WATER SUPPLY REPORT SERIES I
WATER AVAILABILITY AND MITIGATION OPTIONS IN THE CLARK FORK BASIN

PREPARED FOR:
CLARK FORK RIVER BASIN TASK FORCE
AND
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1. Introduction

Water availability for new uses, including development, population growth, and fishery restoration is short in supply in the Clark Fork Basin. Basin Closure and the fact that surface water flows are often less than the existing water rights on a source (over-allocation) require new and changed water uses to develop plans to re-allocate water to eliminate depletions of surface water. Mitigation and aquifer recharge are the two primary mechanisms used to offset surface water depletions and provide a mechanism for new water uses to be permitted. But mitigation and aquifer recharge is far from simple to accomplish.

This report outlines the various limitations to new water use in the Clark Fork Basin, describes the legal and regulatory water right permitting system, and shows where water is available for new uses and the mitigation requirements.

This report is broken into three main chapters:

Chapter 2. ***Water availability in the Clark Fork Basin: the basics of water right laws, basin closures, and legally available water***
Describes water availability geographically by area and the legal and regulatory framework for obtaining water for a new use.

Chapter 3. ***Three Example Scenarios of New Water Use and Mitigation Options***
Describes three examples of new water use in the Clark Fork Basin, the permitting challenges, and options which would allow each project to move forward.

Chapter 4. ***Lessons Learned and Recommendations***
Summarizes lessons learned and makes recommendations for those applying for new water right permits and change applications as well as recommendations for policy changes.

2. Water availability in the Clark Fork Basin: the basics of water right laws, basin closures, and legally available water

The ability to obtain a water right for a new use is not solely based on whether or not water is "physically available," in a stream or aquifer but rather is governed by a host of complex state water right laws and regulations that identify the methods by which water is deemed "legally available" in relation to any particular stream, river, or aquifer. This chapter identifies by area within the Clark Fork Basin options available for new water use and discusses laws, regulations, and special area designations which affect water availability. The chapter is broken into the following sections:

Section 2.1. Water availability in the Clark Fork Basin: describes geographically where and how water may be available for new uses, with maps and tables of expected water availability by location.

Section 2.2. Water right permitting: discusses the Montana Water Use Act and DNRC permitting regulations and provides an introduction to the concept of mitigation and mitigation water rights.

Section 2.3. Special area designations: describes basin closures and controlled groundwater areas in the Basin which limit the legal availability of water.

Section 2.4. Key hydropower and instream flow for fisheries water rights which limit legal water availability: presents instream flow water rights in the Basin which limit new water availability on a large scale.

2.1 Water availability in the Clark Fork Basin

New water uses in the Clark Fork Basin have several options for supply which are discussed in the following sections:

Section 2.1.1. Exemptions from water right permitting. Describes options to appropriate water under an exemption from permitting requirements.

Section 2.1.2. Water availability and mitigation requirements by area. Describes legal availability of water for non-exempt uses by geographic area.

Section 2.1.3. Other options for new water uses. Describes additional options for new use including water right changes and storage during short periods when water is legally available.

2.1.1 Exemptions from water right permitting

Some uses of groundwater for any beneficial use may be exempt from water right permitting (see 85-2-306, MCA). Outside of a stream depletion zone as established by 85-2-380, MCA, a permit is not required to develop a well or a ground water spring with an anticipated use of 35 gpm or less, not to exceed 10 AF a year. Within a stream depletion zone the exempt limit is 20 gpm and 2 AF per year. A Certificate of Water Right is issued for these water uses and the water right is often referred to as a *groundwater certificate*. The 2011 Legislature extended the exemption to allow development of an appropriation made by a local governmental fire agency for emergency fire protection and for nonconsumptive geothermal heating or cooling exchange applications. Exemptions are generally valid in all areas of the Clark Fork Basin with the exception of Controlled Groundwater Areas (section 2.3.2).

An October 2014 court order changed exempt well rules such that a single project can only use one exemption (Clark Fork Coalition et al. v. Tubbs, Director DNRC, MT BDV 2010-874). The court order reinstated DNRC's 1987 rule defining a "combined appropriation" for exempt wells. Guidelines are provided in DNRC (2014). Projects, such as subdivisions proposing individual wells for each lot, are now required to obtain a water right permit if their water use exceeds permit exceptions (85-2-306, MCA).

2.1.2 Water availability and mitigation requirements by area

The availability of water for new uses varies greatly by location and is a factor of both physical water availability (i.e. sufficient flow) and existing legal demands (i.e. existing water rights). Unallocated water which is in excess of the legal water right demands on a source is very limited in the Basin. Where unallocated water is not available for new uses, new water use is still possible using a mitigation or aquifer recharge plan as part of a new water permit.

This section is organized so that a reader can identify the expected legal availability of water at a particular geographic location using the maps below or for a particular waterbody using table 1 below.

The maps and table 1 identify limitations on legal availability of water for new uses and the mitigation requirements for different areas. Limitations on legal availability (basin closure, limiting water rights, etc.) can be cross referenced for further information on special area designations (section 2.3) and key hydropower and instream flow water rights which limit legal availability (section 2.4).

Maps showing where unallocated water is available and where mitigation is likely required are presented in the figures below:

Figure 1 Bitterroot Basin
Figure 2 Upper Clark Fork and Blackfoot Basin
Figure 3 Lower & Middle Clark Fork and Flathead Basin below Kerr Dam
Figure 4 Flathead and Swan Basin above Kerr Dam

Each map shows the DNRC administrative basin outlined in yellow with the basin number labeled (e.g. 76G). The maps are colored to show the water availability designation for the area (described in #1-8 below). To use the maps, find your particular location and use the map key to identify the water availability designation for the area, then read the specific requirements for that area presented in #1-8 below.

The maps are based on surface water availability but in the Clark Fork Basin most groundwater is hydraulically connected to surface water and using groundwater will deplete surface water; therefore in most cases *groundwater availability is reliant on surface water availability*.

Description of water availability designations used in the maps:

1. Unallocated water is potentially available. These are areas where sufficient water is available for a new water use without mitigation. Permitting will require a site specific evaluation of potential effects to other water users but there are no major limiting water rights in the basin such as hydropower and FWP instream flow water rights. The legal availability of unallocated water will be determined during the water right application process. In general unallocated water is limited to Flathead Lake, the mainstem of the Flathead River above Flathead Lake, and potentially on the South Fork Flathead River.

Note: un-allocated water may be available in all basins during certain limited times of the year often during spring high flows. Evaluation of legal availability is site specific and unallocated water which is not sufficient for purposes which require a reliable water supply for more than several days to weeks per year is not shown on the map but is discussed further below in the section 2.1.3.

2. Over-allocated, non-closure. These are areas where the basin is open to new surface water appropriations but where the DNRC regional office has indicated that the source is over-allocated by existing water rights and application for a new water right without mitigation is likely to be denied.

New appropriations will likely require mitigation. Mitigation may involve retiring the use of an existing water right and changing the water right to mitigation or purchasing mitigation marketing water if available; further details of mitigation and aquifer recharge plans are described in section 2.2.2.

3. Legislative Closure. These are areas which have been closed by the Montana Legislature to new surface water uses and where new appropriation of groundwater requires mitigation. There may be other specific exemptions from the closure which are described further in section 2.3.1. Mitigation may involve retiring the use of an existing water right and changing the water right to mitigation or purchasing

mitigation marketing water if available; further details of mitigation and aquifer recharge plans are described in section 2.2.2.

4. Administrative Rule Closure. These are areas which have been closed based on petition by the public or DEQ to new surface water uses and where new appropriation of groundwater may be possible by mitigating adverse effects. There may be other specific exemptions from the closure which are described further in section 2.3.1. Mitigation may involve retiring the use of an existing water right and changing the water right to mitigation or purchasing mitigation marketing water if available; further details of mitigation and aquifer recharge plans are described in section 2.2.2.

5. Controlled Groundwater Areas (CGWAs). These are areas where certain uses of groundwater are prohibited to protect water quality or quantity (§85-2-506, MCA). Controlled Groundwater Areas may be proposed by DNRC, by petition of a state or local public health agency, municipality, county, conservation district, or local water quality district, or by petition of at least one-third of the water rights holders in the proposed controlled groundwater area. Some of the Controlled Groundwater Areas are closed to all water use, others include exemptions for certain uses as described further in section 2.3.2.

Larson Creek and Hayes Creek CGWAs, both in the Bitterroot Basin, are closed due to water availability but may allow new water right permits with mitigation. Mitigation may involve retiring the use of an existing water right and changing the water right to mitigation or purchasing mitigation marketing water if available; further details of mitigation and aquifer recharge plans are described in section 2.2.2.

6. Flathead Reservation Supreme Court Closure. The Supreme Court closed the Flathead Reservation to new appropriation permits and water right changes until the Flathead Indian Reservation Reserved Water Rights are quantified by the Compact process or by adjudication. These cases are outlined in the subsection *Significant Montana Water Right Case Law* of section 2.2.1. This closure does not include exemptions, meaning it is not possible to apply for new water use on the reservation until the conditions specified in the relevant court decisions for removal of the closure are met. The Confederated Salish and Kootenai Tribes of the Flathead Reservation Compact quantifies Flathead Reservation water rights and implements a Unitary Administration and Management Ordinance providing for new and changed water rights on the reservation. The Compact passed the 2015 Montana Legislature, but awaits ratification by U.S. Congress and the tribes, a process which may take years.

7. State of Montana instream flow limiting water right. These are areas where either FWP instream flow water rights or the Montana Department of Justice former Milltown Dam water right appropriate the entire flow of the river during significant portions of the year. They are referred to here as limiting water rights because they limit legal availability of water for new and changed water uses as described in section 2.4.2. The limiting instream flow water rights become de facto basin closures because any new consumptive use which causes a depletion to the river during the period when the instream flow water right appropriates the entire flow needs to be mitigated because water is not legally available. Additionally, water right changes are more difficult in these areas because changes in timing of return flows and other depletions to the river from changing a water right can adversely affect the instream flow water right and must be mitigated. Mitigation may involve retiring the use of an existing water right and changing the water right to mitigation or purchasing mitigation marketing water if available; further details of mitigation and aquifer recharge plans are described in section 2.2.2.

Note: in the Bitterroot, Blackfoot, and Upper Clark Fork, the Noxon Rapids Dam limiting hydropower water right described in #8 also limit legal availability of water in addition to these State owned instream flow water rights.

8. Hydropower limiting water right.

These are areas where hydroelectric dams have water rights which appropriate the entire flow of the river during significant portions of the year. They are referred to here as limiting water rights because they limit legal availability of water for new and changed water uses as described in section 2.4.2. The hydropower water rights become de facto basin closures because new consumptive uses may need to be mitigated during the period when the hydropower use appropriates the entire flow of the river.

Limitations to new water uses depends on the area:

a) Clark Fork River above Noxon Reservoir and Flathead River below Kerr Dam: Limiting water right is Avista Noxon Rapids Dam. New surface water and groundwater uses greater than 35 gpm and 10 AF consumptive use per year require mitigation of consumptive use on an annual time-scale (see DNRC 2008 and 2009 Memos). Mitigation generally involves retiring the use of an existing water right and changing the water right to mitigation or purchasing mitigation marketing water; further details of mitigation and aquifer recharge plans are described in section 2.2.2. The ability to mitigate on an annual time-scale is generally easier to do than mitigation plans which require monthly mitigation of river depletions. (Note this area includes the Bitterroot, Blackfoot, and Upper Clark Fork River)

b) Swan River above Bigfork dam: Limiting water right is Pacific Power and Light Company Bigfork Dam. DNRC approves small domestic and lawn and garden permit applications for surface water and groundwater in the Swan River Basin; however there are no defined limited on the size. Larger new appropriations will likely require mitigation. Mitigation may involve retiring the use of an existing water right and changing the water right to mitigation or purchasing mitigation marketing water if available; further details of mitigation and aquifer recharge plans are described in section 2.2.2.

Figure 1. Bitterroot Basin general water availability (DNRC administrative basins labeled).

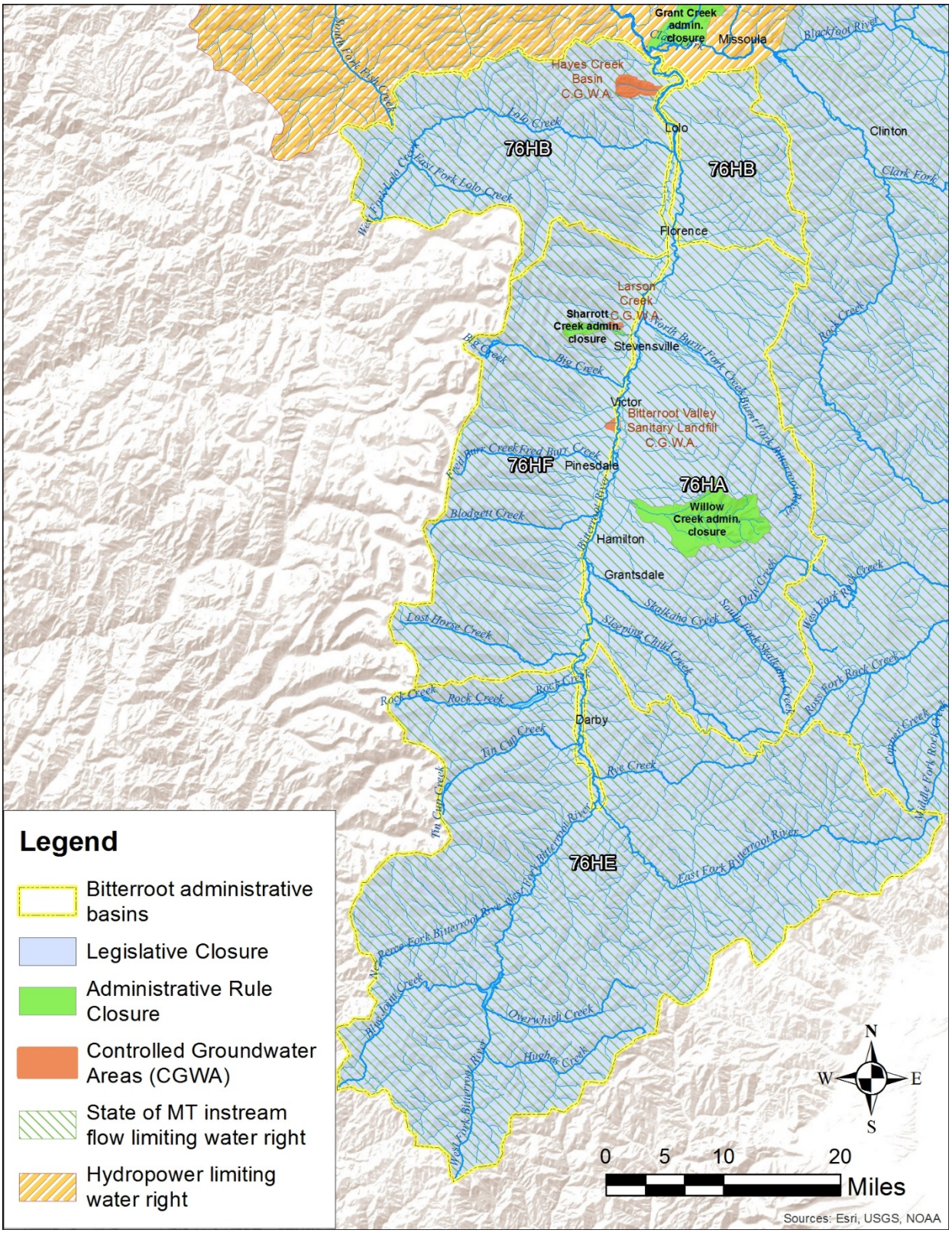


Figure 2. Upper Clark Fork Basin general water availability (DNRC administrative basins labeled).

