dam          | 33.5       | 35.6             | 25.0        | 29.4              |
| Parma Exp. Sta.        | 40.4       | 43.0             | 36.7        | 41.6              |
| Paul LENE              | 38.0       | 40.6             | 34.0        | 38.4              |
| Payette                | 41.0       | 43.0             | 37.4        | 40.9              |
| Picabo                 | 29.9       | 31.9             | 26.8        | 31.2              |
| Pocatello WSO AP       | 37.0       | 39.3             | 32.4        | 36.9              |
| Porthill               | 30.2       | 31.7             | 23.1        | 27.8              |
| Potlatch               | 32.4       | 35.6             | 23.2        | 28.1              |
| Preston                | 34.7       | 37.1             | 27.8        | 33.2              |
| Reynolds               | 30.0       | 31.7             | 26.2        | 29.7              |
| Richfield              | 37.0       | 39.3             | 33.7        | 37.9              |
| Riggins                | 39.1       | 41.4             | 30.4        | 35.3              |
| Rupert                 | 38.8       | 41.5             | 35.7        | 39.3              |
| St. Anthony LWNW       | 29.6       | 31.4             | 25.2        | 28.3              |
| Saint Maries           | 32.5       | 34.7             | 22.5        | 28.0              |
| Salmon                 | 32.2       | 33.9             | 27.2        | 30.6              |
| Sandpoint Exp. Sta.    | 30.3       | 32.1             | 21.0        | 26.0              |
| Shoshone LWNW          | 39.1       | 42.0             | 35.9        | 40.3              |
| Stanley *              | 22.7       | 23.6             | 18.8        | 21.9              |
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\* Values are for irrigated pasture, not alfalfa hay

TABLE A cont.

| Station           | Mean<br>CU | 80th PCTL.<br>CU | Mean<br>CIR | 80th PCTL.<br>CIR |
|-------------------|------------|------------------|-------------|-------------------|
| Swan Falls        | 42.3       | 44.4             | 38.9        | 42.5              |
| Swan Valley       | 32.2       | 33.8             | 23.9        | 28.0              |
| Tensed            | 31.1       | 32.7             | 22.4        | 27.0              |
| Tetonia Exp. Sta. | 28.2       | 29.8             | 22.3        | 26.9              |
| Three Creek       | 26.5       | 28.3             | 22.5        | 26.6              |
| Twin Falls 2NNE   | 39.1       | 41.4             | 35.6        | 39.8              |
| Twin Falls 3SE    | 39.2       | 41.6             | 35.6        | 40.1              |
| Weiser            | 39.2       | 41.7             | 35.8        | 39.9              |



ADMINISTRATOR'S MEMORANDUM

TO: Regional Offices and Water Allocation Section

FROM: Norman C. Young *NCY*

Transfer Processing No. 7

DATE: September 24, 1982

RE: Sample Calculations for Change in Nature of Use.

The intent of these sample calculations is to provide general guidelines for regional and state office staffs for quantitative evaluation of requested changes in nature of use. To comply with the intent of Section 42-222, Idaho Code, Department personnel must insure that a transfer of a water right does not result in an expansion of use.

An expansion could occur if any one of the following three parameters is increased under the new use: (1) rate of flow, (2) volume or (3) consumptive use. Each of the three parameters must be computed and checked since depending on the specific situation any one of the parameters might be "controlling". The "controlling" parameter determines how much water may be transferred without injury to other rights. The sample situation below demonstrates that depending on the situation any one of the three parameters can be "controlling".

The methodology shown makes many assumptions, and is intended to be used when the portion of the water right to be changed was previously applied to 640 acres or less. For larger acreages the applicant will be required to provide an evaluation by a qualified professional. Note also that the methodology does not take into account possible injury due to change in season of use. This factor must be evaluated on a case by case basis.

Sample Situation:

A wateruser desires to change the nature of use of part of a water right from irrigation to industrial for use in an ethanol production plant. The water is currently licensed for irrigation near Mackay. The water user desires to maintain irrigation with any water not needed for industrial use. The rates of flow needed for the industrial use are 0.10 cfs for washing machinery and 0.20 cfs for the mash. The total is 0.30 cfs, since occasionally both rates of flow must be satisfied simultaneously. Assume a seven day per week operation. The volume needed for the industrial use is computed as follows:

