



# Water Rights Re-Form Training Workshop

November 13, 2012



Historic Diverted Volume  
Historic Use Addendum  
Permit Applications (Physical Availability)

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## Questions





**Specialist and  
Hydrologist-Specialist  
Training**

# Technical Data Submittal Timeline



(your helpful new approps specialist)

- System Operation
- Ditch conveyance, capacity, and dimensions
- Infrastructure or field improvements
- Records



Alternative methodologies to address:

- Historic consumptive use
- Historic diverted volume

## **/Pre-Application Meeting      /Application Submittal      / Historic Use Addendum      /Correct and Complete**

*No technical information submitted, however, data needs may be discussed*

Form No. 509 (08/2017) (02/17/2015)

**DNRC**

**SURFACE WATER APPLICATION FOR BENEFICIAL WATER USE PERMIT**

**FILING FEE**  
 \$1000.00 - Inside a Basin Closure Area  
 \$800.00 - Outside of a Basin Closure Area

Use one application for each source of supply. To avoid processing delays, submit all required information. Attach additional sheets if necessary. Attachments must be labeled as shown in the sections below.

**FOR DEPARTMENT USE ONLY**  
 Application # \_\_\_\_\_ Perm \_\_\_\_\_  
 Priority Date \_\_\_\_\_  
 Time \_\_\_\_\_ AM / PM  
 Meter ID \_\_\_\_\_ Check # \_\_\_\_\_  
 Meter Serial # \_\_\_\_\_  
 Deposit Receipt # \_\_\_\_\_  
 Paper \_\_\_\_\_  
 Refund \$ \_\_\_\_\_ Date \_\_\_\_\_

**MITIGATION REQUIREMENT**  
 Basin Closure Area - You must complete a Basin Closure Addendum. Mitigation may be required for any adverse effect.

**FILING FEE RESOLUTION**  
 If you attend a pre-application meeting with DNRC staff and your application is submitted within 90 days of the meeting date, the filing fee will be reduced to \$500.00 inside a Basin Closure Area and \$300.00 outside a Basin Closure Area. The time period may be extended if measurements or an aquifer test is required.

Applicant Name \_\_\_\_\_  
 Mailing Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Phone Numbers: Home \_\_\_\_\_ Work \_\_\_\_\_ Cell \_\_\_\_\_  
 Email Address \_\_\_\_\_

Contact Person:  Contact is Applicant  Contact is Consultant  Contact is Attorney  Contact is Other  
 Contact Name \_\_\_\_\_  
 Mailing Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Phone Numbers: Home \_\_\_\_\_ Work \_\_\_\_\_ Cell \_\_\_\_\_  
 Email Address \_\_\_\_\_

NOTE: If a contact person is identified as an attorney, all communication will be sent only to the attorney unless the attorney provides written instruction to the contrary. If a contact person is identified as a consultant, employee, or leasee, the individual filing the water right form or objection form will receive all correspondence and a copy may be sent to the contact person.

**PERMIT APPLICATION INFORMATION**  
 The information provided to the questions below is required for the Department to begin processing the application. The Department may require additional information during the processing of the application.  
 For any questions, please contact a Water Resources Division Regional Office.

Application For Surface Water Beneficial Use Permit Page 1 - 1

*Additional information to address:*

- Ditch conveyance losses
- On-farm efficiency
- Crop production

*“substantial and credible”*



# Historic Diverted Volume

ARM 36.12.1902 (10)

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June 2012



Historic Diverted Volume =

$$\left( \text{Volume}_{\text{historic consumptive use}} / \text{On-farm efficiency} \right) + \text{Volume}_{\text{conveyance loss}}$$



Historic Diverted Volume =

$$\left( \text{Volume}_{\text{historic consumptive use}} / \text{On-farm efficiency} \right) + \text{Volume}_{\text{conveyance loss}}$$



## Historic Consumptive Use

The annual volume of water used for a beneficial purpose prior to 1973. This includes water transpired by growing vegetation, evaporated from soils or water surfaces, or incorporated into products that do not return to ground or surface water. Methods for quantification are described in ARM 36.12.1902 (14).

## On-Farm Efficiency

The percent of water delivered to the place of use that was consumptively used by the crop.