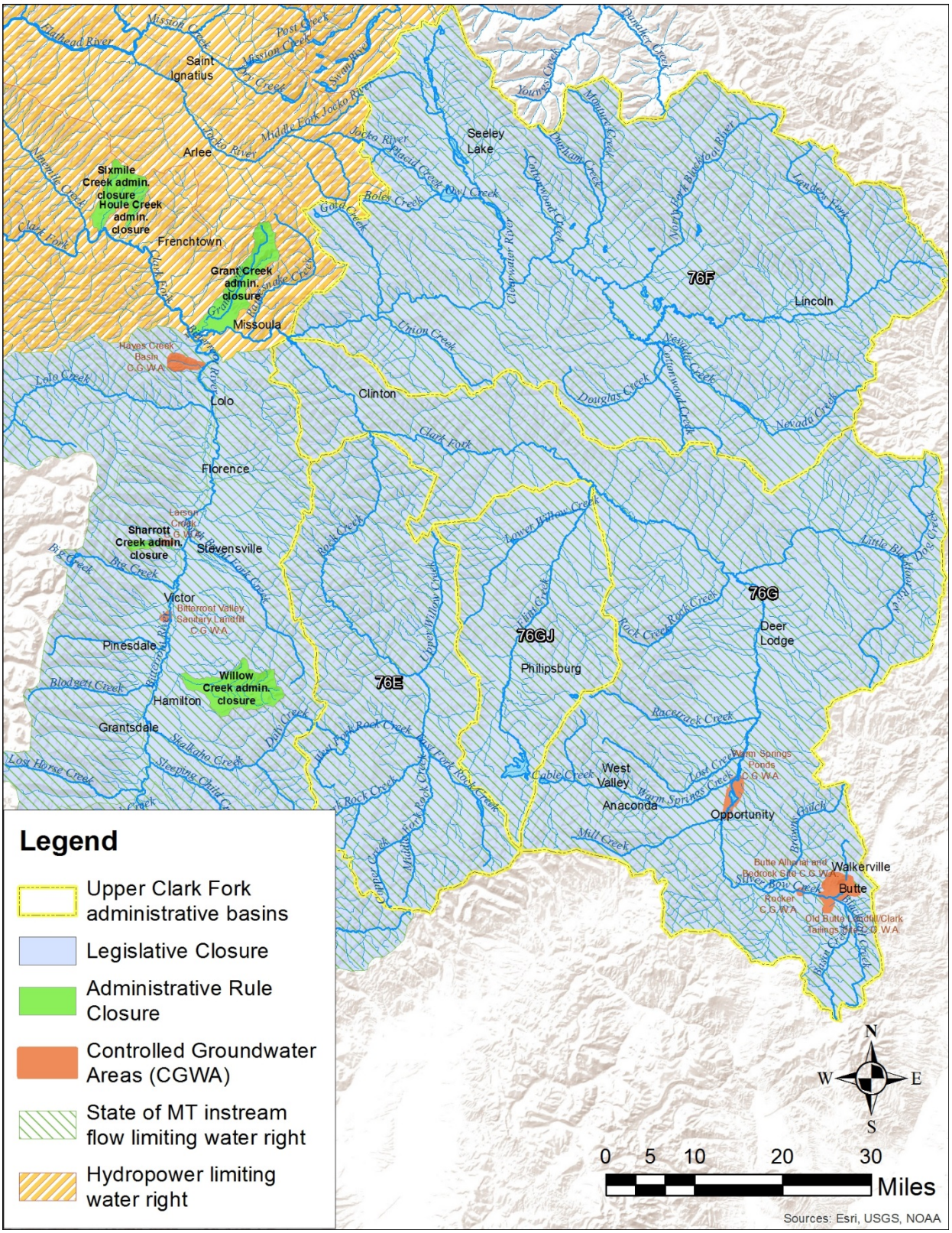


Figure 3. Lower & Middle Clark Fork and Lower Flathead Basin general water availability (DNRC admin. basins labeled).

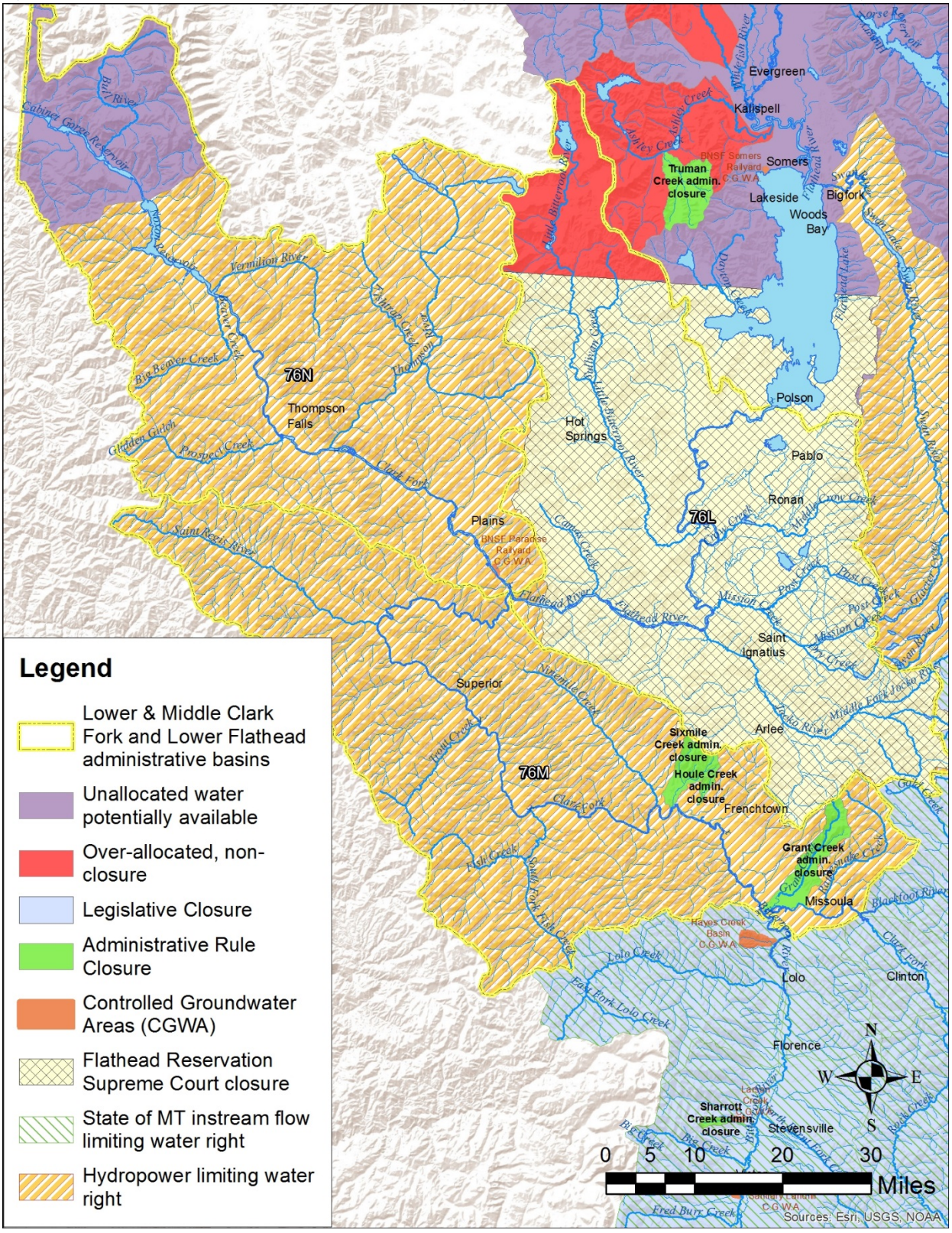
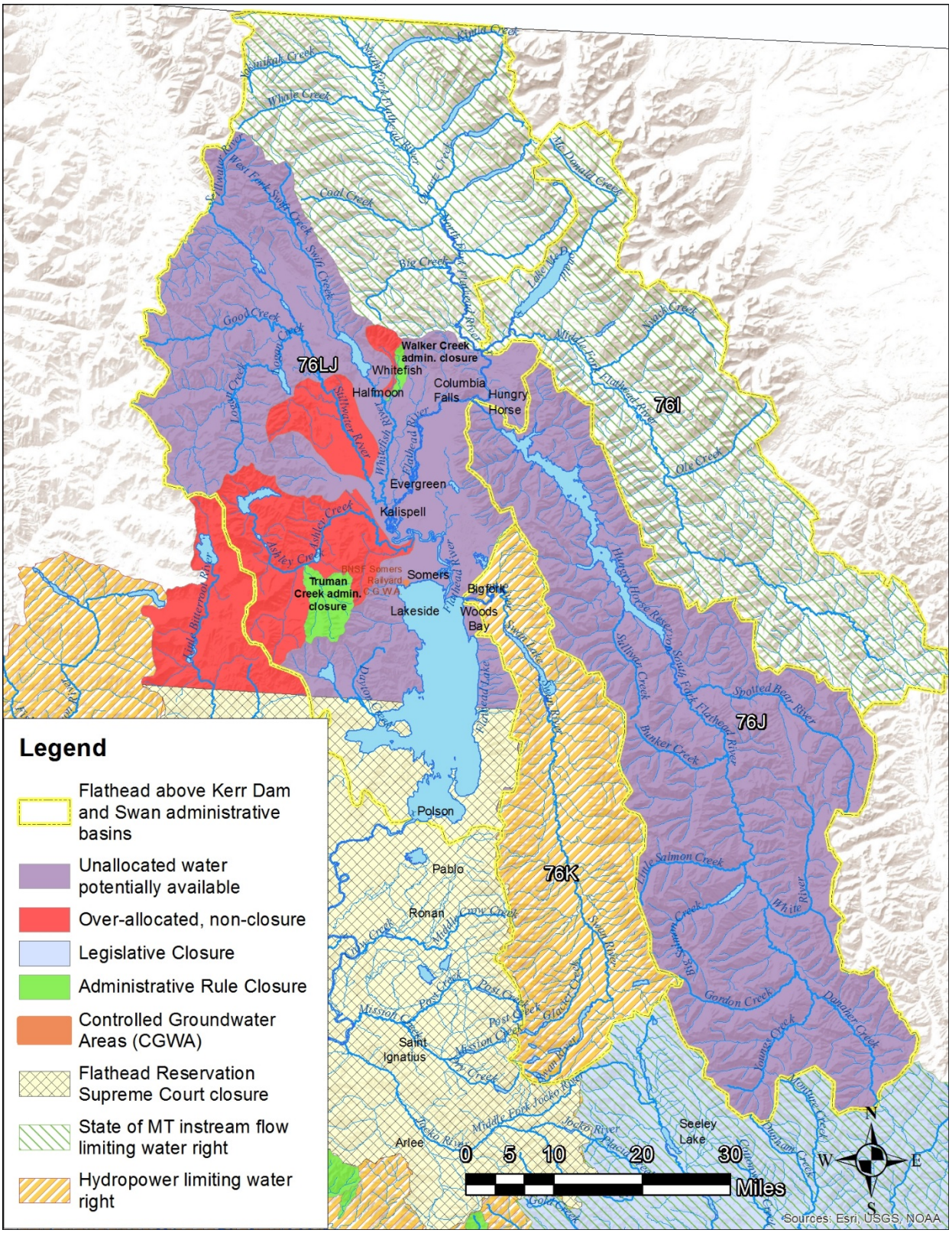


Figure 4. Flathead Basin above Kerr Dam general water availability (DNRC admin. basins labeled).



Expected Water availability by waterbody

Table 1 summarizes the general legal availability of surface water for appropriation in creeks and rivers of the Basin based on DNRC permitting records and experience. New appropriations from aquifers hydraulically connected to these streams and rivers are also subject to the same limitations.

Table 1. General legal availability of surface water based on the experience of DNRC Water Resources regional offices.

Kalispell Region: Flathead, Lake, Lincoln, and Sanders Counties			
Water Source	**Legal availability of new water**	**Primary limiting water rights or legal closure**	**New water use limitations**
Ashley Creek	None	Instream flow for fisheries	Over appropriation largely because Irrigation claims have been divided and changed to various uses and instream fishery use.
Clark Fork, below Flathead River	Subject to hydropower water rights	Hydropower at Noxon dam	Over appropriation due to hydropower rights. Hydropower rights at Noxon Dam may make new appropriations difficult unless an existing water right is retired and changed to mitigation or aquifer recharge.
Flathead River below Kerr Dam	Subject to hydropower water rights	Hydropower at Noxon	Hydropower water right at Noxon Dam may make new appropriations difficult unless an existing water right is retired and changed to mitigation or aquifer recharge.
Flathead River mainstem above Kerr Dam and Flathead Lake	Subject to hydropower water rights	Hydropower at Kerr Dam	Future restrictions possible due to hydropower and instream fishery rights. Permitting may be complicated by the complex operations of dams.
Middle Fork Flathead River	None	Instream flow for fisheries and Glacier National Park Compact	Restrictions due to instream flow fishery right, “Murphy right.” Also limited by future consumptive use limits imposed by Glacier National Park Compact.
Flathead River, North Fork	None	Instream flow for fisheries and Glacier National Park Compact	Restrictions due to instream flow fishery right, “Murphy right.” Also limited by future consumptive use limits imposed by Glacier National Park Compact.
Haskill Creek	None	Irrigation, municipal, and hydropower	Likely over appropriated due to irrigation and municipal rights to include a hydropower right
Little Bitterroot River and Lake	None	Irrigation and storage	Over appropriation of source largely due to irrigation rights and storage at Hubbard Dam.
Stillwater River	None	Over appropriated	Apparent over appropriation on reach between crossing of Highway 93 north of Kalispell and Highway 93 north of Whitefish. Over appropriation possibly due to accounting error due to counting multiple water rights with shared PODs with same flow rate.
Swan River	Limited to spring months	Hydropower right at Bigfork	Over appropriation during most months due to hydropower right at the Bigfork Dam

Missoula Region: Granite, Mineral, Missoula, and Ravalli Counties			
Water Source	**Legal availability of new water**	**Primary limiting water rights or legal closure**	**New water use limitations**
Bitterroot River	None	Basin Closure and instream flow for recreation	Applications for storage of surface water >50 AF allowed, however a storage application in the Bitterroot would be extremely difficult due to large FWP instream flow water rights in the Bitterroot. Even during high water legal availability is an issue. Groundwater permits can be processed, but they may require the retirement of an existing water right that is changed to mitigation or aquifer recharge.
Blackfoot River	None	Basin Closure and instream flow for fisheries	Groundwater permits can be processed, but they likely will require the retirement of an existing water right that is changed to mitigation or aquifer recharge. Surface water storage applications allowed but could be difficult to show legal availability due to hydropower water right at Noxon Dam.
Flint Creek	None	Basin Closure	No water rights issued since 1995
Clark Fork River and tributaries below old Milltown Dam site	Subject to hydropower water rights	Hydropower at Noxon Dam	Open to surface and groundwater water appropriations, however, new appropriations may require the retirement of an existing water right that is changed to mitigation or aquifer recharge due to hydropower water right at Noxon Dam. A marketing-for-mitigation change for the Grass Valley Irrigation District, if granted, would provide approximately 3,800 acre-feet of water for future development through reallocation.
Clark Fork River above old Milltown Dam site	None	Basin Closure, instream flow, and Noxon Dam	Surface water storage applications allowed but may be difficult to show legal availability due to hydropower water right at Noxon Dam.
Rock Creek	None	Basin Closure, instream flow for fisheries, and Noxon Dam	No water rights issued since 1995. Groundwater applications can be processed but may require mitigation or aquifer recharge. Surface water storage applications allowed but may be difficult to show legal availability due to hydropower water right at Noxon Dam.
Swan River and tributaries in Missoula County	Small domestic and lawn and garden uses	Hydropower right at Bigfork	Despite uncertain legal availability with respect to the hydropower facility in Bigfork, small domestic and lawn and garden permit applications are processed for surface water in the upper reaches of the Swan. The success of an application for irrigation or another large consumptive use right in the upper Swan is uncertain.

2.1.3 Other options for new water uses

Change of existing water right

The law allows for changing existing water rights in the point of diversion, place of use, place of storage, and purpose of use (section 85-2-402, MCA). This allows for the purchase and change of an existing water right to support a new water use. The benefit of using a water right change is that the priority date of the existing water right is maintained. The drawback is that the water right change will require a complex evaluation of potential for adverse effects to other water users and may require mitigation similar to a new permit (see section 2.2). Changing an existing water right to a new location and/or use may be a reasonable option when the period of diversion for the new use matches that of the existing water right. ARM 36.12 subchapters 18 and 19 provide details of the water right change process.

Spring flow storage and other un-allocated water

Un-allocated water may be available in all basins during certain limited times of the year. Evaluation of legal availability of un-allocated water is specific to the location and conditions of each new water use. For this reason this report does not evaluate all un-allocated water in the Clark Fork Basin. Most often un-allocated water is available during high spring flows. This water may be available for diversion, storage, or mitigation use depending on whether it is in an open basin or a Basin Closure area with exceptions which allow for storage (see section 2.3.1).

Identifying and permitting un-allocated water from spring flows is a complex endeavor. The limiting water rights described in section 2.4 are big players in limiting availability of un-allocated water. For instance in the Bitterroot River appropriation of spring flows for storage would only be possible when both the FWP Bitterroot River recreation water right and Avista's Noxon Rapid Dam water right are both supplied with adequate water, something which occurs only for about a week on a median water year and may not occur at all on a dry year. Similar, in the Upper Clark Fork

A water right permit for storage of spring flows would be conditioned so that it can only be diverted when all existing water rights are supplied and this may be an option that would suite some water needs such as irrigation and fish & wildlife ponds for instance. Domestic, commercial, municipal, and industrial water uses typically require a larger and more reliable source of water and storage of spring flows is not likely to suffice for those water requirements.