$$\text{Volume: Washing: } .10 \text{ cfs} \times \frac{1.98 \text{ AF}}{\text{CFS DAY}} \times \frac{4 \text{ HRS.}}{\text{DAY}} \times \frac{1 \text{ DAY}}{24 \text{ HRS.}} \times \frac{365 \text{ DAYS}}{\text{YEAR}} = \frac{12.0 \text{ AF}}{\text{YEAR}}$$

$$\text{Mash: } .20 \text{ CFS} \times \frac{1.98 \text{ AF}}{\text{CFS DAY}} \times \frac{6 \text{ HRS.}}{\text{DAY}} \times \frac{1 \text{ DAY}}{24 \text{ HRS.}} \times \frac{365 \text{ DAYS}}{\text{YEAR}} = \frac{36.1 \text{ AF}}{\text{YEAR}}$$

$$\text{Total: } 12.0 + 36.1 = 48.1 \frac{\text{AF}}{\text{YEAR}}$$

The consumptive use for the industrial purposes is computed as follows:

Consumptive Use:

Washing: 1.2 AF/YEAR (assume that 10% is consumptively used)  
Mash: 36.1 AF/YEAR (assume that all is consumptively used)  
Total: 37.3 AF/YEAR

Case 1: Rate of Flow Controlling

- Given:
- Irrigation right is licensed at 0.80 cfs for 80 acres.
  - Volume diverted for irrigation purposes is 3.5 AF/acre (From Water User's Handbook, IDWR p. 11. This assumes alfalfa\* and 60% irrigation efficiency.)
  - Number of days in the irrigation season is 215. (From Water User's Handbook, IDWR, p. 17.)
  - Irrigation consumptive use is 16.3 inches = 1.4 AF/acre (From Sutter, R. J. and G. L. Corey, "Consumptive Irrigation Requirements of Crops in Idaho", University of Idaho Bulletin 516, July 1970 Table 6, page 8, copy attached. This is the average seasonal consumptive irrigation requirement for alfalfa near Mackay. Note that the attached map of Idaho shows the climatic areas.

Find: Rate of flow, volume and consumptive use for irrigation use and industrial use after change.

Analysis: - Total rate 0.80 cfs  
- Total volume diverted 3.5 (80) = 280 AF/YEAR  
- Total consumptive use (C. U.) 1.4 (80) = 112 AF/YEAR

Solution: a. New use check

| RATE             | VOLUME          | C. U.           |
|------------------|-----------------|-----------------|
| 0.80 cfs         | 280.0 AF        | 112.0 AF        |
| <u>-0.30 cfs</u> | <u>-48.1 AF</u> | <u>-37.3 AF</u> |
| 0.50 cfs         | 231.9 AF        | 74.7 AF         |

All values are positive. Therefore, the original right is large enough to provide for the new use.

b. Number of acres calculation.

1. Rate parameter check

$$\frac{0.30}{0.80} (80) = 30 \text{ acres out}$$

2. Volume parameter check

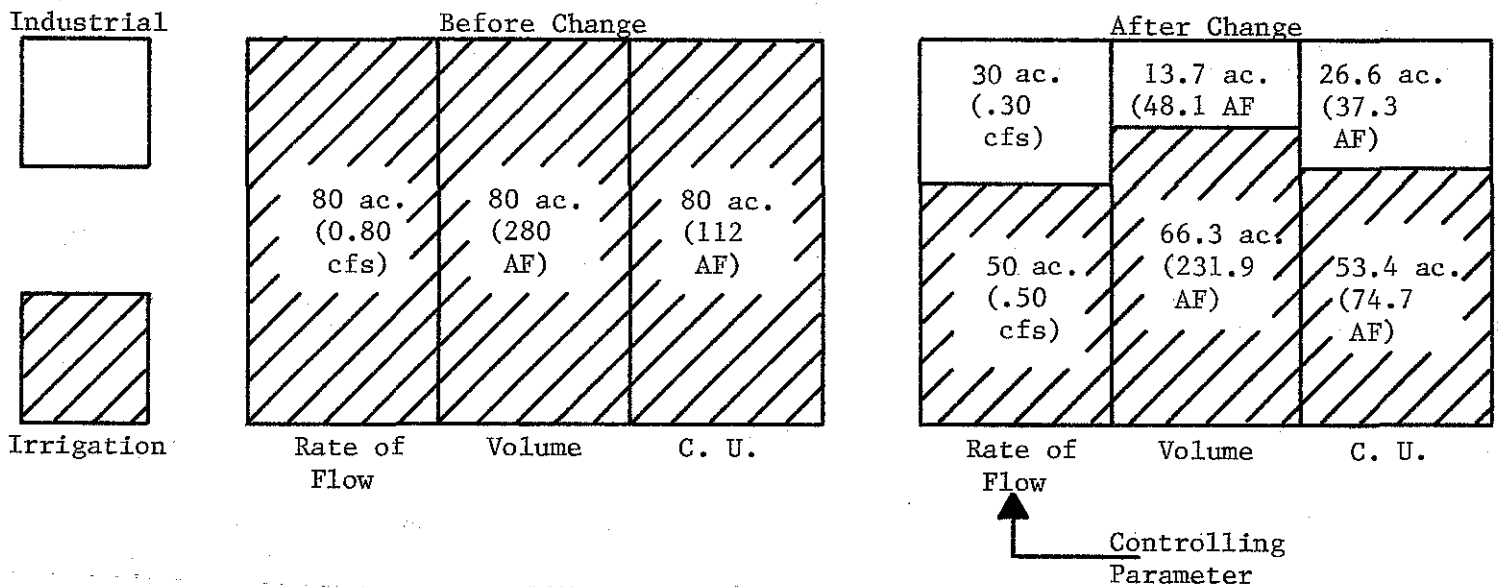
$$\frac{48.1}{3.5} = 13.7 \text{ acres out}$$

