

## **Blackfoot Drought Response Plan Revised September 12, 2008**

### ***Introduction***

Drought is described as a deficiency of precipitation over an extended period of time, usually a season or more that results in shortages of water. Drought is also a normal, recurrent feature of climate that occurs in most climatic zones.

In 2000, the Blackfoot Drought Committee was formalized to coordinate the development and implementation of a voluntary drought response effort in the Blackfoot watershed. The drought response is intended to minimize the adverse impacts of drought on fisheries resources and to aid in the equitable distribution of water resources during low flow summers.

The Blackfoot Drought Response Plan is based on the premise of “shared sacrifice” with the goal that all Blackfoot water users (agricultural, irrigators, outfitters, anglers, recreational users, government agencies, homeowners associations, businesses, conservation groups, and others) voluntarily agree to take actions that will result in water savings and/or the reduction of stress to fisheries resources during critical low flow periods. This approach was selected for several reasons:

- Drought and the management of low flows are a watershed-wide concern;
- Beneficiaries of the drought response effort include interests throughout the watershed;
- The greater benefit to maintaining river flows and sustaining the overall health of the river can only be gained by the cooperative effort of the larger community.

The Blackfoot Drought Plan falls into a more organized, more conservative river restoration and native fish recovery program than other basins in Montana. The Blackfoot approach offers an alternative to angling restrictions and traditional enforcement of Montana Fish, Wildlife and Parks in-stream flow right, while engaging the stakeholders of the Blackfoot Valley in the protection and future conservation of its fisheries. Under the “shared sacrifice” concept, irrigators, outfitters and recreationists have a unique opportunity to have a positive impact on the future and health of the Blackfoot Watershed.

### ***Purpose***

The purpose of the Blackfoot Drought Response Plan is to minimize the adverse impacts of drought on fisheries and to aid in the equitable distribution of water resources during low flow summers.

### ***Areas Covered by the Plan***

This plan covers the Blackfoot River and its tributaries from its headwaters atop the continental divide to its confluence with the Clark Fork River near Bonner, Montana.

### ***The Murphy Right***

Murphy Rights are water rights for in-stream flows created under 1969 legislative authority. Flow evaluations by Montana Fish, Wildlife, and Parks (MT FWP) in the 1960's determined that 700 cubic feet per second (cfs) was the minimal instream flow needed to protect "blue-ribbon" fisheries in the Blackfoot River from severe low flows. These water rights were claimed in the Blackfoot by MT FWP as of January 6, 1971 and were asserted for the reach beginning at the river's mouth upstream to its confluence with the North Fork of the Blackfoot River. This is also known as the Murphy Right Reach.

There are nearly 3,500 water rights of record within the Murphy Right Reach of which 1,270 assert the use of water in excess of 1 cfs. 258 of these water rights are "junior" to the Murphy Right. Although this is a voluntary plan, there are regulatory implications for water users junior to the Murphy Right. As part of this plan, MT FWP has agreed not to initiate a "call for water" under their senior water right (Murphy Right) on junior water users who meaningfully participate in the Blackfoot Drought Response when flows fall below 700 cfs. Junior water users that have not confirmed their participation through the Blackfoot Drought Committee or that do not meaningfully participate in the Blackfoot Drought Response are subject to the Murphy Right "call for water".

### ***Drought: Resource, Social, and Economic Concerns***

Some of the impacts of drought include reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality; and damage to fish and wildlife habitat. In the Blackfoot, drought has also impacted native fish recovery and management efforts.

The 700 cfs minimal instream flow value is based on the concept of the wetted-riffle (the shallow rapids of streams and rivers). Because of the flat shape of a riffle and low angle of the stream bank (in cross-section), once water pulls away from the bank it recedes across the riffle quickly. This process is accelerated at 700 cfs and below for riffles of the lower Blackfoot River.