2.2 Water right permitting

2.2.1 The basics of Montana water right law, regulations, and adverse effect

Water Right Permitting Laws and Administrative Rules

In order to legally put water to a beneficial use in Montana, a person must have a water right. A water right is a property right that is a right to use water, but it is not an ownership right in the water itself. The typical water right consists of "elements," that define the use of water, such as priority date, purpose of use, point of diversion, water source, place of use, period of use, and a quantification of flow rate, volume or both. There are many types of water rights including use rights, filed rights, decreed rights, court approved rights on adjudicated streams, groundwater rights from 1962 to July 1, 1973, Federal and Indian reserved rights, Murphy rights, Permits, Certificates, State Water Reservations, etc. Each have been acquired in accordance with the particular rules that applied at the time; each is just as valid and legal as the next, and just as enforceable in accordance with its priority date (Doney, 1990). The Prior Appropriations Doctrine provides for the orderly use of water based on priority date and specifies that senior water users (those with older priority dates) have the right to their full use of water before a junior users (those with later priority dates) have the right to one drop.

Until July 1, 1973, Montana's law regulating water right acquisition, or use, was not constrained by strict statutory limitations; as a practical matter, merely diverting water from a source and applying it to a beneficial use obtained a water right; with a few exceptions, the filing of a document with a governmental entity to give notice of the appropriation was optional (Doney, 1990). The Montana Water Use Act became effective July 1, 1973 and provided the framework for the legal and regulatory system currently used for administering water rights in Montana. The Montana Water Use Act

confirmed that all waters within Montana are the property of the state for the use of its people and are subject to appropriation for beneficial uses as provided by law. The Legislature was tasked with preparing the legal code (laws) which guide water administration.

Under the Water Use Act, the DNRC has jurisdiction over all new appropriations of water and the responsibility to develop administrative rules to guide permit and change procedures. DNRC evaluates applications for new appropriations of water, which are referred to as *Permits*, pursuant to the criteria set forth in §85-2-311, Montana Code Annotated (MCA). These criteria require a water right applicant to prove that water for a proposed new appropriation is both physically and legally available, and that existing appropriators will not be adversely affected. Physical availability is typically based on an assessment of the median of the mean flows. A determination that water is legally available does not mean it is physically available in all years. The applicant must also prove that the proposed use is a recognized beneficial use of water, that the proposed diversion is adequate, and that the applicant has a possessory interest in the place of use.

Adverse effect means interference with or to interfere with the reasonable exercise of an existing water right. Determination of adverse effect is based on an applicant's plan during times of shortage. For a plan to prevent adverse effect, a surface water diverter merely has to show they can stop diverting in response to a call; however, ceasing pumping from a well does not stop depletion giving rise to the need to mitigate the adverse effect by a mitigation or aquifer recharge plan developed by the applicant. Two significant hearing orders provide further details on how adverse effects are evaluated by DNRC in a permit application (see table 3: In the Matter of Change Application No. 43D-30002264 by Chester and Celeste Schwend and In the Matter of Application for Beneficial Water Use Permit No. 41H 30023457 by Utility Solutions LLC).

For a permit application criteria, adverse effects are determined pursuant to Administrative Rules of Montana (ARM) 36.12.1706, that mandates an applicant provide a plan, written narrative, showing that the diversion and use of water and operation of the proposed project can be implemented and properly regulated during times of water shortage so that the water right of prior appropriators will be satisfied. The applicant's plan must demonstrate a prevention of potential adverse effects to existing water rights, certificates, permits, and water reservations. The plan may include: an agreement to measure appropriations and monitor water supplies, a plan to appropriate only when stream flows exceed certain trigger flow levels, a mitigation or aquifer recharge plan, or other conditions necessary to prevent adverse effects. For groundwater applications, the DNRC will evaluate how water levels in wells of prior water rights could be lowered and the rate, timing, and location where water flow could be reduced by any amount from hydraulically connected surface waters.

Similarly, DNRC was also was granted jurisdiction over changes of existing water rights by the Water Use Act and does so pursuant to the criteria set forth in§85-2-402, MCA. After obtaining preapproved authorization from the Department, a water user can change the place of use, purpose of use, point of diversion, and place of storage for a water right. While these elements of a water right are subject to being changed, a water user may not expand the extent of the underlying water right. Evaluation of an application to change a water right focuses on the comparing historic use of the underlying water right

with the new proposed use; to determine whether the proposed water right change will adversely affect other water users (senior and junior) on the source.

After obtaining a change authorization from the Department, a water user may permanently reallocate water to a new purpose while preserving the priority date and other unchanged elements of the underlying water right. A water right change is limited by what is called the *historic use* of the water right, including period of diversion, historic diverted volume, and historic consumptive use. These limitations are important to ensure that a proposed change will not adversely affect other water users. Increases in amount of consumption or changes in the pattern of use from the historic use can affect other water right holders who depended on that historic pattern of use in their own use of water, protected by their water right. The historic use analysis also looks at the timing and location of return flows. Changes in return flows, ditch seepage, and wastewater returns may not be possible when performing a water right change where other water users are reliant on the timing and location of those return flows. As such, potential adverse effect to other water users is often a limiting factor in the ability to change a water right.

DNRC's determination of adverse effect of a water right change application is set forth in ARM 36.12.1903. Lack of adverse effect for change applications is generally based on the applicant's plan showing the diversion and use of water and operation of the proposed project will not exceed historic use and can be implemented and properly regulated. Similar to a permit, a written narrative must be provided by the applicant that must address the applicant's plan to prevent potential adverse effects to existing water rights, certificates, and water reservations. The applicant's plan must document the effects to the other water rights including, but not limited to, the following: water rights using the existing or proposed point of diversion, other ditch users, down-slope water users, the effect to water rights dependent on the return flow, the effects of changing the historic diversion pattern including rate and timing of depletions, and for groundwater applications, the applicant shall explain how the changed water right will affect water levels in wells of junior and senior water rights and the rate and timing of depletions from hydraulically connected surface waters, and what effect those changes will have on those water rights within the notice area.

Significant Montana Water Right Case Law

Decisions by the Courts help to clarify water law and provide precedent for similar water right issues arise in the future. Often administrative rules and policies for future applications reflect court decisions. There are many court decisions which are important to understanding and applying the laws which govern water rights in Montana. Table 2 presents some, but not all, significant court decisions relevant to water right permitting in the Clark Fork Basin.

Table 2. Significant court decisions in regards to water right permitting.

Montana water right case law	**Decision Summary (see court decision for complete findings)**
Hohenlohe v. DNRC, 2010 MT 203	A change in the amount of return flow, or to the hydrogeologic pattern of return flow, has the potential to affect adversely downstream water rights. The historic diverted volume can be changed into a nonconsumptive instream right where there are no potential return flow adverse effects.

Montana water right case law	Decision Summary (see court decision for complete findings)
Montana Trout Unlimited v. Department of Natural Resources and Conservation, 2006 MT 72 331 Mont. 483.	New appropriations which pump ground water otherwise flowing to surface water (pre-stream capture) may adversely affect other appropriators.
Wesmont Developers v. DNRC CDV-2009-823, Montana First Judicial District Court.	MT Water Use Act does not contemplate a de minimis level of adverse effect on prior appropriators; adverse effects are calculable and need not be measurable.
Sitz Ranch v. DNRC DV-10-13390, Montana Fifth District Court.	Stream depletion does not have to be measurable to cause an adverse effect.
Spokane Ranch & Water Co. v. Beatty (1908), 37 Mont. 342. Gassert v. Noyes (1896), 18 Mont. 216 .	In a water right change, other appropriators (including juniors) have a vested right to have stream conditions maintained substantially as they existed at the time of their appropriations.
McDonald v. State (1986), 220 Mont. 519.	A water right is defined by its pattern of historic use (not by the flow and volume numbers on the "paper right"). Beneficial use is the basis measure and limit. Volume doesn't need to be adjudicated for irrigation use because it naturally varies depending on other conditions.
Ciotti. (In the Matter of the Application for Beneficial Water Use Permit Nos. 66459-76L, Ciotti; 64988-g76L, Starner; and Application for Change of Appropriation Water Right No. G15152-S761, Pope, 1996) 278 Mont. 50, 923	State may not issue new water permits on the Flathead Reservation until the Tribes' prior and preeminent federally reserved water rights have been quantified, either by a general water rights adjudication or by compact negotiations with the Montana Reserved Water Rights Compact Commission.
CSKT v. Clinch (1999), MT 342, 297 Mont. 448, 992	Reinforced Ciotti decision in the face of changes to MT water law in 1997 (Permit Amendments) and gives CSKT original jurisdiction over water rights on reservation until the CSKT rights are quantified.
CSKT v. Stultz (2002) MT 280, 312 Mont. 420	Ciotti and CSKT v. Clinchs decision also apply to groundwater on the Flathead Reservation.
CSKT v. Clinch (2007), MT 63	Change of use on Flathead Reservation is not limited as are new appropriations. Existing permit holders must be afforded the opportunity to prove that a proposed change to a water right would not adversely affect the tribe's water right.
Clark Fork Coalition et al. v. Tubbs, Director DNRC (2014), MT BDV 2010-874	Reinstated DNRC's 1987 rule defining a "combined appropriation" for exempt wells. Limits a single project or a single property owner to one exempt groundwater certificate from a single source aquifer; new guidelines are provided in DNRC (2014). Subdivisions proposing individual wells for each lot which exceed permit exceptions (85-2-306, MCA) required to obtain a water right permit.

Significant Hearing Order Decisions and implications for water availability

The DNRC Hearings Unit holds hearings in contested water right cases and when the public appeals a department decision such as a denied permit. The Hearings Unit is an independent unit of the Water Rights Bureau staffed by the Hearing Examiners and administrative support. Hearing Examiners are responsible for conducting a fair and impartial hearing in accordance with applicable laws, rules and procedures and for preparing and issuing decisions that include Findings of Fact, Conclusions of Law and an Order based on the case record, and certain other legally accessible materials. Hearing Order Decisions help to clarify the legal availability of water as well as the requirements of the water right permitting system. Key Hearing Order Decisions which we believe are most relevant to water right permitting the Clark Fork Basin are listed in table 3. These specific Hearing Order Decisions are selected for the purposes of this report; there are other decisions that may apply. DNRC maintains a list of significant Hearing Order Decisions on the Department's website.

Table 3. Significant DNRC Water Right Bureau Hearing Order Decisions.

Significant Hearing Order Decisions	**Summary**
In the Matter of Application for Beneficial Water Use Permit No. 76N-30010429 by Thompson River Lumber Company, Final Order (December 21, 2006)	Requires new appropriations with consumptive use greater than 35 gpm or 10 acre-feet (AF) per year in basins 76M (Clark Fork between Blackfoot and Flathead River) and 76N (Clark Fork below Flathead River) to mitigate the adverse effects (reductions in river flow) to Avista's hydropower water right for Noxon Rapids dam when flows are below 50,000 cfs.
In the Matter of Change Application No. 43D-30002264 by Chester and Celeste Schwend (DNRC Final Order 2008)	Applicant must show that significant changes in timing and location of historic return flow will not adversely affect other appropriator.
In the Matter of Application to Change Appropriation Water Right No.41F-31227 by T-L Irrigation Company (DNRC Final Order 1991)	In a change of use application a senior appropriator cannot change pattern of use to detriment of junior appropriator.
In the Matter of Application for Beneficial Water Use Permit No. 41H 30023457 by Utility Solutions LLC, Final Order 2007.	A new appropriation or water right change which causes surface water depletion which adversely effects another appropriator must be offset in timing, amount, and location.

2.2.2 Mitigation and Aquifer Recharge

What are "mitigation" and "aquifer recharge"

New appropriations that deplete surface water may need to implement a mitigation or aquifer recharge plan in order to obtain a permit. As defined in law (85-2-102, MCA), "Mitigation" means the reallocation of surface water or ground water through a change in appropriation right or other means that does not result in surface water being introduced into an aquifer through aquifer recharge to offset adverse effects resulting from net depletion of surface water. "Aquifer recharge" means either the controlled subsurface addition of water directly to the aquifer or controlled application of water to the ground

surface for the purpose of replenishing the aquifer to offset adverse effects resulting from net depletion of surface water. The purpose of mitigation and aquifer recharge is to offset net depletion to surface water which cause adverse effects to existing water users, thereby providing a mechanism for a new water use to be permitted.

Mitigation and/or aquifer recharge are required for new water uses in the Clark Fork basin where:

- The basin is closed (see section 2.3.1). Mitigation and aquifer recharge plans are required in closed basins where basin closure includes an exemption for new groundwater permits (85-2-362, MCA).
- Downstream hydropower or instream flow water rights appropriate the entire flow of a river (see section 2.4).
- Other existing water rights may be adversely affected by the new use; this can occur anywhere in the Basin.

Mitigation and Aquifer Recharge Water Right Changes

Water right changes provide a mechanism for mitigating new groundwater uses that deplete surface water or cause adverse effects to other water users. An applicant for a new appropriation of water is required to demonstrate that the water right being changed will provide sufficient water in timing, location and amount to mitigate potential adverse effect either by instream mitigation or through use of aquifer recharge. Mitigation and aquifer recharge options are described further in the last part of section 2.1.2.

Water right changes for mitigation and aquifer recharge fall under the general criteria for water right changes in law 85-2-402, MCA and administrative rule, ARM 36.12.19. New appropriations could also obtain mitigation or aquifer recharge water using a temporary change (85-2-407, MCA). Temporary changes may be approved for up to 10 years with an opportunity to renew for 10 more years and there is no limit on the number of renewals. A temporary change may be preferable for projects which will not require a permanent water supply because a temporary change reverts to the historic use when the water is no longer needed for the changed use. Other projects with short term water use could be mitigated using a temporary lease of water as provided for under 85-2-427, MCA and 36.12.2101, ARM. Temporary leases are limited to a maximum 180 AF per year consumptive portion of an existing water right, may only be leased for 2 years of any 10 consecutive years, must use the same point of diversion and not add storage. The benefit of a temporary lease is the permitting requirements are significantly less complex.

Stream or aquifer depletions resulting from the new consumptive water use can only be mitigated using water which was historically consumed under the existing water right being changed to mitigation; mitigation of the new use cannot use water which was historically not consumed such as irrigation return flows, deep percolation, ditch loss, etc. Mitigation of the new consumptive use with water which was not historically consumed would represent an increase in the water right and is not allowed under the Montana Water Use Act. However, mitigation of stream or aquifer depletions which result from changes in return flow timing or ditch loss can be mitigated with water which was historically not consumed.

DNRC methods for calculating the historic use of an irrigation water right are described in ARM 36.12.1902. An applicant always has the opportunity to submit alternative evidence pertaining to consumptive use, diverted volume, management factors and irrecoverable losses with the Historic Use Addendum.

Mitigation and Aquifer Recharge Marketing Water Right Changes

Montana law allows existing water rights holders to change all or part of an appropriation and market that water (for lease or sale) for use as aquifer recharge or mitigation (section 85-2-420, MCA). Unlike the traditional change process discussed above, this approach enables a water user to prospectively change all or a portion of a water right to mitigation and have that mitigation water available for lease or sale to individuals seeking mitigation water for new uses that could be used in an adverse effects plan. The holder of the water right that is changed to marketing for mitigation may continue the authorized beneficial use until the change in use is completed, thereby allowing the original beneficial use to occur until such time that requests and contracts are established for the new mitigation use. In some situations, mitigation marketing can provide predictability for new water users who need to mitigate depletions as the mitigation water change has already been authorized and is ready to put to use in a mitigation or aquifer recharge plan assuming the geographic locations of the mitigation marketing water right place of use match with any new proposed uses that could benefit from a mitigation source.

Mitigation and Aquifer Recharge Options

Mitigation and aquifer recharge methods are not defined in law or regulations. Applicants for new water rights must design a mitigation or aquifer recharge plan that meet the requirements to offset any potential adverse effects to other water users. Some examples of mitigation and aquifer recharge options which have been used in Montana and elsewhere are described below. Table 4 at the end of the description of the six options below summarizes and compares the methods. Mitigation and aquifer recharge requirements vary by location in the Clark Fork Basin; see section 2.1.2 for a description of requirements by specific area.

1. Instream mitigation

This option changes an existing surface water right, such as an irrigation water right, the water is no longer diverted and is left instream. The purpose of use is changed to mitigation and the place of use to instream. This requires a change application as described above in section 2.2.1. Instream mitigation is a relatively inexpensive method because it does not require storage or other infrastructure such as infiltration systems to be engineered and constructed.