3. C. U. parameter check

$$\frac{37.3}{1.4} = 26.6 \text{ acres out}$$

\*An "alfalfa standard" will be used for any consumptive use computation for irrigation. This means that regardless of the historical crop uses, the crop used in the water requirement computations is alfalfa.

c. Graphical representation of the solution:



d. Evaluation of water right after the change. As demonstrated above, the original irrigation right is large enough to provide for the requirements of the industrial use and to provide for continued irrigation of a portion of the lands. The computation of the number of acres that can be irrigated after the change is based on maximum utilization of remaining water supplies. In this case, the rate of flow appears to limit the irrigated acreage to 50 acres, so rate of flow appears to be the "controlling" parameter.

However, when rate of flow is initially found to be "controlling" one further check should be made. If the remaining irrigation rate of flow (0.50 cfs) can provide enough water to irrigate more than the proportionate number of acres (50), then the acreage irrigated for the rate of flow parameter can be increased.

Generally, the minimum rate of flow per acre is based on the maximum irrigation demand. Since the demand is based on a number of factors including soil type, soil depth and irrigation system in addition to the factors already mentioned, this computation must be made by a qualified irrigation expert (e.g. Verl King). After the maximum number of acres is found for rate of flow when it is the controlling factor the other parameters should be checked to make sure they are not exceeded by the new maximum.

As an example, assume that the maximum number of acres that can be irrigated by 0.50 cfs is computed by an expert to be 52.0 acres. Then the right after the change would be as follows:

Right after change

| <u>USE</u> | <u>ACRES</u> | <u>RATE</u> | <u>VOLUME</u>  | <u>C. U.</u>    |
|------------|--------------|-------------|----------------|-----------------|
| Irr.       | 52           | 0.50        | 52 X 3.5 = 182 | 52 X 1.4 = 72.8 |
| Ind.       | N.A.         | 0.30        | 48.1           | 37.3            |
|            |              | 0.80 cfs    | 230.1 AF       | 110.1 AF        |

Case 2: Volume Controlling

- Irrigation right is licensed at 0.80 cfs for 80 acres.
- Volume diverted for irrigation purposes is 3.5 AF/ acre.
- Consumptive use for irrigation is 1.4 AF/acre.
- Water used to wash machinery is used 24 hours/day and only 1.67% is consumptively used.

Find: Rate of flow, volume and consumptive use for irrigation and industrial use after change.

- Analysis: - Total rate 0.80 cfs  
 - Total volume 3.5 (80) = 280 AF/YEAR  
 - Total C. U. 1.4 (80) = 112 AF/YEAR  
 - Volume for industrial use recalculated as follows:

$$\text{Washing: } .10 \text{ cfs} \times 1.98 \frac{\text{AF}}{\text{cfs DAY}} \times \frac{24 \text{ HRS.}}{\text{DAY}} \times \frac{1 \text{ DAY}}{24 \text{ HRS.}} \times$$

$$\frac{365 \text{ DAYS}}{\text{YEAR}} = 72.3 \frac{\text{AF}}{\text{YR.}}$$

Mash: No change (36.1 AF/YEAR)

$$\text{Total Vol.} = 72.3 + 36.1 = 108.4 \text{ AF/YEAR}$$

- C. U. for industrial use recalculated as follows:

Washing: 1.67% of 72.3 = 1.2 AF/YEAR

Mash: 36.1 AF/YEAR

Total C. U.: 1.2 + 36.1 = 37.3 AF/YEAR (no change)

Solution: a. New use check

| <u>RATE</u> | <u>VOLUME</u> | <u>C. U.</u> |
|-------------|---------------|--------------|
| 0.80        | 280.0         | 112.0        |
| -0.30       | -108.4        | -37.3        |
| 0.50 cfs    | 171.6 AF      | 74.7 AF      |

All values are positive. Therefore, the original right is large enough to provide for the new use.

b. Number of acres calculation.