## Conveyance Loss

The summation of seepage and evapotranspiration losses that occurred between the point of diversion and the place of use.

$$\text{Historic Diverted Volume} = (\text{Volume}_{\text{historic consumptive use}} / \text{On-farm efficiency}) + \text{Volume}_{\text{conveyance loss}}$$

## On-Farm Efficiency (ARM 36.12.115)

<u>Irrigation Method</u>	<u>Percent Efficiency</u>
Sprinkler	70
Level Border	60
Graded Border (Design Slope = .1-.4%)	70
Graded Border (Design Slope = .75-1.5%)	65
Graded Border (Design Slope = 3%)	60
Furrow (Design Slope = .1-.4%)	70
Furrow (Design Slope = .75-1.5%)	65
Furrow (Design Slope = 3%)	60
Contour Ditch (Design Slope = .75%)	60
Contour Ditch (Design Slope = 1.5-3%)	55
Contour Ditch (Design Slope = 6%)	45
<b>Wild Flood</b>	<b>25*</b>



\*Neibling, 1997, Utah State, 2008)

$$\text{Historic Diverted Volume} = \left( \text{Volume}_{\text{historic consumptive use}} / \text{On-farm efficiency} \right) + \text{Volume}_{\text{conveyance loss}}$$

Seasonal Conveyance Loss =

Seepage Loss + Vegetation Loss + Ditch Evaporation



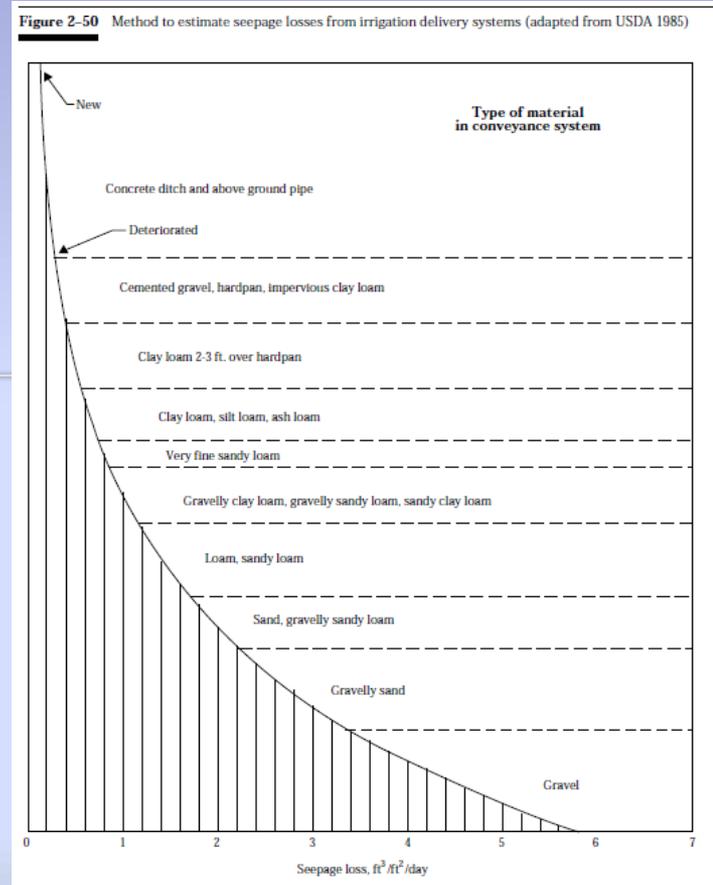
Seasonal Conveyance Loss = *Seepage Loss* + *Vegetation Loss* + *Ditch Evaporation*

Seepage Loss = (wetted perimeter)(ditch length)(loss rate)(days)

43,560 ft<sup>2</sup>/acre

(NEH 1993)

(loss rate, based on soil type  
and figure 2-50)



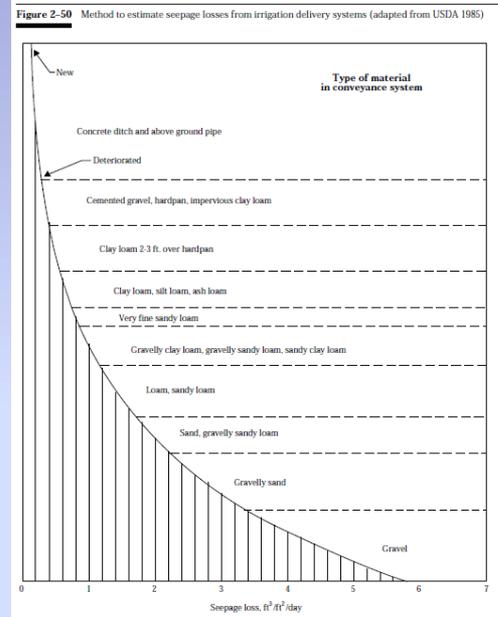
$$\text{Seasonal Conveyance Loss} = \text{Seepage Loss} + \text{Vegetation Loss} + \text{Ditch Evaporation}$$

$$\text{Seepage Loss} = \frac{(\text{wetted perimeter})(\text{ditch length})(\text{loss rate})(\text{days})}{43,560 \text{ ft}^2/\text{acre}}$$

43,560 ft<sup>2</sup>/acre

(NEH 1993)

(loss rate, based on soil type  
and figure 2-50)