The changed water right can only be used to mitigate adverse effects during the historic period of use of the water right; therefore changing an irrigation water right to instream mitigation cannot mitigate adverse effects outside of the irrigation season. The limitation of this method to the historic period of use limits the usefulness of this mitigation option for new uses which cause year-round depletions typical of wells used for new residential, commercial, municipal, or industrial uses. However it is possible that instream mitigation could be used in tandem with another mitigation option (such as aquifer recharge or retiring an existing groundwater right) to achieve year-round mitigation. Instream mitigation is the most practical and inexpensive mitigation option where mitigation can be supplied on

an annual timescale such as mitigation of Noxon Rapids Dam water right which is required anywhere in the Basin above Noxon Reservoir except for the Flathead Basin above Kerr Dam (see section 2.4.1 for additional details).

2. New storage above ground

This option uses a new appropriation of surface water during periods when water is legally available or changes an existing surface water right to mitigation, stores water in a reservoir or pond, and releases water for mitigation when needed. Evaporation from a reservoir is often significant and will reduce the amount of water which can be changed to mitigation.

One challenge for using a new appropriation for storage is defining when water is legally available. The Noxon Rapids Dam water right limits legal availability in the Clark Fork River Basin above Noxon Reservoir and in the Flathead Basin below Kerr Dam to a period during spring runoff when flow exceeds 50,000 cfs at Noxon Rapids (see section 2.4.1 for additional details). Because flows do not exceed 50,000 cfs every year and may do so at different times during different years, the ability to store spring flows in a reservoir is unreliable. Additionally, drought may create multiple year periods where water is not legally available for storage. Legal availability of water for storage is further limited in much of the Clark Fork Basin by instream flow water rights (see section 2.4.2 for additional details). Therefore storing high spring flow is likely limited to those purposes which do not require water supply ever year, such as supplemental irrigation.

Alternatively, storage can involve changing an existing surface water right such as an irrigation water right and storing that water for mitigation. The existing water right to be changed may be relatively junior in priority date if diversion for storage is conducted in early summer when surface water flow has historically supplied the junior right.

Perhaps the greatest limit on this mitigation option is the cost and land area required to store large volumes of water for larger projects. We evaluate storage of two years of mitigation water for a residential development with 300 single family homes and 100 acres of lawn and garden in Scenario #2 in section 3.2. That evaluation shows it would require a reservoir with a capacity of 472 AF. As an example, a 20 acre reservoir would be 23.6 ft deep to achieve this capacity. This option may be more reasonable for water uses which require smaller volumes, such as smaller residential development or residential development with very small irrigated area or xeriscaping.

3. Aquifer storage and recovery (ASR)

ASR involves recharging an aquifer with surface water using an injection well or infiltration system (drainfield, infiltration basin, etc.) and recovering that water later by pumping from the aquifer. The basic premise of ASR is to store water in an aquifer when surplus surface water is available and use that water when water is not legally or physically available. The benefit of ASR is that large volumes of water can be stored without having to build a large surface reservoir.

The water source for recharge could potentially use a new appropriation of surface water when water is legally and physically available such as during spring runoff; the occurrence of legally available water is specific to the basin closures and existing water rights at a particular location. One challenge for storing spring flows is defining when water is legally available which is discussed in detail under option #2 *New*

storage above ground. Alternatively, recharge could involve changing an existing surface water right such as an irrigation water right to aquifer recharge. The existing water right to be changed may be relatively junior in priority date if recharge is conducted in early summer when surface water flow has historically supplied the junior right.

Another significant hurdle to ASR is that significant excess volume is needed in an aquifer for the injected water. Many of the shallow aquifers in Western Montana are already at capacity with the artificial recharge already provided by irrigation loss, leaving little or no room for additional storage. Additionally, recharge of large quantities of water may lead to elevated water tables, flooding of household basements, lowlands, or unintended creation of wetlands. Confined aquifers such as the deep alluvial aquifer in the Flathead Valley or the Madison limestone formation may provide a safer location for storage of injected water because water table rise is less likely to be an issue. One option to be explored is creating capacity for recharged water in aquifers not immediately connected to surface water by drawing down the water levels with pumping, then refilling the aquifer to capacity (Wheaton, 2014). However drawing down an unconfined aquifer which is hydraulically connected to surface water may lead to depletion of the surface water and potential for adverse effects.

Aquifer recharge involves mixing recharge water with the native water of an aquifer and state water quality laws apply to the aquifer recharge as covered in 75-5-410, MCA. DEQ has indicated that aquifer recharge which uses water which does not contain industrial waste, sewage, or other wastes does not require a permit as indicated in 75-5-401(1)(b), MCA. These State water quality laws regulate the use of treated sewage for aquifer recharge. In general the use of unaltered surface water for aquifer recharge is not regulated by the State of Montana. ASR injection wells are regulated as Class V injection wells by U.S. Environmental Protection Agency (EPA). As such, ASR well owners and operators are required to submit basic inventory information to EPA and the injection may not contain any contaminants which may cause a violation of any drinking water standard or otherwise adversely affect the health of persons (40 CFR 144.12).

ASR presents a number of challenges including engineering complexity, high costs of injection systems, and the need for a high level of study as to the potential side-effects of higher water tables or increased pressure in confined aquifer systems. To our knowledge a large-scale ASR project has not been attempted in Montana and someone proposing such a project would likely face significant permitting hurdles given this lack of precedence.

4. Aquifer recharge

Aquifer recharge involves infiltrating mitigation water to an unconfined aquifer to offset depletions from a new use. Aquifer recharge is similar to aquifer storage and recovery, the main difference being that with aquifer recharge the groundwater discharges naturally from the aquifer into surface water to offset depletions. Aquifer recharge uses some form of enhanced infiltration such as a drainfield, infiltration basin, surface spreading of water, or potentially ponds or constructed wetlands.

There are no standards for infiltration design in State law or regulations; this means that there is a degree of freedom in choosing a recharge system design. Drainfields or other subsurface infiltration require the least amount of mitigation water because evaporation is limited, but require engineering,

construction, and maintenance. Aquifer recharge through a drainfield may require monitoring groundwater levels to insure that the water table does not rise into the root zone, resulting in increased evapotranspiration. Infiltration basins may be inexpensive but will require additional water to compensate for evaporation and take up land area. Ponds or constructed wetlands will require even more water to compensate for higher evaporation, but have an aesthetic and ecological value. Wetlands may also create compensatory mitigation credits under Section 404 of the Clean Water Act (33 U.S. Code § 1344), potentially creating value. Mitigation credits could be sold to private or government development projects which eliminate wetlands protected under Section 404. In this case, the water right change will include the wetland beneficial use in addition to aquifer recharge. The important consideration in any aquifer recharge design is that sufficient water is infiltrated to the aquifer on the monthly timescale required to off-set depletions that would create an adverse effect from a permit.

Typically recharge water is obtained by changing an existing surface water right such as an irrigation water right to aquifer recharge. The existing water right to be changed may be relatively junior in priority date if recharge is conducted in early summer when surface water flow has historically supplied the junior right. Recharge could potentially use a new appropriation of surface water when water is legally and physically available such as during spring runoff. One challenge for using spring flows is legal availability of spring flow water may be limited to short periods and not reliable from year-to-year which would impact the effectiveness of the mitigation; this is discussed in detail under option #2 *New storage above ground.* Additionally, recharging water during a short period during spring flows may not provide sufficient mitigation later in the year if the recharged water discharges from the aquifer rapidly.

Aquifer recharge involves mixing recharge water with the native water of an aquifer and state water quality laws apply to the aquifer recharge as covered in 75-5-410, MCA. DEQ has indicated that aquifer recharge which uses water which does not contain industrial waste, sewage, or other wastes does not require a permit as indicated in 75-5-401(1)(b), MCA. These State water quality laws regulate the use of treated sewage for aquifer recharge. In general the use of unaltered surface for aquifer recharge or mitigation is not regulated by the State of Montana.

5. Retiring existing groundwater rights.

Existing groundwater water rights may also be changed to mitigation by stopping use of the associated well. Retiring a well can mitigate adverse effects outside the historic period of use of the well because the depletion to surface water caused by pumping a well is longer in duration than the actual pumping. The feasibility of a mitigation plan involving a change of a groundwater right depends on consumption of the historic and new uses. In practice this mitigation option may be used alone for new uses which are similar in consumption to the retired well or in combination with other mitigation options where mitigation needs are greater. The important element is that the historic use of water is actually curtailed as identified in the mitigation plan.

6. Wastewater return flows.

DNRC allows credit for new wastewater return flows towards mitigation where those return flows offset depletions from the new use. Montana water quality laws (75-5-401, MCA) regulate the use of treated sewage for aquifer recharge. In general, a septic system designed to meet current standards is acceptable for aquifer recharge. In permitting a new appropriation where a new well and wastewater

infiltration system are similar distance from depleted surface water, aquifer recharge from the septic system is subtracted from the diverted (pumped) volume in the net depletion analysis. In this situation wastewater discharge is considered recycled to the aquifer and not consumed. If wastewater treatment methods change after issuance of a permit to a method which consumes more wastewater (such as changing from discharge to land application of treated effluent) the permit holder will have to mitigate the additional consumption. This would likely involve a petition to modify their permit to change their mitigation plan and may require a change application for the additional mitigation water.

Table 4. Mitigation and aquifer recharge options compared.

Method	Benefits	Limitations	Cost	Feasibility	Implementation
Instream mitigation	Does not require expensive engineering or infrastructure. Most practical method where mitigation can be supplied on an annual timescale such as mitigation of Noxon Rapids Dam water right.	Limited to historic period of use of the changed water right; retiring irrigation water rights cannot mitigate depletion which causes adverse effects outside of the irrigation season.	Low	High	Change of purpose for an existing surface water right to instream mitigation or, purchase mitigation marketing water, or contract water.
New storage above ground	Possible to store spring runoff flow where legally available. Can provide a year-round source of water.	Expensive and requires significant land area for a reservoir. Legal availability of spring runoff may not be reliable year-to-year and may require changing an existing water right.	High	Low	New appropriation of legally available water (such as spring runoff) or, change existing surface water right to mitigation with a place of storage or, purchase mitigation marketing water.

Method	Benefits	Limitations	Cost	Feasibility	Implementation
Aquifer storage and recovery	Possible to store spring runoff flow where legally available. Large volumes of water can be stored without having to build a large surface reservoir. Can provide a year-round source of water.	Need for a high level of study as to the potential for rising water table to cause flooding. Lack of previous ASR projects in Montana to test technical and regulatory framework. Legal availability of spring runoff may not be reliable year-to-year and may require changing an existing water right.	High	Low	New appropriation of legally available water (such as spring runoff) or, change of purpose of existing surface water right to aquifer recharge or, purchase mitigation marketing water.
Aquifer recharge	Infiltration systems such as drainfields and infiltration basins are straight forward to design and construct. May provide year-round mitigation water.	Likely requires changing an existing water right or purchasing mitigation marketing water.	Medium	High	New appropriation of legally available water (such as spring runoff) or, change of purpose of existing surface water right to aquifer recharge or, purchase mitigation marketing water.
Retire existing groundwater right	Does not require expensive engineering or infrastructure. May provide year-round mitigation water.	Requires retiring an existing use; availability of wells which are not needed is limited.	Low	High	Change of purpose of an existing groundwater right to mitigation.
Wastewater return flow	For developments with onsite wastewater treatment and discharge to groundwater there are no extra costs.	None	Low	High	Wastewater return flows may be considered in the net depletion analysis required for DRNC permitting of the new water use.

2.3 Special Area Designations

2.3.1 Basin Closure

Several major river basins in the greater Clark Fork Basin are closed to certain types of new water appropriations because of water availability problems, over-appropriation, and a concern for protecting existing water rights. Section 85-2-319, MCA, legislatively authorizes the closure of basins to certain new appropriations either directly by the legislature (Legislative Closures) or through rule by the DNRC (Administrative Rule Closures) with a petition by the public or DEQ. Basin closures can also occur through negotiation of reserved water rights compacts.

Closed basins in the Clark Fork Basin are shown in figure 5 and include the Bitterroot River and Upper Clark Fork River drainages as well as smaller closures in Sharrott Creek, Willow Creek, Grant Creek, Sixmile Creek, Houle Creek, Walker Creek, and Truman Creek. Exceptions to the closure for each of these basins are described in table 5 and 6 below.

The Upper Clark Fork River closure includes the drainage area of the Clark Fork River and its tributaries upstream of the location of the former Milltown Dam. The Bitterroot River closure extends upstream from the confluence of the Bitterroot with the Clark Fork River.

A person wanting to appropriate groundwater in a basin closure must complete a hydrogeologic assessment and must meet the requirements of 85-2-360, 85-2-361, and 85-2-362, MCA. If the assessment predicts net depletion of surface water, it must be determined if net depletion would have an adverse effect on prior appropriators and if there would be an adverse effect, the applicant must submit a plan for mitigation or aquifer recharge which is described in section 2.2.2 above.

There is also a Montana Supreme Court closure for the area of the Flathead Indian Reservation. The court cases are outlined in table 2 of section 2.2.1. The Supreme Court closed the Flathead Reservation to new appropriations until the Flathead Indian Reservation Reserved Water Rights are quantified by the Compact process or by adjudication. Additionally, DNRC cannot process a water right change on the reservation either. The Flathead Reservation closure does not include exemptions, meaning it is not possible to apply for new water use on the reservation until the conditions specified in the relevant court decisions for removal of the closure are met.

Figure 5. Basin Closures.

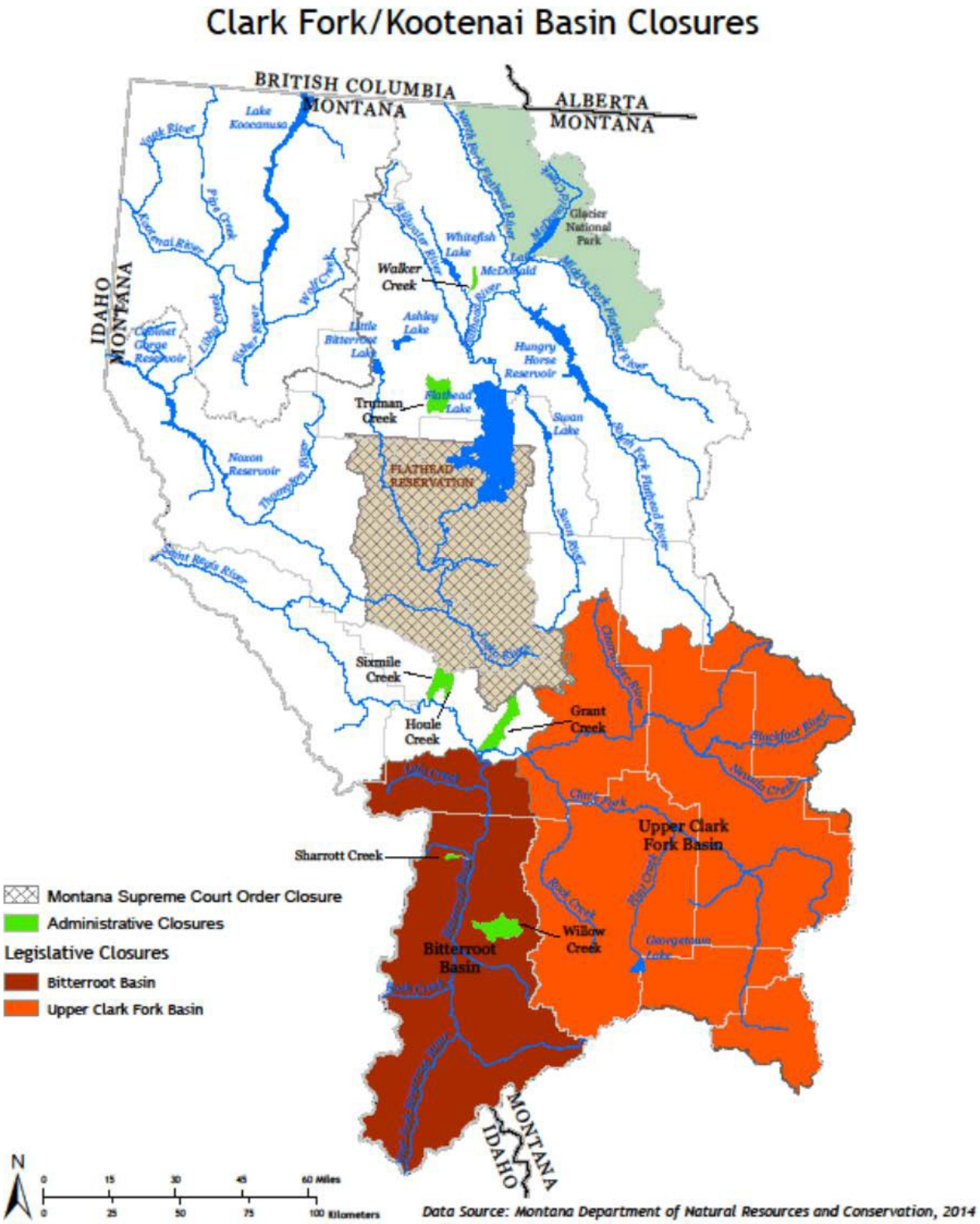


Table 5. Legislative Closures: Types of water use which are limited and statutory exceptions.