1. Rate parameter check

$$\frac{0.30}{0.80} (80) = 30 \text{ acres out}$$

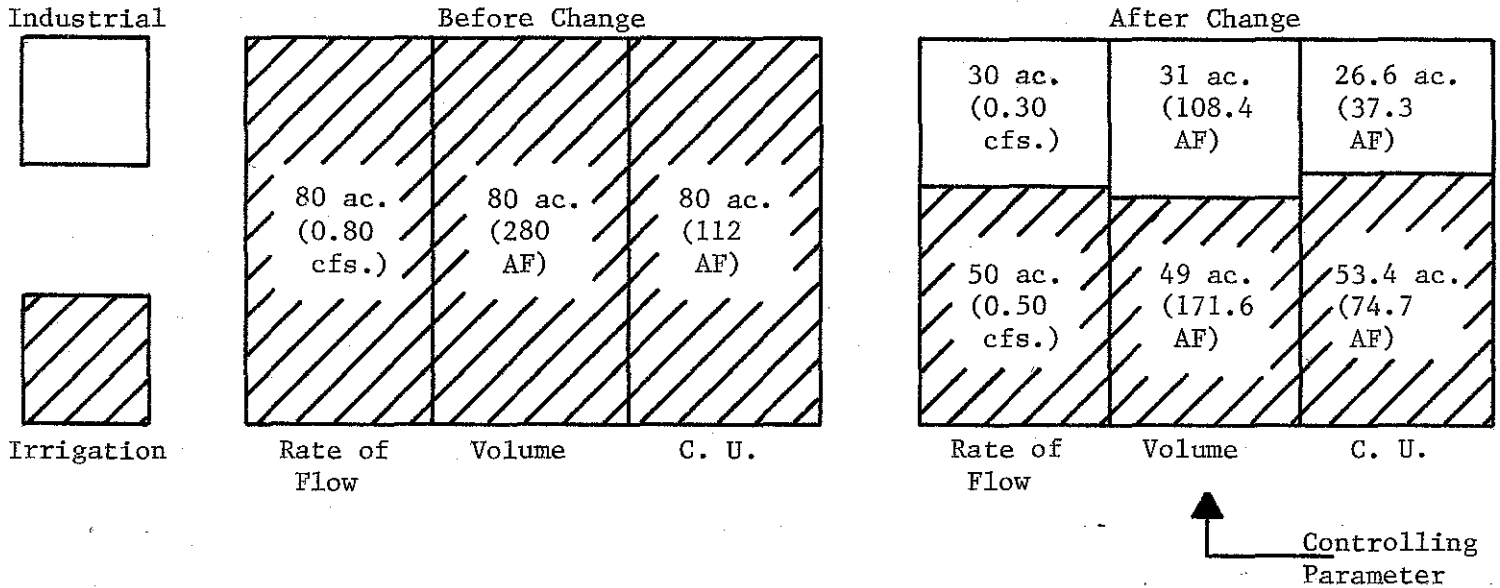
2. Volume parameter check

$$\frac{108.4}{3.5} = 31 \text{ acres out}$$

3. C. U. parameter check

$$\frac{37.3}{1.4} = 26.6 \text{ acres out}$$

c. Graphical Solution



d. Evaluation of water right after the change. As shown in the graphical solution, volume is the "controlling" parameter, which limits irrigation after the change to 49 acres.

Right after change

| USE  | ACRES | RATE     | VOLUME   | C. U.           |
|------|-------|----------|----------|-----------------|
| Irr. | 49    | 0.50     | 171.6    | 49 (1.4) = 68.6 |
| Ind. | N.A.  | 0.30     | 108.4    | 37.3            |
|      |       | 0.80 cfs | 280.0 AF | 105.9           |

Case 3: Consumptive Use Controlling

- Given:
- Irrigation right is licensed for 1.60 cfs for 80 acres.
  - Volume diverted for irrigation purposes is 3.5 AFA/acre.
  - Consumptive use for irrigation is 1.4 AF/acre.