Riffles are critical because they produce the chlorophyll (plant life) and forage (insects and small fish) that fuels the upper trophic levels (e. g. larger trout) of the ecosystem. In addition to basic river productivity, riffles provide spawning areas and habitat for juvenile trout and forage-fish alike. Entire communities - species ranging from midge to salmonfly, dace, sculpin and juvenile whitefish live in the cracks and crannies of cobbles that form the riffle. This forage base - the grocery list at the lower end of the food chain - sustains predatory species like trout as well as dependent wildlife in the upper food chain. When the wetted-width of the riffle narrows, river productivity rapidly declines and the forage base that sustains thriving trout fisheries is greatly diminished.

As the habitat base shrinks below minimal flows, it sets in motion a series of complex biological processes. These involve increased competition within fisheries communities for food and space; restricted movements between critical habitats (e.g. spawning sites

and refugia); elevated mortality (at all trophic levels) as prey is concentrated; and cold-water communities become vulnerable to temperatures stressors depending on species and location. Juvenile fish are highly vulnerable to habitat loss and related stress and are the first to undergo population-level declines.

As flows decrease, water temperature increases. With elevated water temperature, metabolic rates increase and dissolved oxygen levels decline, pollutants concentrate and fish become more susceptible to pathogens like fungal infections and whirling disease. Although all Blackfoot River trout are cold-water fish, bull trout occupy the coldest waters within the system. Unlike other trout, bulls undergo thermal stress beginning at 60-65°F, above which growth and survival begin to decline. As an obligate cold-water fish, bull trout migrate from the river to cooler tributaries in response to normal summer warming. Unfortunately, many refuge habitats are less than optimal due to riparian alterations and water temperatures of 63-70°F. For other trout species (cutthroat, rainbow and brown trout), temperature stress begins near 70°F with growth and survival at issue between 73–77°F. Depending on location, Blackfoot River temperatures of 70-78°F are common for July-August and place variable levels of stress on the fish.

For those who depend on water and other natural resources for their livelihood, drought can mean the loss of income and jobs. Drought severely limits the amount of water available for crop production and raising livestock. For outfitters and other businesses that depend on visitors to the Blackfoot have to deal with the consequences of declining fish populations and people seeking other areas for fishing and recreational opportunities.

### ***Shared Sacrifice***

The 258 water users junior to the Murphy Right cannot by themselves solve the low flow problem. Additionally, while there are major water users within the Murphy Right Reach, the most concentrated use of water lies upstream of this reach or on major tributaries of the river.

The Blackfoot Drought Response Plan is based on meaningful participation from water users junior and senior to the Murphy Right who voluntarily reduce their collective water use during drought periods in order to maintain critical in-stream flows. The plan seeks as a matter of equity to include junior users, senior users, small users, and large users throughout the entire watershed.

Under the Blackfoot Drought Response Plan, water right holders junior and senior to the Murphy Right are asked to voluntarily reduce water consumption when flows reach pre-determined thresholds. The strategy is to create a “water bank account” through pooling of reductions in water usage. Prior to development of the Blackfoot Drought Response Plan, junior water users were required to stop water withdrawals if MT FWP made a “call for water” in enforcing their water right. The Blackfoot Drought Response Plan offers an alternative to traditional enforcement of the Murphy Right by allowing junior water users who voluntarily reduce their water consumption to match their contribution with those provided by senior water right holders who have also place their water savings in the “water bank”.

The Blackfoot Drought Plan is a basin-wide effort. This allows the opportunity to identify and address stream reaches outside of the Murphy Right Reach where small increases in instream flows could provide significant benefits that are less than predictably protected through a formal call for water. Through the basin-wide pooling of water resources, the end goal of maintaining critical in-stream flows during drought periods can be achieved.

Participation by other interests such as fishing outfitters and local residents is also critical to the success of the plan. Drought, low flows, water temperatures and large increases in angling pressure over the past 15 years, and the associated stress to fish, has compounded concerns for native fish recovery in the Blackfoot. Native fish have a high catchability and mortality rate which is why outfitters and anglers are asked to voluntarily limit fishing hours and/or alter angling techniques on the river and critical recovery streams when pre-determined temperature thresholds are reached. By taking these actions, the angling community helps to reduce stress to fish and increase chances of survival during critical low flow periods.

The “shared sacrifice” approach distributes the impacts of drought and low flow management to all water users as opposed to a single group of water users as is the case with many traditional drought management plans. By working together under the Blackfoot Drought Plan, all water users have a unique opportunity to a positive impact on the future and health of the Blackfoot Watershed.