### Method Comparison to Real Data

<u>Location</u>	<u>Year</u>	<u>Ditch</u>	<u>Soils</u>	<u>Seepage Loss (acre-feet)</u>		<u>% difference</u>
				<u>Measured</u>	<u>Estimated</u>	
NF Blackfoot	2000	Weaver-Rue	gravel-loam	934	825	<b>12</b>
Clark Fork	2003	Morrison	loam	1245	1312	<b>5</b>
Big Hole	2012	Big	silt loam	17.8	29.4	<b>39</b>
Beaverhead	2007	East bench	Loam	1071	1294	<b>17</b>
Beaverhead	2007	East bench	Loam	1785	1638	<b>9</b>

*Seasonal Conveyance Loss = Seepage Loss + Vegetation Loss + Ditch Evaporation*

$\text{Vegetation Loss} = (\% \text{ loss/mile})(\text{flow})(\text{days})(\text{ditch length})(2)$  *(user supplied and NEH standard)*

$\text{Ditch evaporation} = (\text{surface area of ditch})(\text{evaporation rate})/43,560 \text{ ft}^2/\text{acre}$  *(Potts, 1988)*



# Additional Data



## Addendum Historical Water Use (Form 606 HWU)



### Historic Consumptive Use and Historic Diverted Volume

Form 606-2003, Revised 2012 Applicant Name \_\_\_\_\_

**APPLICATION FOR CHANGE OF WATER RIGHT  
ADDENDUM  
HISTORICAL WATER USE**

This addendum may be completed and the information attached to a change application.

Attachments must be labeled as shown in the sections below. If a section is not applicable, label the section as Not Applicable or NA and explain why it is not applicable.

**Section 3 – Historical Water Use – Applicant Determination** Question/Answer Sheet

If you would like the Department to consider an amount other than the amount that would be determined from ARM 36.12.1902, you must complete this form. Include as much detail as possible for each water right. The answers to these questions will allow the Department to analyze the extent of the historical consumptive use and whether the historical use will be adequate to meet the needs of your proposed use.

Water Right No. \_\_\_\_\_ Complete this form for each water right being changed.  
Applicant Name \_\_\_\_\_

**Section 1 Water Right Information**

1.A Yes  No  Is your priority date senior enough in relation to other water rights on the stream or conveyance system (ditch, canal, etc.), to allow irrigation throughout the entire growing season? The growing season typically ranges between April through October.

1.B Yes  No  Have you ever received a "call" on your water right by senior water users requesting you to cease diverting water? If yes, when? \_\_\_\_\_

1.C Yes  No  Are your diversions limited by a water commissioner or calls from senior users during portions of the irrigation season?

1.D Yes  No  Do you irrigate every year? If not, please explain.  
\_\_\_\_\_  
\_\_\_\_\_

1.E What is the typical month & day you can begin using water? \_\_\_\_\_

1.F What is the earliest month & day water has been diverted? \_\_\_\_\_

1.G What is the latest month & day water has been diverted? \_\_\_\_\_

1.H Do you rotate water use with other irrigators within your ditch/canal, or stream? If yes, please explain the rotation system.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 2 Source Information**

2.A Yes  No  Is your water source perennial at your point of diversion? If not, how long during the irrigation season does your source typically flow? \_\_\_\_\_

# Historic Use Addendum

Form 606-1(IIA) (New 10-12-2012)

Applicant Name \_\_\_\_\_

## APPLICATION FOR CHANGE OF WATER RIGHT HISTORICAL WATER USE ADDENDUM

This addendum may be completed and the information attached to a change application. This addendum is for changes to irrigation uses only.

Attach additional sheets if necessary. Attachments must be labeled as shown in the sections below (i.e. HUA.1.a). If a section is not applicable, label the section as Not Applicable or NA and explain why it is not applicable.

If you would like the Department to consider an amount other than the amount that would be determined from ARM 36.12.1902, you must complete this form. Include as much detail as possible for each water right. The answers to these questions will allow the Department to analyze the extent of the historical consumptive use and whether the historical use will be adequate to meet the needs of your proposed use.

Water Right No. \_\_\_\_\_

Complete this form for each  
water right being changed.

Applicant Name \_\_\_\_\_

### Section 1. Water Right Information

HUA.1.a Yes  No  Is your priority date senior enough in relation to other water rights on the stream or conveyance system (ditch, canal, etc.), to allow irrigation throughout the entire growing season? The growing season is typically April through October.

HUA.1.b Yes  No  Have you ever received a "call" on your water right by senior water users requesting you to cease diverting water? If yes, when? \_\_\_\_\_

HUA.1.c Yes  No  Are your diversions limited by a water commissioner or calls from senior users during portions of the irrigation season?