Find: Rate of flow, volume and consumptive use for irrigation use and industrial use after change.

Analysis:

|                           |                       |
|---------------------------|-----------------------|
| Total rate                | 1.60 cfs              |
| Total volume              | 3.5 (80) = 280 AF/YR. |
| Total C. U.               | 1.4 (80) = 112 AF/YR. |
| Volume for industrial use | = 48.1 AF/YR.         |
| C. U. for industrial use  | = 37.3 AF/YR.         |

Solution: a. New use check

|                |                 |                |
|----------------|-----------------|----------------|
| <u>RATE</u>    | <u>VOLUME</u>   | <u>C. U.</u>   |
| 1.60           | 280.0           | 112.0          |
| -0.30          | 48.1            | -37.3          |
| <u>1.3 cfs</u> | <u>231.9 AF</u> | <u>74.7 AF</u> |

All values are positive. Therefore, the original right is large enough to provide for the new use.

b. Number of acres calculation.

1. Rate parameter check

$$\frac{0.30}{1.60} (80) = 15 \text{ acres out}$$

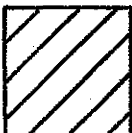
2. Volume parameter check

$$\frac{48.1}{3.5} = 13.7 \text{ acres out}$$

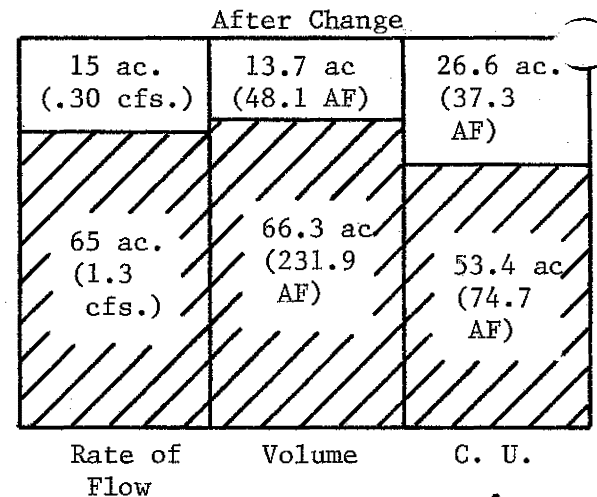
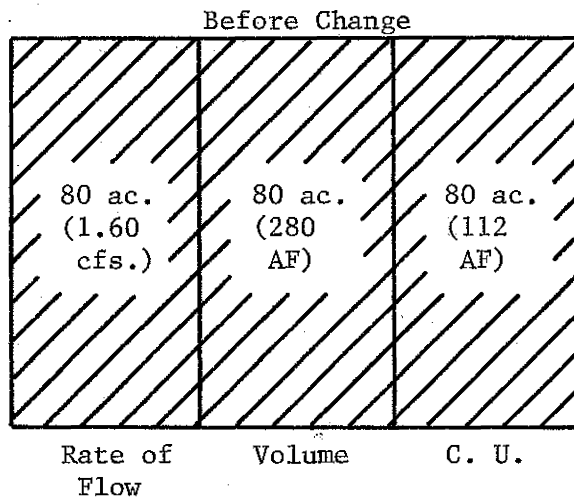
3. C. U. parameter check

$$\frac{37.3}{1.4} = 26.6 \text{ acres out}$$

Industrial



Irrigation



Controlling  
Parameter



d. Evaluation of water right after the change. As shown in the graphical solution, consumptive use is the "controlling" parameter, which limits irrigation after the change to 53.4 acres.

Right after change

| <u>USE</u> | <u>ACRES</u> | <u>RATE</u> | <u>VOLUME</u>      | <u>C. U.</u> |
|------------|--------------|-------------|--------------------|--------------|
| Irr.       | 53.4         | 1.3         | 53.4 (3.5) = 186.9 | 74.7         |
| Ind.       | N.A.         | .3          | 48.1               | 37.3         |
|            |              | 1.6         | 235.0 AF           | 112.0 AF     |

When the supplemental information sheet for change in nature of use is received by the regional office, the computations of the three parameters should be completed and placed in the file. These computations will be reviewed by state office personnel during the review process.

REPLACED by Table A in attached amendment.