### ***Blackfoot Drought Committee***

The Blackfoot Drought Committee is charged with the oversight and implementation of the Blackfoot Drought Response Plan and is coordinated through the Blackfoot Challenge. Its membership is comprised of local landowners, irrigators, outfitters, state and federal agents, and members of various conservation organizations.

Oversight of the Blackfoot Drought Response Plan is a continuous process that involves monitoring drought indicators, conducting outreach, and implementation. Activities and timing of activities may change throughout the year depending on conditions and needs but in general the following provides a more detailed description of Committee activities throughout the year:

### **January/February/March**

- The Committee will meet monthly (or more if needed) to monitor drought indicators such as snow pack, precipitation, soil moisture, and the Surface Water Supply Index (SWSI). These indicators help to determine when and whether low flows will occur and ultimately if the Blackfoot Drought Response will be implemented in a given year;
- At least one update (via letter and email) on conditions may be provided to Blackfoot water users during this period.

### **April/May**

- The Committee will meet monthly (or more if needed) to monitor drought indicators such as snow pack, precipitation, soil moisture, SWSI, and spring runoff;
- At least one update (via letter and email) on conditions is provided to Blackfoot water users during this period;
- If drought is predicted based on monitoring of conditions, the Committee will increase outreach activities. Outreach activities may include notices (letters and email) to water right holders on potential for low flows and need for the Drought Response, notices to outfitters and anglers on the potential for high water temperatures and need for the Drought Response; issuing press releases, posting of flyers, signs, and posters; personal communication with water users, and updating the Blackfoot Challenge hosted “Drought Information” web site. If necessary the Committee may also choose to host a public meeting on drought and the need for cooperation.

### **June/Mid-July**

- Committee meetings will increase (typically to once a week) and monitoring focus will shift to stream flows, precipitation, water temperature, and biotic conditions;
- If drought is predicted based on monitoring of indicators, water users will be contacted and asked to confirm their participation in the drought response;
- Outreach activities (letters, emails, personal communication, posters, signs, press releases, web site) continue and are updated with current information to help water users prepare for and respond to drought

### **Mid July/August/September**

- Drought Plan is implemented as described in the “Drought Plan Implementation” section;

### **October/November/December**

- The Committee will host an annual year end meeting to summarize hydrology, drought plan participation; water conserved, and outreach activities. The Committee will also discuss drought plan related issues and possible changes in approaches to drought management at the annual meeting.

### ***Drought Plan Implementation***

The Blackfoot Drought Plan utilizes flow and temperature triggers to determine when drought response measures are necessary. Flows are the primary indicator of drought conditions and determine when specific actions under the Blackfoot Drought Plan will be implemented. All flow triggers described in this plan are as measured at the USGS gage station (#12340000) near Bonner, Montana. While flows will vary throughout the watershed during the year, this site is generally considered to be representative of conditions upstream with respect to biological processes and river productivity.

Water temperatures can also trigger drought response measures. Depending on the conditions of a given year, water temperature can take precedence over flows with respect to certain drought response measures. Water temperatures can vary greatly throughout the watershed and are monitored at various locations. However, no one site is considered to represent conditions throughout watershed.

While the Blackfoot Drought Response Plan is active, the Committee will provide assistance to water users in implementing their drought response/management plans. To the extent allowed by the availability of funding and field staff, the Committee will conduct field checks during implementation of the Drought Response and reviews of at least 10 individual drought response plans each year.

### ***Flow & Temperature Triggers***

The Blackfoot Drought Committee maintains internal rosters of participants and potential participants. For consumptive water users (primarily irrigators), this roster contains the participants name, contact information, and water right data (flow rate, priority date, and water sources). More importantly, the roster contains the participant's drought management plan and an estimate of water conserved. The individual drought management plans have been developed by working with the water user to identify opportunities for water conservation based on individual needs and conditions. Drought management plans vary by participant but common water conservation strategies include pooling water rights and using them in rotation, reducing overall use, reducing instantaneous use, or shutting down. A roster is also maintained for non-consumptive water users (primarily fishing outfitters) which contains names and contact information. These rosters are for Committee use only and are used to track water conserved and quantify success of the Blackfoot Drought Response.