Upper Clark Fork including Blackfoot River (85-2-336, MCA)
Closed to new permits to appropriate water.
Exceptions:
Groundwater if complies with 85-2-360, MCA
Nonconsumptive power generation at existing hydroelectric dams
Stock use
Stored water
Appropriation pursuant to U.S. Forest Service compact under 85-20-1401, Article VI
Appropriation to conduct aquatic resource activities under federal Clean Water Act of 1977, 33 U.S.C. 1251 through 1387.
Bitterroot (85-2-344, MCA)
Closed to new permits to appropriate water or for a state water reservation within a Bitterroot River subbasin.
Exceptions:
Groundwater if complies with 85-2-360, MCA
Surface water by or for a municipality.
Temporary emergency appropriations pursuant to 85-2-113(3).
Stored water during high spring flow in an impoundment with a capacity of 50 acre-feet or more.
Appropriation pursuant to U.S. Forest Service compact under 85-20-1401, Article VI
Surface water for use in natural resource restoration required for CERCLA (federal Superfund), CECRA (State Superfund), aquatic resource activities under federal Clean Water Act of 1977, 33 U.S.C. 1251 through 1387, may not be used for dilution.

Table 6. Administrative Rule Closures: Types of water use which are limited and statutory exceptions.

Grant Creek (near Missoula) (ARM 36.12.1011)
Closed to new surface water consumptive use between July 1 and Sept 30.
Exceptions:
Nonconsumptive use from July 1 to Sept 30 that does not decrease the source of supply, disrupt stream conditions below the point of return, or adversely affect prior appropriators between the point of diversion and the point of return.
Emergency appropriations of water as defined in ARM 36.12.101(6) and 36.12.105.
Water stored from Oct 1 to Jun 30 for use during July 1 to Sept 30.
Houle Creek (near Frenchtown) (ARM 36.12.1021)
Closed to new surface water consumptive use year-round.
Exceptions:
Nonconsumptive use that does not decrease the source of supply, disrupt stream conditions below the point of return, or adversely affect prior appropriators between the point of diversion and the point of return.
Emergency appropriations of water as defined in ARM 36.12.101(6) and 36.12.105.

Groundwater use which would not cause a calculable reduction in surface flow.
Area of basin below the Frenchtown Irrigation District ditch.
Sharrot Creek (near Stevensville) (ARM 36.12.1017)
Closed to new surface water consumptive use year-round.
Exceptions:
Nonconsumptive use that does not decrease the source of supply, disrupt stream conditions below the point of return, or adversely affect prior appropriators between the point of diversion and the point of return.
Emergency appropriations of water as defined in ARM 36.12.101(6) and 36.12.105.
Groundwater use which would not cause a calculable reduction in surface flow.
Sixmile Creek (near Huson) (ARM 36.12.1020)
Closed to new surface water consumptive use between June 1 and Sept 15.
Exceptions:
Nonconsumptive use from June 1 to Sept 15 that does not decrease the source of supply, disrupt stream conditions below the point of return, or adversely affect prior appropriators between the point of diversion and the point of return.
Emergency appropriations of water as defined in ARM 36.12.101(6) and 36.12.105.
Water stored from Sept 16 to May 31 for use during any time of year.
Truman Creek (near Kila) (ARM 36.12.1019)
Closed to new surface water consumptive use between July 15 and Aug 31.
Exceptions:
Nonconsumptive use from July 15 to Aug 31 that does not decrease the source of supply, disrupt stream conditions below the point of return, or adversely affect prior appropriators between the point of diversion and the point of return.
Emergency appropriations of water as defined in ARM 36.12.101(6) and 36.12.105.
Water stored from Sept 1 to July 14 for use during any time of year.
Groundwater use which would not cause a calculable reduction in surface flow during the closure period.
Walker Creek (near Whitefish) (ARM 36.12.1014)
Closed to new surface water consumptive use between July 1 and Mar 31.
Exceptions:
Nonconsumptive use from July 1 to Mar 31 that does not decrease the source of supply, disrupt stream conditions below the point of return, or adversely affect prior appropriators between the point of diversion and the point of return.
Emergency appropriations of water as defined in ARM 36.12.101(6) and 36.12.105.
Water stored from Apr 1 to Jun 30 for use during July 1 to Mar 31.

Willow Creek (near Hamilton) (ARM 36.12.1018)
Closed to new surface water consumptive use between May 1 and Sept 30.
Exceptions:
Nonconsumptive use from May 1 to Sept 30 that does not decrease the source of supply, disrupt stream conditions below the point of return, or adversely affect prior appropriators between the point of diversion and the point of return.
Emergency appropriations of water as defined in ARM 36.12.101(6) and 36.12.105.
Area of basin below the Republican Ditch.

2.3.2 Controlled Groundwater Areas

In addition to basin closures for surface water, controlled groundwater areas (CGWAs) may be designated to protect water quality or quantity (§85-2-506, MCA). CGWAs designated due to water quality are typically associated with sites with significant groundwater contamination. CGWAs designated due to water quantity are typically due to limited water availability in an aquifer. An area for designation may be proposed by DNRC on its own motion, or by petition of a state or local public health agency, municipality, county, conservation district, or local water quality district. An area also may be proposed upon petition of at least one-third of the water rights holders in the proposed controlled groundwater area.

A permit may be required to appropriate any quantity of water in a CGWA, whether the designation was for contamination or limited water availability. Controlled groundwater areas are shown in figure 6 and limitations to water use are described in table 7 below. All the controlled groundwater areas within the basin are closed because of water quality concerns with the exception of Larson Creek and Hayes Creek.

Figure 6. Controlled groundwater areas.

Table 7. Controlled groundwater areas, limitations to water use and new appropriation.

Bitterroot Valley Sanitary Landfill (near Victor)
Purpose: Groundwater contaminated by organic chemicals.
Restrictions:
No well may be drilled without DNRC authorization.
All wells within the site boundary require a permit or change authorization.
Zone 1: No potable water development of groundwater. Nonpotable water may be developed if applicant demonstrates using groundwater model it will not cause migration of chemical plume.
Zone 2: pumping restriction of 35 gpm for wells that produce water from less than 200 ft deep to prevent migration of chemical plume.
Burlington Northern and Santa Fe Somers Railyard (in Somers)
Purpose: Groundwater contaminated by hydrocarbons and zinc metal.
Restrictions:
No well may be drilled in the alluvial aquifer except for monitoring and remediation; wells for other uses may be drilled in the bedrock aquifer only.
Burlington Northern and Santa Fe Paradise Railyard (in Paradise)
Purpose: Groundwater contaminated with creosote.
Restrictions:
No well may be drilled except for monitoring and remediation.
Butte Alluvial and Bedrock (in Butte)
Purpose: Groundwater contaminated by metals and arsenic.
Restrictions:
New groundwater wells must be authorized by Butte-Silver Bow Board of Health acting as the Butte Silver Bow Water Quality District office, the USEPA and MDEQ.
Water wells which exceed drinking water standards may not be used for potable water. Drinking water supplies will be replaced by the Superfund Settling Defendants under BMFOU and BPSOU consent decrees.
Irrigation and industrial use wells may continue to be used. Applications for new or replaced irrigation or industrial wells must demonstrate that the well use will not be detrimental to human health or the environment and must be approved by Butte Silver Bow Water Quality District, in conjunction with USEPA and MDEQ.
Hayes Creek (near Lolo)
Purpose: Limited water availability.
Restrictions:
All new groundwater use within the site boundary requires a permit.
No well will be permitted which will withdraw groundwater beyond the aquifer capacity.
No more than one well on each lot.
A groundwater supervisor will monitor groundwater and administer any restrictions to groundwater use.

Larson Creek (near Stevensville)
Purpose: Limited water availability.
Restrictions:
All new groundwater use within the site boundary requires a permit.
Wells less than 70 ft deep require augmentation of Larson Creek.
Wells deeper than 70 ft must be sealed off with grout from the shallow aquifer.
Rocker (in Rocker)
Purpose: Groundwater contaminated by arsenic.
Restrictions:
Closed to all new uses of groundwater.
Old Butte Landfill/Clark Tailings (in Butte)
Purpose: Groundwater contaminated by organic chemicals.
Restrictions:
All new groundwater use within the site boundary requires a permit.
Zone 1+2: no new wells
Zone 3: no new wells over 10 gpm.
Zone 4: now new wells over 200 gpm.
All permitted new wells will be sampled for specific contaminants.
All permitted new potable water supply wells must meet drinking water standards.
New wells which do not meet the conditions of the order must be abandoned.
Warm Springs Pond (near Opportunity)
Purpose: Groundwater contaminated by metals and arsenic.
Restrictions:
Closed to all appropriations of ground water within 40 feet of ground surface.
Wells greater than 40 feet deep must be constructed with grouted conductor casing to 40 ft and must be terminated and sealed in a minimum 6 foot thick clay aquitard.

2.4 Key hydropower and instream flow for fisheries water rights which limit legal water availability

As discussed in section 2.2.1., evaluation of adverse effects from a new water right permit or change in appropriation is a site specific analysis. In the Clark Fork Basin there are several major hydropower water rights and State of Montana instream flow water rights which appropriate the entire flow of rivers during certain times of the year. These water rights are referred to here as limiting water rights because they limit legal availability of water for new and changed water uses. What this means for other water users is that depletions to river flow from new water uses and from changes to existing water rights must be mitigated so that these hydropower and instream flow water rights are not adversely effected during those periods when the entire flow of the river is appropriated. This presents a significant constraint to new water uses considering that water right changes, such as changing irrigation water rights to mitigation, that reduce late fall and winter return flows may not be possible.

2.4.1 Limiting hydropower water rights

Major hydropower water rights affect legal availability in these basins:

- Flathead Basin below Kerr Dam: Noxon Rapids Dam
- Clark Fork River Basin above the Flathead River, including the Bitterroot and Blackfoot: Noxon Rapids Dam
- Flathead Basin above Kerr Dam: Kerr Dam
- Swan Basin above Bigfork Dam: Bigfork Dam

Each of these hydropower water rights are described further below.

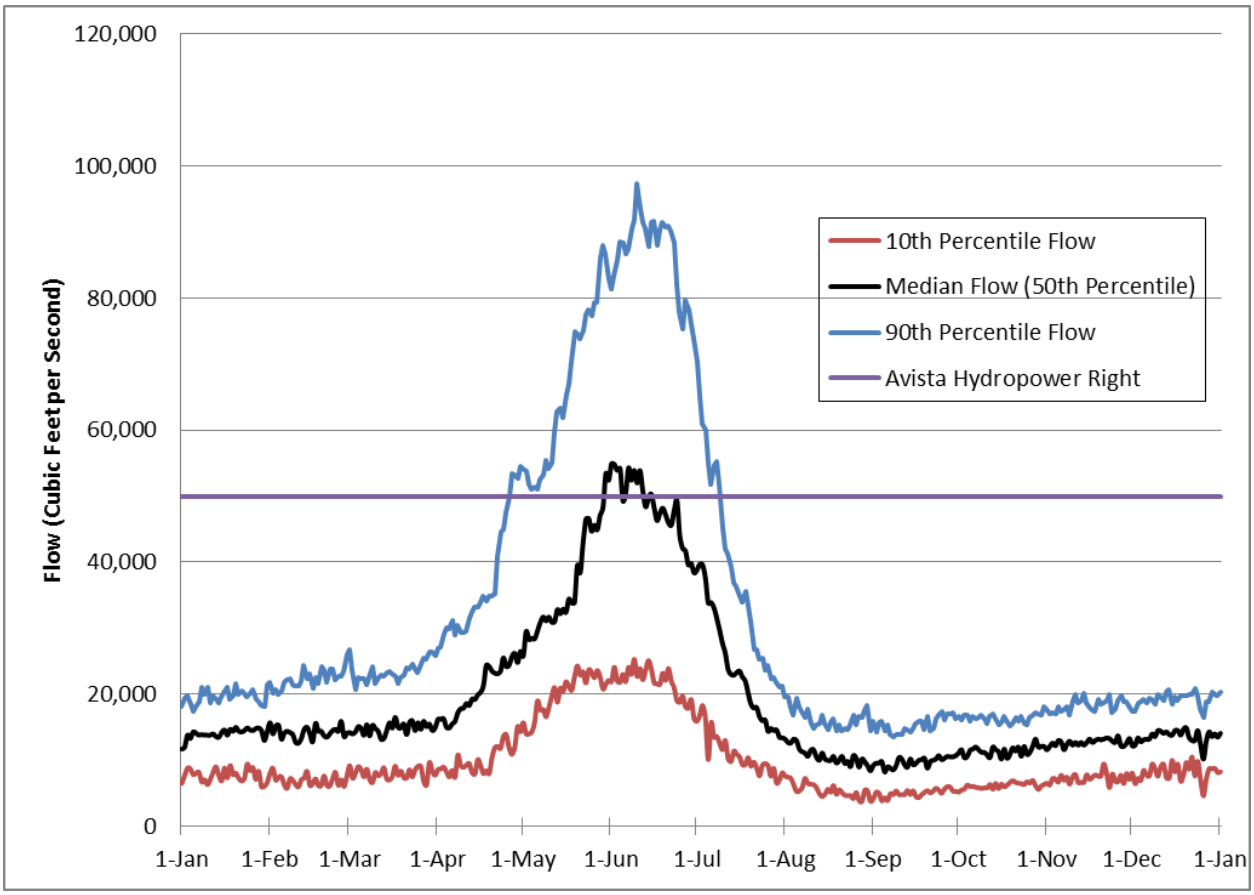
Noxon Rapids Dam

Water rights owned by Avista 76N 4189 00 (15,000 cfs), 76N 125799 00 (35,000 cfs), 76N 211889 00 (5,400 cfs), combined not to exceed 50,000 cfs.

These water rights are a major consideration for legal availability in the Clark Fork Basin above Noxon Reservoir and below Kerr Dam, including the Bitterroot, Blackfoot, and Upper Clark Fork (see DNRC 2008 and 2009 Memos for further explanation). Table 1 in section 2.1.2 gives further details on areas where the Noxon Rapids Dam water right is a consideration for adverse effects.

Water is only legally available above Avista's water right when streamflow is over 50,000 cfs at Noxon Rapids Dam (figure 7). Flows exceed 50,000 cfs most often during May and June, and potentially in April and July. Water use outside of periods when flows exceed 50,000 cfs must be mitigated on an annual basis (see DNRC 2008 and 2009 Memos). Flows do not rise above 50,000 cfs every year making the legal availability of water unreliable from year to year. New water uses which require a reliable annual water supply, such as municipal and residential uses, are unlikely to be able to use this unallocated water for their supply and will have to find a mechanism to mitigate depletions to the Clark Fork River at Noxon Rapids Dam.

Figure 7. Clark Fork River daily streamflow and Avista Noxon Rapids Dam water right (USGS gage 12391400, period of record 1961-2012).



Kerr Dam

These water rights are owned by NorthWestern Corporation. Confederated Salish and Kootenai Tribe will take ownership on Sept, 5 2015. 76L 94408 00 (14,540 cfs) for power generation and 76L 94409 00 (614,700 second foot days) for storage.

This water right is a consideration for legal availability in the Flathead River Basin above Kerr Dam. Table 1 in section 2.1.2 gives further details on areas where the Kerr Dam water right is a consideration for adverse effects.

Currently NorthWestern and the Confederated Salish and Kootenai Tribes jointly operate Kerr Dam. The two claimed water rights for Kerr Dam are for 14,540 CFS up to 614,200 AF for power generation, and a volume of 614,700 second foot days for storage for power generation which is equivalent to 1,217,106 AF. (A second foot day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours).

Current DNRC policy states that Flathead Lake is managed to keep a full pool of water during the late spring and summer months and must accommodate many management factors including, but not limited to federal licensing (Flathead Lake levels required by FERC (Federal Energy Regulatory

Commission) for fish and recreation, instream flow requirements, flood control, and irrigation needs. Records show that Kerr Dam's reservoir, Flathead Lake, consistently obtains a full pool status each year. At the claimed flow rate of 14,540 CFS flowing 24 hours per day, both claimed water rights, the direct flow hydropower right and storage for hydropower water right, can be fulfilled over a period of 64 days. DNRC policy states that pending an adjudication of Kerr Dam hydropower water rights and completion of a water availability study that shows otherwise, that water above Kerr Dam can reasonably be considered legally available. Legal availability of water above Kerr Dam is discussed further in Franz (2003) and DNRC (2010b).