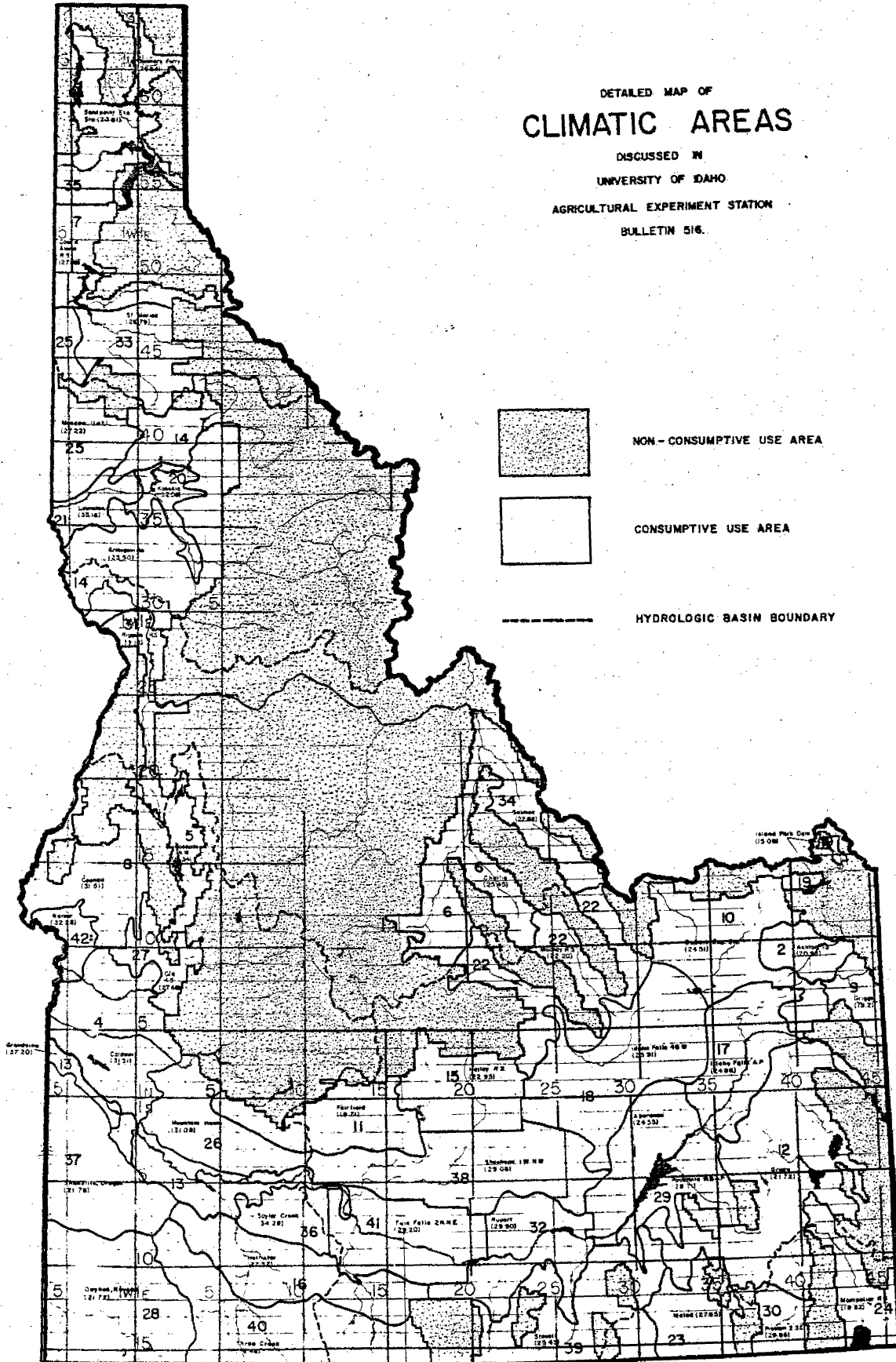
Table 6. Average annual consumptive irrigation requirement by crop for Idaho (inches).