#### **As flows near the 700 cubic feet per second (cfs) trigger, the Committee will:**

- Contact the roster of consumptive water users. Participants are asked to confirm their participation or non-participation in the Blackfoot Drought Response via “response cards”.
- Contact the roster of non-consumptive water users and alert them to the potential need for angling restrictions.
- Implement outreach activities necessary to inform water users and the general public of drought conditions and the need for participation in the Drought Response.

#### **When flows in the Blackfoot River fall to 700 cfs, the Committee will:**

- Notify consumptive water users (primarily irrigators) that the Blackfoot Drought Response is active and request implementation of their voluntary drought management plans.
- Confirm participation by junior water users through response cards, personal communication, and field checks;
- Convene and make recommendations on a “call for water” from non-participating junior water users under the Murphy Right;
- MT FWP, in consultation with the Committee, will issue a “call for water” from non-participating junior water users. Junior water users who receive a “call for water” are ordered to cease water withdrawals;

#### **If flows are below 700 cfs and water temperatures are > 73°F for more than three days at Bonner:**

- MT FWP will issue mandatory afternoon (2:00 pm – 5:00 am) fishing closures.

**As flows near the 600 cfs trigger, the Committee will:**

- Contact the roster of non-consumptive water users to alert them of the potential need for angling restrictions if not already in place or the need for additional angling restrictions.
- Implement outreach activities necessary to inform water users and the general public of drought conditions and the need for participation in the Drought Response.

**When flows in the Blackfoot River fall below 600 cfs, the Committee and MT FWP will:**

- Issue an Angler Alert
- Convene to confirm irrigator in the Drought Response.
- Request additional “calls for water” are made by MT FWP under the Murphy Right.

**If flows in the Blackfoot River fall below 600 cfs and water temperatures are > 71°F for three consecutive days at Bonner:**

- MT FWP will issue mandatory afternoon (2:00 pm – 5:00 am) fishing closures;

**If flows in the Blackfoot River fall below 600 cfs and water temperatures in the North Fork Blackfoot River and Monture Creek > 60°F for three days:**

- MT FWP will issue mandatory afternoon (2:00 pm – 5:00 am) fishing closures on all critical bull trout streams. These include Gold Creek, Belmont Creek, Cottonwood Creek, Monture Creek, North Fork Blackfoot River, Copper Creek, Landers Fork, and Morrell Creek.

**If flows in the Blackfoot River fall below 600 cfs and water temperatures in the North Fork Blackfoot River and Monture Creek > 65°F for three days:**

- MT FWP will issue full, mandatory fishing closures in all critical bull trout streams.

**As flows in the Blackfoot River near 500 cfs, the Committee will:**

- Convene to confirm irrigator in the Drought Response.
- Request additional “calls for water” are made by MT FWP under the Murphy Right.
- Implement outreach activities necessary to inform water users and the general public of drought conditions and the need for participation in the Drought Response.

**If flows in the Blackfoot River fall below 500 cfs:**

- All water users junior to the Murphy Right, including those participating in the Drought Response, must cease junior water right withdrawals to satisfy MT FWP’s in-stream flow right. The Committee will also work with senior water right holders and seek further water conservation measures;
- MT FWP will issue full, mandatory fishing closures on the mainstem Blackfoot River as well as all critical bull trout streams if measures are not already in place.

### ***Agreements Outside of the Blackfoot Drought Response Plan***

In the Blackfoot, there are several cases where individual landowners have entered into agreements with an organization or agency in which management of water is described. These agreements may contain flow triggers that are similar to or the same as flow triggers described in this plan. While increasing in-stream flows is a common goal of the Blackfoot Drought Response and these agreements, they are managed separately. Enforcement of individual agreements is not dependent on implementation or non-implementation of the Blackfoot Drought Response.

### ***The Murphy Right in Non-Drought Years***

There will be years where flows in the Blackfoot River are average or above average and implementation of the Blackfoot Drought Response is not necessary. However, flows below the Murphy Right trigger (700 cfs) are likely even in normal years. As such, Montana FWP retains the right to make a “call for water” on water rights that are junior to the Murphy Right during non-drought years.