Bigfork Dam

Water rights owned by Pacific Power and Light Company: 76K 212312 00 (63.70 cfs), 76K 212313 00 (75.40 cfs), 76K 212314 00 (121.20 cfs), 76K 212315 00 (216.70 cfs), 76K 212316 00 (194.10 cfs), combined 671.1 cfs.

This water right is a consideration for legal availability in the Swan River Basin above Bigfork Dam. The DNRC does not have an official policy regarding new appropriations In the Swan River Basin and mitigation of river depletions when flows are less than 671.1 cfs. There is also no streamflow gage which is representative of the flow at the dam for comparison; the nearest USGS gage 12370000 is near Swan Lake and above significant tributaries and inflow. DNRC approves small domestic and lawn and garden permit applications for surface water and groundwater in the Swan River Basin. Given this it is not clear exactly how this water right effects legal availability of water above Bigfork dam; this uncertainty lends considerable risk to those applying for permits for new uses because an application for a new permit above Bigfork Dam is subject to potential objection by the dam owner.

2.4.2 Limiting instream flow water rights held by the State of Montana

The State of Montana holds instream flow water rights which affect legal availability in the following basins:

- Bitterroot River
- Flathead River
- Blackfoot River
- Rock Creek (tributary to Clark Fork River)
- Young Creek (tributary to Flathead River)
- Former Milltown Dam Water Right (Blackfoot and Upper Clark Fork)

These instream flow water rights are described further below.

Bitterroot River

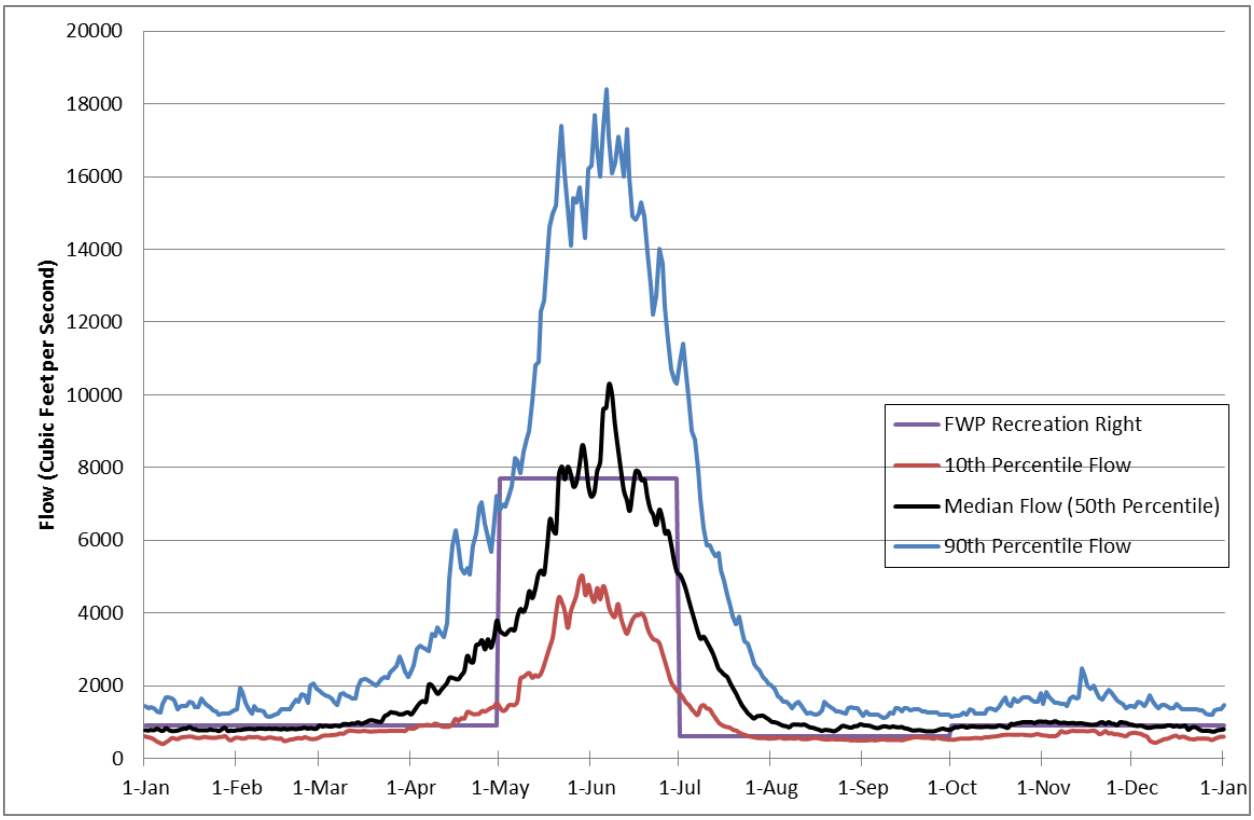
FWP holds instream flow for recreation water rights for three reaches of the mainstem Bitterroot River (table 8). In 1979 the Montana legislature conferred on FWP the responsibility to represent the public in establishing any prior and existing public recreation uses in water right determinations. The flow rate and volumes of these FWP claims are linked to fish habitat needs, and the recreational use is primarily fishing and recreational floating.

Figure 8 compares Bitterroot River flow to the FWP recreation water right for Reach 1. Water is legally available only when streamflow is greater than the FWP water right. FWP appropriates the entire median flow of the Bitterroot River from approximately October 1 until mid-March and also during much of May through the end of June. What this means for other water users is that changes to the Bitterroot River flow from new water uses and from changes to existing water rights must be mitigated so that the river is not depleted during those periods. This presents a significant constraint to new water uses considering that water right changes which reduce late fall and winter return flows would not be authorized because it would likely adversely affect this instream flow water right. Adverse effects could be mitigated through an appropriate mitigation or aquifer recharge plan.

Table 8. FWP Bitterroot instream flow for recreation water rights.

Claim Number	Priority date	Period of use	Seasonal Use	Flow (cfs)	Volume (acre feet)
Bitterroot River Reach 1 (Confluence with the Clark Fork River upstream to the Stevensville Bridge)					
76H 151313 00	7/1/1970	10/1 to 4/30	(winter)	900	378,356
76H 151306 00	7/1/1970	5/1 to 6/30	Spring Runoff - 1 day channel flow @ 15,000 cfs	15,000	29,745
76H 151311 00	7/1/1970	5/1 to 6/30	Spring Runoff - 60 days channel flow @ 7,700 cfs	7,700	916,146
76H 151312 00	7/1/1970	7/1 to 9/30	(Summer Period)	600	109,462
Bitterroot River Reach 2 (Stevensville Bridge up stream to confluence with Sleeping Child Creek)					
76H 151316 00	7/1/1970	10/1 to 4/30	(Winter)	500	210,198
76H 151309 00	7/1/1970	5/1 to 6/30	Spring Runoff - 1 day channel flow @ 11,000 cfs	11,000	21,813
76H 151310 00	7/1/1970	5/1 to 6/30	Spring Runoff - 60days channel flow @ 5,500 cfs	5,500	654,390
76H 151305 00	7/1/1970	7/1 to 9/30	(Summer Period)	300	54,731
Bitterroot River Reach 3 (From the confluence with Sleeping Child Creek upstream to the confluence of E. & West Forks)					
76H 151314 00	7/1/1970	10/1 to 4/30	(Winter)	350	147,139
76H 151307 00	7/1/1970	5/1 to 6/30	Spring Runoff - 1day channel flow @ 11,000 cfs	6,000	11,898
76H 151315 00	7/1/1970	5/1 to 6/30	Spring Runoff - 60 days channel flow @ 5,500 cfs	3,000	356,940
76H 151308 00	7/1/1970	7/1 to 9/30	(Summer Period)	250	45,609

Figure 8. Bitterroot River near Missoula median daily flows and FWP instream flow for recreation water right for reach 1 (USGS Gage 12352500, period of record 1899-2012).



Flathead River

FWP holds instream flow for fisheries "Murphy" water rights for seven reaches of the mainstem Flathead River, and South, Middle, and North Forks (table 9). Murphy Rights are named after Montana Legislator James E. Murphy. Murphy rights are associated with the instream flow protections bill that became law in 1969 and placed protections on unappropriated waters on twelve blue ribbon trout streams in Montana. Instream flow Murphy rights typically change with typical streamflow throughout the water year to reflect increased instream flow rights during runoff and decreased rights during base flows.

These instream flow for fisheries water rights are a consideration for legal availability in the Flathead River Basin; table 1 in section 2.1.2 shows that these FWP instream water rights limit legal availability in the North and Middle Fork Flathead River.

Table 9. FWP Murphy instream flow for fisheries water rights in the Flathead River.

Claim Number	Priority date	Period of use	Flow (cfs)	Volume (acre feet)
Flathead River				
Reach: Flathead Lake to South Fork				
76LJ 147037	12/22/1970	8/1-4/15	3,500	1,790,649

Claim Number	Priority date	Period of use	Flow (cfs)	Volume (acre feet)
76LJ 147036	12/22/1970	4/16-4/30	6,650	197,804
76LJ 147039	12/22/1970	5/1-7/15	8,125	1,224,502
76LJ 147038	12/22/1970	7/16-7/31	5,402	171,395
Reach: confluence of South Fork to Middle Fork				
76LJ 147029	12/22/1970	10/1-3/31	1,950	703,767
76LJ 147034	12/22/1970	4/1-4/15	2,100	62,465
76LJ 147032	12/22/1970	4/16-4/30	3,597	106,993
76LJ 147031	12/22/1970	5/1-7/15	5,000	753,540
76LJ 147033	12/22/1970	7/16-7/31	3,945	125,167
76LJ 147030	12/22/1970	8/1-9/30	2,100	254,022
Middle Fork Flathead River				
Reach: Mouth to Bear Creek				
76I 134927	12/22/1970	8/1-4/15	850	434,872
76I 134926	12/22/1970	4/16-4/30	1,831	54,463
76I 134929	12/22/1970	5/1-7/15	2,325	350,396
76I 134928	12/22/1970	7/16-7/31	1,904	60,410
North Fork Flathead River				
Reach: Middle Fork to Bowman Creek				
76LJ 147035	12/22/1970	10/1-3/31	988	356,395
76LJ 147025	12/22/1970	4/1-4/15	1,400	41,643
76LJ 147026	12/22/1970	4/16-4/30	1,766	52,530
76LJ 147027	12/22/1970	5/1-7/15	2,625	395,609
76LJ 147028	12/22/1970	7/16-7/31	2,041	64,757
76LJ 147024	12/22/1970	8/1-9/30	1,400	169,348
Reach: Bowman Creek to Canadian Border				
76LJ 147018	12/22/1970	10/1-3/31	625	225,566
76LJ 147023	12/22/1970	4/1-4/15	750	22,309
76LJ 147021	12/22/1970	4/16-4/30	1,100	32,720
76LJ 147022	12/22/1970	5/1-7/15	1,500	226,062
76LJ 147020	12/22/1970	7/16-7/31	1,279	40,580
76LJ 147019	12/22/1970	8/1-9/30	750	90,722
South Fork Flathead River				
Reach: Hungry Horse Reservoir to Powell County Line				
76J 134970	12/22/1970	10/1-3/31	600	216,544
76J 134969	12/22/1970	4/1-4/15	700	20,822
76J 134973	12/22/1970	4/16-4/30	1,180	35,099
76J 134972	12/22/1970	5/1-7/15	1,750	263,739
76J 134971	12/22/1970	7/16-7/31	943	29,920

Claim Number	Priority date	Period of use	Flow (cfs)	Volume (acre feet)
76J 134968	12/22/1970	8/1-9/30	700	84,674
Reach: Powell County Line to Headwaters				
76J 179244	1/7/1971	4/1-9/30	270	97,980
76J 179245	1/7/1971	10/1-3/31	100	36,091

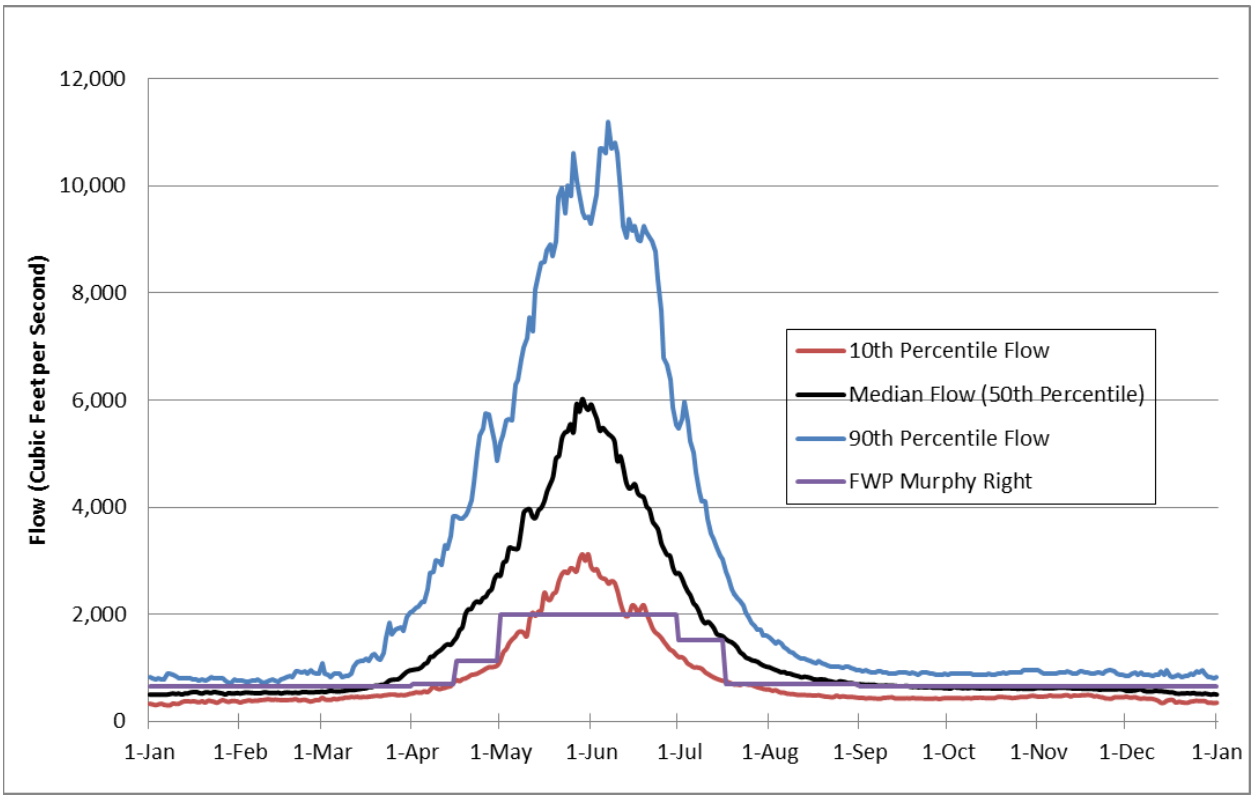
Blackfoot River

FWP holds instream flow for fisheries "Murphy" water rights for two reaches of the mainstem Blackfoot River (table 10). Figure 9 compares Blackfoot River flow to the FWP Murphy water right for the reach from the mouth to Clearwater River. Water is legally available only when streamflow is greater than the FWP water right. FWP appropriates the entire median flow of the Blackfoot River from approximately mid-September until mid-March. What this means for other water users is that changes to the Blackfoot River flow from new water uses and from changes to existing water rights must be mitigated so that the river is not depleted during those periods. This presents a significant constraint to new water uses considering that water right changes which reduce late fall and winter return flows would not be authorized because it would likely adversely affect this instream flow water right. Adverse effects could be mitigated through an appropriate mitigation or aquifer recharge plan.

Table 10. FWP Murphy instream flow for fisheries water rights in the Blackfoot River.

Claim Number	Priority date	Period of use	Flow (cfs)	Volume (acre feet)
Reach: Mouth to Clearwater River				
76F 098984	1/6/1971	9/1-3/31	650	273,257
76F 098985	1/6/1971	4/1-4/15	700	20,822
76F 098988	1/6/1971	4/16-4/30	1,130	33,612
76F 098987	1/6/1971	5/1-6/30	2,000	241,926
76F 098989	1/6/1971	7/1-7/15	1,523	45,302
76F 098986	1/6/1971	7/16-8/31	700	65,241
Reach: Clearwater River to North Fork				
76F 149464	1/6/1971	9/1-3/31	360	151,343
76F 149463	1/6/1971	4/1-4/30	500	29,745
76F 149465	1/6/1971	5/1-5/15	837	24,897
76F 149462	1/6/1971	5/16-6/15	1,750	107,578
76F 149461	1/6/1971	6/16-6/30	1,423	42,327
76F 149460	1/6/1971	7/1-7/15	848	25,224
76F 149459	1/6/1971	7/16-8/31	500	46,601

Figure 9. Blackfoot River near Bonner MT median daily flows and FWP instream flow for fisheries Murphy water right (USGS Gage 12340000, period of record 1900-2012).