| Area | Station             | Sugar<br>beets | Dry<br>beans | Corn<br>silage | Field<br>corn | Spring<br>grain | Pota-<br>toes | Small<br>veg. | Winter<br>grain | Al-<br>falfa | Pas-<br>ture | Or-<br>chards |
|------|---------------------|----------------|--------------|----------------|---------------|-----------------|---------------|---------------|-----------------|--------------|--------------|---------------|
| 1.   | Aberdeen            | 18.1           | 14.0         | 14.4           | 15.5          | 13.5            | 17.7          | 9.5           | 18.4            | 19.6         | 15.7         | ----          |
| 2.   | Ashton 1S           | 12.1           | ----         | 9.6            | ----          | 10.0            | 12.3          | ----          | 13.7            | 13.5         | 10.1         | ----          |
| 3.   | Bonnars Ferry 1SW   | ----           | ----         | 11.8           | ----          | 13.0            | 15.1          | ----          | 15.1            | 16.7         | 12.0         | ----          |
| 4.   | Caldwell            | 24.4           | 16.9         | 18.8           | 19.8          | 13.7            | 23.4          | 10.7          | 19.9            | 26.1         | 20.3         | 21.4          |
| 5.   | Cascade 1NW         | ----           | ----         | 9.9            | ----          | 10.3            | 11.4          | ----          | 13.8            | 13.7         | 10.3         | ----          |
| 6.   | Challis             | ----           | ----         | 13.6           | ----          | 15.2            | 15.3          | ----          | 16.3            | 19.3         | 14.7         | ----          |
| 7.   | Coeur d'Alene RS    | ----           | ----         | 13.5           | ----          | 13.9            | 17.2          | ----          | 16.1            | 19.1         | 13.5         | ----          |
| 8.   | Council             | 20.4           | ----         | 16.2           | ----          | 13.4            | 20.3          | ----          | 17.1            | 22.5         | 16.5         | ----          |
| 9.   | Driggs              | ----           | ----         | 9.4            | ----          | 9.2             | 11.5          | ----          | 13.5            | 12.7         | 9.5          | ----          |
| 10.  | Dubois Exp. Sta.    | 16.5           | ----         | 12.4           | ----          | 12.6            | 16.1          | ----          | 16.0            | 17.5         | 13.5         | ----          |
| 11.  | Fairfield           | ----           | ----         | 11.9           | ----          | 12.3            | 14.4          | ----          | 15.6            | 15.6         | 12.1         | ----          |
| 12.  | Grace               | 12.8           | ----         | 10.2           | ----          | 10.5            | 12.4          | ----          | 14.2            | 14.4         | 10.6         | ----          |
| 13.  | Grandview           | 18.7           | 18.8         | 22.6           | 22.9          | 16.2            | 26.9          | 13.0          | 21.1            | 31.6         | 24.2         | 26.1          |
| 14.  | Grangeville         | ----           | ----         | 9.5            | ----          | 6.4             | 12.7          | ----          | 11.5            | 14.1         | 8.5          | ----          |
| 15.  | Hailey RS           | ----           | ----         | 12.7           | ----          | 13.1            | 14.9          | ----          | 16.3            | 17.5         | 13.7         | ----          |
| 16.  | Hollister           | 18.5           | 13.3         | 14.0           | 15.2          | 11.8            | 18.3          | 8.1           | 17.1            | 20.4         | 15.2         | ----          |
| 17.  | Idaho Falls AP      | 18.6           | ----         | 13.9           | ----          | 12.9            | 17.9          | ----          | 17.1            | 19.4         | 15.5         | ----          |
| 18.  | Idaho Falls 46W     | 15.6           | ----         | 12.9           | ----          | 13.5            | 16.6          | ----          | 16.2            | 17.3         | 13.5         | ----          |
| 19.  | Island Park Dam     | ----           | ----         | 5.6            | ----          | 4.6             | 7.0           | ----          | 9.3             | 8.2          | 5.7          | ----          |
| 20.  | Kooskia             | ----           | ----         | 13.4           | ----          | 11.0            | 17.4          | ----          | 14.6            | 19.2         | 12.0         | ----          |
| 21.  | Lewiston            | ----           | ----         | 18.2           | ----          | 14.8            | 21.4          | 5.1           | 14.4            | 25.8         | 18.2         | 20.7          |
| 22.  | Mackay RS           | ----           | ----         | 11.5           | ----          | 13.3            | 13.2          | ----          | 15.7            | 16.3         | 12.8         | ----          |
| 23.  | Malad               | 19.1           | ----         | 14.8           | ----          | 15.0            | 18.4          | ----          | 16.6            | 20.8         | 15.5         | ----          |
| 24.  | Montpelier RS       | ----           | ----         | 10.8           | ----          | 11.1            | 13.3          | ----          | 15.1            | 14.5         | 11.2         | ----          |