HUA.1.d Yes  No  Do you irrigate every year? If not, please explain.  
\_\_\_\_\_  
\_\_\_\_\_

HUA.1.e What is the typical month & day you can begin using water? \_\_\_\_\_

HUA.1.f What is the earliest month & day water has been diverted? \_\_\_\_\_

HUA.1.g What is the latest month & day water has been diverted? \_\_\_\_\_

HUA.1.h Do you rotate water use with other irrigators within your ditch/canal or stream? If yes, please explain the rotation system.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Form 606-1(IIA) (New 10-12-2012)

Applicant Name \_\_\_\_\_

### Section 2. Source Information

HUA.2.a Yes  No  Is your water source perennial at your point of diversion? If not, how long during the irrigation season does your source typically flow? \_\_\_\_\_

HUA.2.b Yes  No  Does your source of water flow in sufficient quantity to meet your diversion, conveyance and crop needs throughout the growing season or the period of appropriation of your water right? If not, please explain.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Section 3. Historic Diverted Volume

HUA.3.a Yes  No  Do the dimensions of your present conveyance system resemble pre-1973 dimensions?

HUA.3.b Yes  No  Can you provide quantification of conveyance losses that resemble pre-1973 conditions? If yes, please explain.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

HUA.3.c Yes  No  Can you provide quantification of on-farm efficiency that resembles pre-1973 conditions? If yes, please explain.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Section 4. Historic Consumptive Use

HUA.4.a Yes  No  Can you provide evidence of pre-1973 crop production specific to the place of use in this application? If yes, please explain.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

HUA.3.a Do the dimensions of your present conveyance system resemble pre-1973 dimensions?



**Section 2. Source Information**

HUA.2.a Yes  No  Is your water source perennial at your point of diversion? If not, how long during the irrigation season does your source typically flow? \_\_\_\_\_

HUA.2.b Yes  No  Does your source of water flow in sufficient quantity to meet your diversion, conveyance and crop needs throughout the growing season or the period of appropriation of your water right? If not, please explain.  
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\_\_\_\_\_  
\_\_\_\_\_

HUA.3.c Yes  No  Can you provide quantification of on-farm efficiency that resembles pre-1973 conditions? If yes, please explain.  
\_\_\_\_\_  
\_\_\_\_\_

**Section 4. Historic Consumptive Use**

HUA.4.a Yes  No  Can you provide evidence of pre-1973 crop production specific to the place of use in this application? If yes, please explain.  
\_\_\_\_\_  
\_\_\_\_\_



HUA.3.c Can you provide quantification of farm efficiency that resembles pre-1973 conditions?

**Section 2. Source Information**HUA.2.a Yes  No  Is your water source perennial at your point of diversion? If not, how long during the irrigation season does your source typically flow? \_\_\_\_\_HUA.2.b Yes  No  Does your source of water flow in sufficient quantity to meet your diversion, conveyance and crop needs throughout the growing season or the period of appropriation of your water right? If not, please explain.  
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\_\_\_\_\_  
\_\_\_\_\_

HUA.4.a Can you provide additional information, specific to the place of use, that will allow the Department to more accurately assess the historic consumptive use? Specifically, can you provide documentation pertaining to historic irrigation practices such as growth dates or net irrigation application, that may differ from the implementation of the historic use rules, ARM 36.12.1902. If yes, explain and provide evidence to support this information (production records, aerial photographs, temperature records, etc).

# Permit Applications -- Physical Availability

- Gaged and Ungaged streams



# Estimation Techniques for Ungaged Streams

Streamflow Estimation Techniques		Regression Equations for Ungaged Streams						
(A-area, BR-basin relief, BSL-basin slope, AC-active channel width, BF-bakfull width, P-annual precipitation)								
Area		Regional Office	Monthly Median	Monthly Mean	Annual Mean	Exceedance Flows	Required data <sup>1</sup>	# sites
Clark Fork								
	WSP 2365	KSP, MSL	x	x		x	A, BR, BSL, AC, BF E, PE, P, E6	59
	WSP 2260	KSP, MSL						106
Upper Missouri (abv Ft. Peck)								
	WRI 89-4082	HEL, BZM	x	x		x	A, P	341
Mussellshell								
	WRI 89-4165	LEW		x			A, P, AC	145
	WRI 96-4094	LEW						13
Milk River/ St. Marys								
	WRI 95-4022	HAV, GLG						14
	SIR 2005-5216	HAV, GLG						4
	WRI 89-4206	HAV, GLG						6
Upper Yellowstone								
	WRI 86-4009	BZM, BIL						40
Eastern/Central MT								
	WRI 84-4143	BIL			x		A, P, BSL	
Southeast MT								
	WRI 82-4092	BIL	x			x	AC, BF	
Lower Missouri/Little Missouri								
	WRI 94-4098	BIL						21
National Forests								
	WRI 85-4071				x		A, P	



Stream  
Stats  
(2013?)