Rock Creek

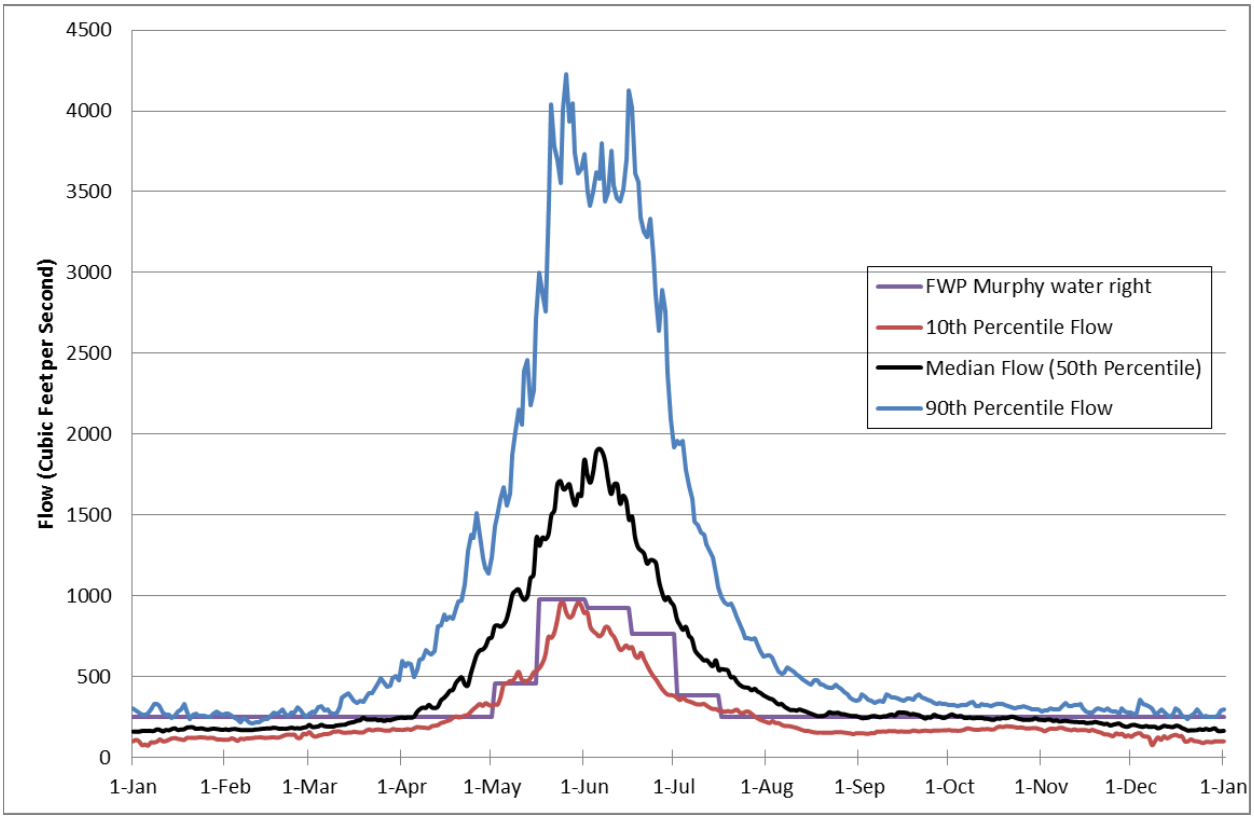
FWP holds instream flow for fisheries "Murphy" water rights for two reaches of Rock Creek (table 11). Figure 10 compares Rock Creek flow to the FWP Murphy water right for the reach from the mouth to Ranch Creek. Water is legally availability only when streamflow is greater than the FWP water right. FWP appropriates the entire median flow of Rock Creek from approximately early-October until early-April. What this means for other water users is that changes to the Rock Creek flow from new water uses and from changes to existing water rights must be mitigated so that the river is not depleted during those periods. This presents a significant constraint to new water uses considering that water right changes which reduce late fall and winter return flows would not be authorized because it would likely adversely affect this instream flow water right. Adverse effects could be mitigated through an appropriate mitigation or aquifer recharge plan.

Table 11. FWP Murphy instream flow for fisheries water rights on Rock Creek.

Claim Number	Priority date	Period of use	Flow (cfs)	Volume (acre feet)
Reach: Mouth to Ranch Creek				
76E 133209	1/6/1971	7/16-4/30	250	143,272
76E 133211	1/6/1971	5/1-5/15	454	13,504
76E 133213	1/6/1971	5/16-5/31	975	30,935

Claim Number	Priority date	Period of use	Flow (cfs)	Volume (acre feet)
76E 133214	1/6/1971	6/1-6/15	926	27,544
76E 133212	1/6/1971	6/16-6/30	766	22,785
76E 133210	1/6/1971	7/1-7/15	382	11,363
Reach: Ranch Creek to headwaters				
76E 133219	1/6/1971	7/16-4/30	150	85,963
76E 133216	1/6/1971	5/1-5/15	454	13,504
76E 133217	1/6/1971	5/16-5/31	975	30,935
76E 133215	1/6/1971	6/1-6/15	926	27,544
76E 133208	1/6/1971	6/16-6/30	766	22,785
76E 133218	1/6/1971	7/1-7/15	382	11,363

Figure 10. Rock Creek daily streamflow and FWP Murphy water right (USGS gage 12334510, period of record 1973-2013).



Ashley Creek

FWP has asserted pre-1973 water rights in Ashley Creek for instream flow and fishery use based on intensive pre-1973 management and restoration activities on Ashley Creek near Kalispell (table 12). These Ashley Creek water rights are referred to as "judicially recognized" because the FWP's water right has been up-held in court decisions. These instream flow water rights are a limitation for legal availability in Ashley Creek as shown in table 1 in section 2.1.2.

Table 12. FWP judicially recognized water rights to Ashley Creek.

Claim Number	Priority date	Use	Period of use	Flow (cfs)	Volume (acre feet)
76L 122355	3/6/1897	Maintain Water Quality (Pollution Abatement)	1/1-12/31	35	1908
76L 122356	3/6/1897	Fish & Wildlife	1/1-12/31	35	9540

Former Milltown Dam

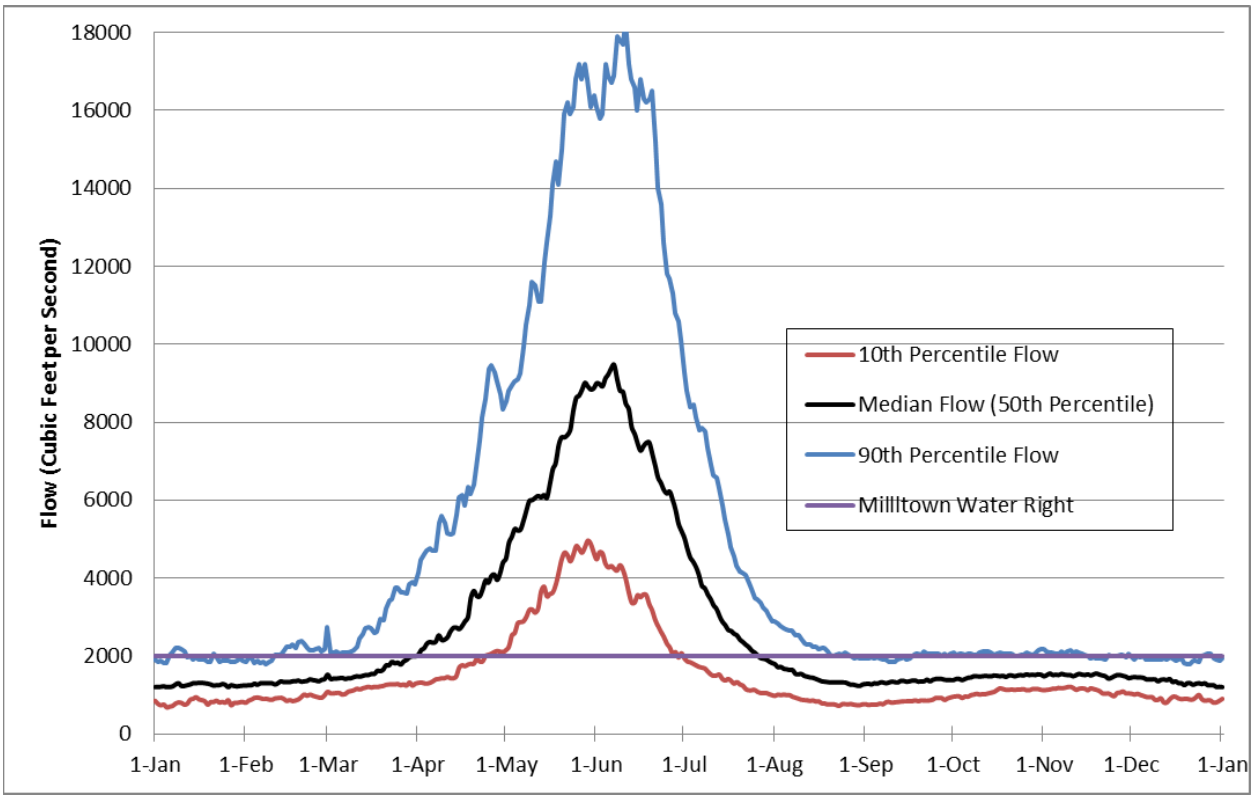
Water rights owned by State of Montana, Department of Justice: 76M 94404 00 (2000 cfs), 76M 94405 00 for storage (flow rate and volume undetermined).

This water right is a significant consideration for legal availability in the Upper Clark Fork Basin and Blackfoot River above the former Milltown Dam. This water right was transferred to the State of Montana for change to use as instream flow for fisheries when the former dam was removed. The water right has a December 11, 1904 priority date and junior surface water appropriators upstream on the Blackfoot and Upper Clark Fork may be called to reduce water use to fulfill this water right.

Figure 11 compares Clark Fork River flow to the Milltown water right. Water is legally available only when streamflow is greater than the water right. This water right appropriates the entire median flow of the Clark Fork River from approximately late-July until late-March. The State of Montana has indicated they will enforce the 2,000 cfs water right in legal availability analyses for water right permits and would likely object to a new appropriation or permit change which depletes flows during the period when the river is fully appropriated by this water right. What this means for other water users is that changes to the Clark Fork River flow from new water uses and from changes to existing water rights must be mitigated so that the river is not depleted during those periods. This presents a significant constraint to new water uses considering that water right changes which reduce late fall and winter return flows would not be authorized because it would likely adversely affect this instream flow water right. Adverse effects could be mitigated through an appropriate mitigation or aquifer recharge plan.

This water right will also be changed by the Confederated Salish and Kootenai Tribes of the Flathead Reservation Compact. Details of the changes will affect legal availability of water in the Blackfoot and Upper Clark Fork as described in appendix 30 and 31 of the Compact. The Compact passed the 2015 Montana Legislature, but awaits ratification by U.S. Congress and the tribes, a process which may take years.

Figure 11. Clark Fork River above Missoula median daily flows and Milltown Dam instream flow water right (USGS Gage 12340500, period of record 1930-2013).



3. Three Example Scenarios of New Water Use and Mitigation Options

Three theoretical scenarios of new water use in the Clark Fork Basin were selected to investigate how the water use impacts streamflow and to evaluate potential mitigation options. Each scenario represents a typical new water use which would require a DNRC permitting action.

The three scenarios are as follows:

1) A new municipal well in the Bitterroot Basin (Bitterroot Valley). This scenario investigates depletions to the Bitterroot River caused by both the new well as well as changing the irrigation water right and evaluates potential mitigation and aquifer recharge options.
2) A new subdivision well in the Middle Clark Fork Basin (Missoula Valley). This scenario investigates depletions to the Clark Fork River from the new well, potential mitigation, and effects on the river.
3) A water right change from irrigation to instream flow for fisheries for fisheries in the Deer Lodge Valley. This scenario investigates changes to instream flow for fisheries, potential mitigation of changes in return flow, and effects on the river.

A description of each scenario and results of modeling different mitigation options are provided below. The evaluation of mitigation options is separated into those which work to successfully offset depletions from each scenario and those which do not work and leave a river depleted when water is not legally

available. Complete details of the scenarios, modeling, and legal availability analyses are provided in attachment 1 to this report.

3.1 New municipal well in the Bitterroot alluvial aquifer

3.1.1 Description

This scenario represents a new municipal well needed to expand service to an existing municipality water service area in the Bitterroot Valley. This example evaluates the effects of this new use on the Bitterroot River and five potential mitigation options.

The new municipal service area is a 125 acre residential/commercial development with 100 single family homes with ¼ acre of lawn and garden each, 1 church, 1 school, 1 store, and one 5 acre park. The water is pumped from a well in the shallow Bitterroot alluvial aquifer which is the productive aquifer at shallow depths below the ground surface in the Bitterroot Valley. The well is located 5300 ft from the Bitterroot River. The development uses a community wastewater system with a drainfield which returns treated wastewater to the shallow aquifer.

The theoretical development is constructed on ground where 100 acres was formerly irrigated with a wheel-line sprinkler system and the irrigation water right is retired and used for mitigation and aquifer recharge of depletions to the Bitterroot River caused by the new municipal well.

The new well depletes flows in the Bitterroot River because it captures groundwater which discharges to the river. Additionally, changing the irrigation water right for the property also depletes the river due to reduced return flows in the absence of a mitigation plan. Depletions to the river must be mitigated during all months of the year because new water is not legally available due to existing water rights. During the irrigation season the river is over-allocated to many different water users. The main limiting water rights outside of the irrigation season is FWP's instream flow for recreation water right on the Bitterroot River and Avista's hydropower water right for Noxon Rapids Dam.

3.1.2 Bitterroot municipal well mitigation and aquifer recharge options evaluated

Option #1. Aquifer recharge is used to offset depletions from pumping the new well and also to generate extra mitigation marketing water which can be sold or used for additional new uses. The new well is used for both domestic and irrigation purposes. Aquifer recharge uses 100% of the former irrigation consumptive use and a portion of on-farm efficiency losses infiltrated using a large drainfield.
Option #2. The historic irrigation water right from a ditch is used for lawn and garden irrigation. The new water supply well is used only for indoor use. Aquifer recharge is used to mitigate depletions from the new well and from changes in return flow lost from the irrigated area developed using a small drainfield.
Option #3. Aquifer recharge is used to offset depletions from the new well by infiltrating using a large drainfield the minimum amount of water needed to offset depletions to the Bitterroot River which cause adverse effects. The new well is used for both domestic and irrigation purposes.
Option #4. Depletions from the new well use are mitigated by leaving the former irrigation water instream in the river. The new well is used for both domestic and irrigation purposes.

Option #5. Aquifer recharge is used to mitigate depletions from the new well by infiltrating using a constructed wetland the minimum amount water needed to offset depletions to the Bitterroot River which cause adverse effects. The new well is used for both domestic and irrigation purposes.

Bitterroot municipal well mitigation options which work

Options 1, 2, 3, and 5 which all use aquifer recharge are capable of providing a recharge plan which offsets depletions to the Bitterroot River and mitigate adverse effects. The results of each option are described below.

Option #1: Using a drainfield to recharge 100% of the formerly consumed irrigation water both mitigates depletions to the Bitterroot River from the new well pumping and creates extra mitigation marketing water year-round in the amount of ~6 AF per month. This is a significant quantity of mitigation marketing water that could be sold or used for another residential development of larger size than the one proposed for this scenario. Mitigation also requires infiltrating formerly non-consumed water (field loss) to mitigate change in return flow. Assuming the soil is a loamy sand this would require a 1.4 acre drainfield with a maximum flow rate 314 gpm.

Option #2: Uses the existing irrigation water right for lawn and garden and a new well for indoor use. The new well has an annual diversion of 31.6 AF and does not qualify for exemption from permitting and will require aquifer recharge to mitigate year-round depletions from new well. Recharging 1.3% of the historically consumed irrigation water using a drainfield mitigates depletions to the Bitterroot River from the new well pumping. Mitigation also requires infiltrating a significant quantity of formerly non-consumed water (field loss) to mitigate changes in return flow. Assuming the soil is a loamy sand this would require a 0.2 acre drainfield with a maximum flow rate 50 gpm.

Option #3: Using a drainfield to recharge 43% of the formerly consumed irrigation water mitigates depletions to the Bitterroot River from the new well pumping. Mitigation also requires infiltrating formerly non-consumed water (field loss) to mitigate change in return flow. Assuming the soil is a loamy sand this would require a 0.8 acre drainfield with a maximum flow rate 172 gpm.