| 25.  | Moscow U of I       | ----           | ----         | 12.8           | ----          | 11.0            | 16.2          | 7.7           | 15.0            | 18.2         | 12.6         | ----          |
| 26.  | Mountain Home       | 25.1           | 17.0         | 19.1           | 20.7          | 16.6            | 24.1          | 11.9          | 21.5            | 26.7         | 21.1         | 22.1          |
| 27.  | Ola 4S              | 18.9           | ----         | 15.1           | ----          | 10.0            | 19.4          | 7.6           | 17.6            | 21.2         | 15.7         | 17.1          |
| 28.  | Owyhee, Nevada      | ----           | ----         | 12.6           | ----          | 13.0            | 15.5          | ----          | 16.5            | 17.3         | 13.1         | ----          |
| 29.  | Pocatello WB AP     | 21.3           | 14.3         | 16.2           | ----          | 12.8            | 20.2          | 9.6           | 17.3            | 22.6         | 17.5         | ----          |
| 30.  | Preston 2SE         | 18.3           | ----         | 14.3           | ----          | 14.8            | 18.0          | ----          | 16.8            | 20.1         | 14.8         | ----          |
| 31.  | Riggins RS          | ----           | ----         | 18.5           | ----          | 14.6            | 22.2          | ----          | 14.6            | 26.5         | 17.2         | ----          |
| 32.  | Rupert              | 23.3           | 16.2         | 18.1           | 19.2          | 12.7            | 21.9          | 10.2          | 19.1            | 24.9         | 19.5         | 20.5          |
| 33.  | St. Maries          | ----           | ----         | 12.8           | ----          | 13.1            | 16.0          | 8.4           | 15.9            | 17.9         | 12.8         | ----          |
| 34.  | Salmon              | ----           | ----         | 12.2           | ----          | 13.0            | 16.5          | ----          | 16.4            | 17.0         | 13.3         | ----          |
| 35.  | Sandpoint Exp. Sta. | ----           | ----         | 10.2           | ----          | 11.6            | 13.4          | ----          | 14.4            | 14.6         | 10.2         | ----          |
| 36.  | Saylor Creek        | 26.9           | 17.5         | 20.5           | 21.9          | 17.8            | 25.3          | 12.1          | 19.3            | 28.7         | 22.2         | 23.7          |
| 37.  | Sheaville, Oregon   | ----           | ----         | 13.9           | ----          | 13.7            | 17.0          | ----          | 17.5            | 18.0         | 14.3         | ----          |
| 38.  | Shoshone 1WNW       | 21.9           | 16.1         | 17.2           | 17.8          | 12.8            | 21.6          | 10.2          | 20.6            | 23.6         | 18.8         | ----          |
| 39.  | Strevell            | 16.2           | ----         | 13.0           | ----          | 13.5            | 16.6          | ----          | 16.5            | 18.0         | 13.6         | ----          |
| 40.  | Three Creek         | ----           | ----         | 7.5            | ----          | 7.5             | 11.5          | ----          | 12.1            | 11.3         | 8.7          | ----          |
| 41.  | Twin Falls 2NNE     | 21.9           | 15.6         | 16.8           | 17.4          | 13.2            | 21.3          | 9.7           | 19.2            | 23.2         | 18.3         | 18.9          |
| 42.  | Weiser              | 25.6           | 17.9         | 19.3           | 21.2          | 14.5            | 23.7          | 7.3           | 21.4            | 26.8         | 21.2         | 22.0          |
|      | State Average       | 20.0           | 16.1         | 13.9           | 19.2          | 12.6            | 17.3          | 9.4           | 16.3            | 19.3         | 14.5         | 21.4          |



DETAILED MAP OF  
**CLIMATIC AREAS**

DISCUSSED IN  
 UNIVERSITY OF IDAHO  
 AGRICULTURAL EXPERIMENT STATION  
 BULLETIN 516.



NOTE: Figure in Parenthesis is 80  
 Percentile Seasonal Alfalfa  
 Consumptive Use From U of I  
 Bulletin 516

STATE OF IDAHO

DEPARTMENT OF WATER RESOURCES

Application For Transfer of Water Right  
Supplemental Information for  
CHANGE IN NATURE OF USE

1. Fully complete Form 222. Type or print in ink "CHANGE IN NATURE OF USE" at the top of page 1. If no change in point of diversion or place of use is desired, so note under items C.2 and/or C.3 C.

2. Describe fully the new use to which the water is intended to be applied:

a. Nature of use: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b. Rate of flow: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

c. Hours per day and days per year that the flow will be diverted: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

d. Season of use: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

e. Return flows from the use: (quantity and quality of return flows, and location of discharge):  
\_\_\_\_\_  
\_\_\_\_\_

3. Describe positive and negative effects on other waterusers predicted to result from the proposed change in nature of use. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_