Option #5: Using a 1.39 acre wetland to recharge 45% of the formerly consumed irrigation water mitigates depletions to the Bitterroot River from the new well pumping. Mitigation also requires infiltrating formerly non-consumed water (field loss) to mitigate change in return flow. A wetland requires additional water above that used for aquifer recharge to compensate for evaporation and wetland pool filling. Wetland evaporation requires 3.14 AF of water annually and pool filling requires 0.7 AF of water annually. The biggest challenge for this option will be engineering a wetland which both holds water where needed to support a perched water table and pool for wetland vegetation and which also leaks enough to provide the necessary aquifer recharge. Engineering may actually be easier to accomplish if the wetland drains to a drainfield to provide the aquifer recharge. Otherwise, the owner will have to ensure that the wetland does not build up fine material and organics which plug the wetland bed and prevent recharge. A wetland can generate Section 404 compensatory mitigation credits which can be sold to offset jurisdictional wetlands impacted by private and government projects.

Bitterroot municipal well mitigation options which do not work

Option #2 which uses instream mitigation does not work because it is not possible to offset non-irrigation season depletions to the Bitterroot River without aquifer recharge.

Option #2: This option leaves the Bitterroot River depleted from October through April because instream mitigation is only possible during the irrigation season period of use of the irrigation water right changed to mitigation. Montana FWP hold instream flow for recreation water rights in the Bitterroot River. The FWP water right appropriates the entire flow of the Bitterroot River during January, February, October, and December (see section 2.4.2 for a complete description of how this FWP water right limits water availability). Therefore aquifer recharge is required to mitigate the FWP water right.

3.2 New subdivision well in the Missoula Valley Aquifer

3.2.1 Description

This scenario represents a new large subdivision development that will require a multiple domestic water right/lawn and garden water right. This example evaluates the effects of this new use on the Clark Fork River and three potential mitigation options.

This is a 250.5 acre development with 300 single family homes in the Missoula Valley in between Missoula and Frenchtown. Irrigation includes ¼ acre per home and a 25.5 acre park and field common area. The development is on ground which was not historically irrigated. The water supply well is 2600 ft from the Clark Fork River. The development uses a community wastewater system with a drainfield which returns treated wastewater to the shallow aquifer.

This example shows the different challenges a new water user faces in obtaining a permit for a new well in a basin that is still open to new water right applications, where the main limitation on new water use is mitigating Avista's water right for hydropower at Noxon Rapids. Avista has the ability to store water behind Noxon Dam which allows DNRC to issue permits where new water uses are mitigated on an annual basis, not monthly as is done for permits in closed basins. This makes it easier to retire irrigation water, or other seasonal water rights, and use the saved water to mitigate the new water use. Typically an aquifer recharge plan is not needed, and the expense of construction, operation, and maintenance of a recharge system is avoided.

3.2.2 Missoula Valley Subdivision well mitigation options evaluated

Option #1. Instream mitigation using an irrigation water right changed to mitigation.
Option #2. Instream mitigation using purchased mitigation credit from a mitigation marketing water right.
Option #3. Instream mitigation by storing spring flows when water is legally available in a lined pond and releasing water for mitigation.

Missoula Valley subdivision well mitigation options which work

The new subdivision well depletes the Clark Fork River year-round, but water is not limited in the Clark Fork at this location with the exception of the Avista hydropower water right for Noxon Rapids Dam which can be mitigated on an annual time-scale. Options #1 and #2 which provide mitigation water

both offset depletions to the Clark Fork River on an annual timescale and mitigate adverse effects. The results of each option are described below.

Option #1: Retiring 155 acres of irrigated hay will reduce consumptive use by 175 AF per year, sufficient to offset the new subdivision's consumptive use. Retiring 155 acres of irrigated hay, processing a water right change to mitigation, and leaving the formerly diverted water instream will mitigate adverse effects to Avista.

Option #2: Alternatively the developer can purchase mitigation marketing water which is available on the private market in the amount of 175 AF per year.

Missoula Valley subdivision well mitigation options which do not work

Option #3: Storing 2-years supply of mitigation water requires a 472 AF reservoir. To accomplish this, a 20 acre reservoir would be 23.6 ft deep. A reservoir has significant evaporation which is part of the reason such a large reservoir is needed. The cost of constructing a reservoir this large and the land base it would use do not make this a feasible option. An additional factor is water is not legally available for storage every year. Storing 2-years supply gives some buffer for years when water is not legally available; however the water supply for the subdivision would not be guaranteed for droughts which are longer than 2 years. Residential development, and people's need for water for basic needs, cannot rely on such an unreliable water supply.

3.3. Water right change from irrigation to instream flow for fisheries in the Deer Lodge Valley.

3.3.1 Description

This scenario is a change from irrigation to instream flow for fisheries in the Upper Clark Fork. This example evaluates the effects of this change in water use on the Clark Fork River and three potential water right change options.

In this scenario, a portion of a center pivot which irrigates a 290 acre field will be taken out of production and the saved water will be changed to an instream flow water right for fisheries. The hay field was 310 acres of flood irrigated pasture grass prior to July 1, 1973 when historic use is evaluated. The irrigation practice was changed to center pivot in the early 1990's and the irrigated area was decreased to 290 acres as the pivot does not reach the lower field corners. The irrigated field runs parallel to the river with the lower edge of the field located 2700 ft from the Clark Fork River. The ditch which supplies the field will continue to provide water to other irrigators and no change in ditch efficiency is proposed.

Water right changes from irrigation to instream flow for fisheries can be used to change the former consumptive evapotranspiration use by the crop to protectable instream flow below the point of diversion (§85-2-408, MCA). We call these changes "protectable" instream flow because it is backed by a water right and junior appropriators can be called to make sure the water remains instream.

This example shows the challenges which are faced when performing a change application for irrigation water rights which have been changed from flood to pivot sprinkler. The pivot sprinkler is inherently more efficient leading to greater consumptive use of water by the crop and greatly reduced return flow

from field loss. So long as there is no expansion of historic use and irrigation occurs within a water right's specified place of use, Montana's salvage law, §85-2-419, MCA , allows an irrigator to change from flood irrigation to center pivot irrigation without first obtaining a DNRC water right change permit. *However,* when a water right is changed to a new purpose, such as instream flow for fisheries, Montana law and administrative rules require the water right to be quantified by its historic beneficial use under flood irrigation. This means the increase in consumption associated with the past pivot conversion will need to be factored into the water right change in addition to the actual proposed change of use. The historical flood irrigation use is considered the extent of the water right leading to the requirement for both reducing any expansion in consumptive use with pivot irrigation and a need to mitigate for reductions in return flow.

3.3.2 Evaluation of the existing change in water use for the flood to center pivot change.

The existing change to center pivot in the 1990's changed irrigation water demand and return flow from that which occurred under flood irrigation. The change in water consumption and return flows are described in detail in the modeling report in attachment 1 to this report. To summarize, the maximum diverted flow rate is reduced with center pivot from the historic ditch capacity of 15 cfs to the pivot design flow rate of 4.1 cfs. The higher flood flow rate is required to quickly deliver a flood irrigation application. The center pivot has lower peak demand but will be irrigating for a longer duration each month, leading to a slightly higher total monthly applied volume.

Consumptive crop water use increases with center pivot in all months except September due to the greater uniformity and better timing of water application. Over the entire irrigation season, center pivot consumptive use increases by 141% over flood irrigation. With the change to instream flow for fisheries the existing expansion in consumptive use will have to be eliminated by decreasing the acreage under pivot irrigation.

Return flows are significantly reduced in all months but May due to the higher efficiency of the center pivot system. Reduced return flows lead to depletions to the Clark Fork River throughout the year ranging from a low of -0.06 cfs depleted in May to a high of -0.20 cfs in September. This decrease in return flow will also have to be mitigated.

3.3.3 Deer Lodge Valley instream flow for fisheries change options evaluated

Option #1. Retire 50 acres of the current pivot acreage (290 acres) and leave the water applied for that 50 acres instream.
Option #2. Retire sufficient acreage from current center pivot (290 acres) to create a minimum of 0.5 cfs of protectable, formerly consumed instream flow for fisheries during August. Offset changes in return flow with instream mitigation.
Option #3. Retire sufficient acreage from current center pivot (290 acres) to create a minimum of 0.5 cfs of protectable, formerly consumed instream flow for fisheries during August. Offset changes in return flows with aquifer recharge using a drainfield.

Deer Lodge Valley instream flow for fisheries change options which work

The results of each option are described below. The changes in irrigation practice and reductions in return flows lead to depletions of the Clark Fork River outside of the irrigation season. Water is not

legally available in the Clark Fork River during most of the year. Outside of the irrigation season, the limiting water right is the former Milltown Dam hydropower water right, now owned by the State of Montana, which appropriates the entire flow of the Clark Fork River at Milltown from August through March (see section 2.4.2 for a complete description of how the Milltown water right limits water availability). Because depletions have to be offset outside of the irrigation season, when mitigating with an irrigation water right it is necessary to use aquifer recharge to provide year-round accretions to the river.

Option #3: This option retires 166 acres of center pivot irrigated alfalfa and creates 0.54 cfs of protectable instream flow for fisheries during July, 0.5 cfs during August, and 0.39 cfs during September. Under this option, permitting laws and administrative rule require the applicant to recreate the historic return flow pattern under flood, even though those return flows haven't existed for decades. Doing this requires a huge volume of water to be recharged. Assuming the soil is loamy sand a drainfield of 1.6 acres in size with a maximum flow rate 359 gpm would be necessary. The costs and engineering challenges of this recharge system would be significant.

Deer Lodge Valley instream flow for fisheries change mitigation options which do not work

Options #1 and #2 which seek to change the irrigation water right to instream use alone do not offset depletions to the Clark Fork River outside of the irrigation season and would result in adverse effects to the Milltown water right.

Option #1: This option retires 50 acres of center pivot irrigated area. However even with the acreage reduction, consumptive use is increased over the historic flood irrigation due to the higher crop yield and evapotranspiration afforded by center pivot irrigation. This increase in consumptive use represents an expansion of the water right and is not allowed in the water right change. Additionally, the river is depleted during October to May from reduced return flow which would cause an adverse effect to the Milltown water right.

Option #2: This option retires 166 acres of center pivot irrigated alfalfa and creates 0.54 cfs of protectable instream flow for fisheries during July, 0.5 cfs during August, and 0.39 cfs during September. However, reduced return flows are not mitigated outside of the irrigation season because the mitigation plan can only offset depletions to the Clark Fork during the period of use of the irrigation water right changed to mitigation. This too causes an adverse effect to the Milltown water right which would not pass permitting approval.

4. Lessons Learned and Recommendations

Lessons learned

1. Permitting both new water appropriations and changes in use is very complex. Montana water right laws were designed to protect existing water right users under the prior appropriation doctrine. This combined with the fact that many of the Clark Fork Basin's water sources are already over-allocated makes permitting new or changed uses very difficult. Protection of existing water rights requires detailed analyses of potential for adverse effects from new or changed water use and detailed mitigation plans to offset depletions which cause adverse effects.

2. There are a variety of legal constraints to water availability in the Clark Fork Basin including basin closure, controlled groundwater areas, and existing water rights. In many areas of the basin there is no additional legally available water and all new water uses and many changes in use will require mitigation of depletions to streams and aquifers.

3. Designing an effective mitigation plan is site specific and requires evaluating different options. Where water is not legally available, new water uses and some water right changes require mitigation to offset depletions to surface water and potentially to ground water. However, Montana's current water market has limited mitigation marketing water available. This means that mitigation will typically require the water user to obtain and change an existing water right to mitigation or aquifer recharge. The prospective water user will have to consider which water rights are available to change to mitigation and if those water rights can supply sufficient water in the timing, amount, and location needed.

4. Commonly irrigation water right are changed to mitigate a new use which causes year-round depletion, such as most wells. In order to mitigate a year-round depletion with a seasonal irrigation water right an aquifer recharge plan is likely needed. Aquifer recharge plans will need to consider if land is available to accommodate sizing of the recharge system and whether it is possible to convey the recharge water from its source, such as a river, to the recharge system.

5. Aquifer recharge also provides an option to offset depletions using a relatively junior water right. Junior water rights which do not typically provide water during shortages, such as irrigation water rights which are not full service, can be used to provide a source for aquifer recharge. As an example it may be possible to use an irrigation water right which has historically been curtailed by mid-July to provide aquifer recharge which is capable of offsetting depletions year-round. Site specific conditions will determine the viability of this for a particular project.

6. Different areas of the basin have different mitigation requirements. The drier and more developed basins including the Bitterroot, Blackfoot, Rock Creek, Flint Creek, and Upper Clark Fork typically require mitigation of depletions during much of the year. In these basins, mitigation of year-round depletions is not possible with an irrigation water right unless aquifer recharge or stored water can be used to mitigate depletions outside of the irrigation season. In contrast, in the Middle Clark Fork (below the former Milltown Dam), Lower Clark Fork, and Flathead Basin below the Flathead Reservation mitigation of depletions to hydropower water rights is possible on an annual time-scale. Mitigation on an annual time-scale is typically much easier to accomplish as retired irrigation water rights are more likely to be

able to supply the water without aquifer recharge. Additionally it is more likely that mitigation marketing water is available during the time needed.

7. Water right changes from irrigation to instream flow for fisheries face many on the same permitting challenges as new appropriations. Changing irrigation water use will change return flows. Montana law gives other water right holders the right to the conditions of the water source as they existed when they appropriated the water and changes in return flows must be mitigated if they cause depletions which adversely affect other water rights. This means that water right changes from irrigation to instream flow for fisheries may be required to develop aquifer recharge plans to mimic the historic pattern of return flows. This is a significant consideration, both for planning and for the cost of performing instream flow for fisheries water right changes.

8. Opportunities exist to develop aquifer recharge systems to produce mitigation marketing water and sell that water to others. Developers or municipalities who are required to construct aquifer recharge systems for new permits and who own sufficient water rights can engineer those systems to be capable of generating extra mitigation marketing water (see mitigation option #1 for the Bitterroot municipal well mitigation scenario in section 3.1.2). Alternatively, it is possible to develop an aquifer recharge system and mitigation marketing water solely for the purpose of marketing water for sale. In these scenarios, existing water rights would be changed to mitigation marketing and be available for future water uses, while still being used for their existing purpose until the change to mitigation is made.

Modeling recommendations

1. The AWAS model is a good alternative to more complex groundwater models where hydrogeologic conditions are reasonably approximated by AWAS. AWAS computes stream depletion or accretion caused by a well pumping from or recharging to an aquifer hydraulically connected to the stream. The model works well in alluvial aquifer settings where there is a single valley-bottom stream or river and where the alluvial aquifer is hydraulically connected to surface water. The requirement that the aquifer and stream be hydraulically connected is critical. In settings where a stream or river is perched above the water table drawdown from pumping will extend underneath the waterbody and instead draw water from sources other than the perched stream.

2. Modeling performed for new groundwater permit applications should model accretions and depletions due to changes in return flows and mitigation of those return flow changes separately from accretions and depletions due to pumping a new well and mitigation of the new use. Separate accounting in modeling for the water right change and new use is necessary to show that the new use is mitigated entirely with water which was part of the historic consumptive use of the water right being changed. Without separate accounting it becomes difficult to account for whether depletions from a new well use are being mitigated with consumed vs formerly unconsumed water. By law, only the historically consumed portion of a water right may be used to mitigate new consumptive use.

3. DNRC is currently allowing water right applicants to assume wells which pump confined aquifers to have a year-round constant depletion to valley rivers, absent information to show otherwise. In that assumption modeling is not necessary because depletions are assumed to be constant year-round.

Simplifying assumptions such as this will help to make the permitting process more efficient and less costly.

Policy recommendations

1. Additional permit application simplifications would help to lower the costs and streamline the water right permitting process. The water right permitting process is very complex. Adverse effects analyses and mitigation plans typically require extensive hydrologic analyses and evaluation of effects on a great number of existing water rights. Simplifications to these analyses, such as using an analytical model as done in this report, help to reduce the amount of time and money required for permitting. Other options likely exist to increase the efficiency of the required analyses.

2. Additional state assistance for a water marketing system would help to bolster Montana's water market. Currently Montana's water market is in the early stages of development. Mitigation marketing water has an approved water right change from existing uses (e.g. irrigation) and is ready to be transferred for mitigating a new or changed water use. Ideally, Montana will someday have numerous sources of mitigation marketing water and mitigation water for year-round use will be available on the market. Current state law allows individuals to change existing water rights to mitigation marketing; however there is no state-coordinated or assisted process which facilitates this. Water market conditions are not clear and there is considerable risk for the public to invest in the expense of a mitigation marketing water right change when market conditions are so difficult to predict. Due to this, activity in Montana's water market is limited. Additional state involvement in coordinating, funding, or otherwise providing economic incentives to facilitate mitigation marketing or water banking will benefit Montana's water market at this early stage. Efforts to advance Montana's water market will also greatly benefit those seeking water for new uses or changed use.

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