### ***The Montana State Drought Plan and Regional Rivers***

Unlike most areas in Montana, the Blackfoot is one of a few basins to have a developed drought management plan. The Blackfoot Drought Response Plan was designed specifically to address drought management in the Blackfoot watershed but operates in coordination with the Montana State Drought Plan and is subject to its regulations and requirements.

Other rivers in the region (Clark Fork River, Bitterroot River, and Little Blackfoot River) rely on the Montana State Drought Plan to dictate water use and fishing restrictions. Mandatory fishing restrictions on these rivers can have the unintended consequence of increasing angling pressure in the Blackfoot putting even more stress on the Blackfoot’s water resources. The reverse is also true. The Committee will maintain close communication with MT FWP on the management of other regional rivers. If mandatory fishing restrictions are requested on other regional rivers, the Committee will meet, review conditions, and may request that mandatory fishing restrictions also be issued on the Blackfoot River and core bull trout recovery streams to protect fisheries and water resources from increased pressure. MT FWP will consider restrictions on the Blackfoot to reduce pressure only if criteria under this plan or the “State” plan are present or imminent.

### ***Ending the Drought Response***

Between early and mid-September, drought pressures and stressors to the Blackfoot’s water resources usually begin to ease with cooler weather and increased precipitation. The Drought Committee, in monitoring conditions and forecasts throughout the summer will, as September approaches, begin to evaluate conditions and develop a recommendation to maintain, lift, or partially lift the voluntary drought response. Unlike other portions of this drought response plan, lifting of voluntary restrictions is not based on a specific flow or temperature trigger (unless flows and temperature recover to implementation triggers). Instead, the determination to maintain or lift the drought response during a given water year is an evaluation of changing water flow, water

temperature, biotic conditions, climatic and soil moisture conditions, irrigation demands, angling pressure, and long-term impacts on the fishery and on the water supply.

Ideally flows in the Blackfoot River near Bonner would be above 650 cfs (the Murphy in-stream flow after September 1<sup>st</sup>) at the Bonner gage station to lift voluntary irrigation measures. If flows recover above the drought plan triggers after the Drought Response has been implemented and appear to be more than short duration change, the Committee will recommend lifting drought response measures. Similarly, the Committee will recommend lifting any temperature induced angling restrictions if water temperatures are below temperature triggers in bull trout recovery streams and mainstem of the Blackfoot River for three consecutive days.

While it is not impossible for flows to recover above the drought plan triggers after implementation of the Drought Response, it has proven to be very unlikely. If flows have not recovered after implementation of the Drought Response, the Drought Committee must consider the short and long term effects of drought and will evaluate the following conditions in its decision to lift or maintain the Drought Response.

- **Climatic Conditions:** Hot and dry weather are likely to increase water demands to maintain soil moisture, crops, and fall/winter pastures. Additionally, hot and dry weather are likely to diminish flows and increase water temperatures. If hot and dry weather persists, maintaining the Drought Response until cooler, wetter weather is predicted may be necessary;
- **Water Demands:** Voluntary irrigation measures enhance river flows by an estimated 50 to 70 cfs each year which has kept flows above the 500 cfs drought plan trigger, maintaining the Drought Response may be necessary. If irrigation demands have declined and flows are likely to stay above the 500 cfs drought plan trigger, or are gaining or stable, lifting the Drought Response may be recommended;
- **Angling Pressure:** Stress to fish during low flows is exacerbated by angling pressure particularly in core bull trout recovery streams and critical biological areas (key spawning, rearing and staging areas, important migration corridors and areas of thermal refugia). If stress to fish from low flows and high water temperatures is likely to increase from angling pressure in these areas, maintaining the Drought Response may be necessary. If flows and water temperatures are trending towards recovery (flow are gaining or stable and temperatures are below 60 °F) and angling is not likely to cause further fish stress, lifting the Drought Response may be recommended;
- **Social/Economic Concerns:** In general, the Drought Response will be lifted between September 1<sup>st</sup> and September 15<sup>th</sup> as overall conditions (flow and temperature) improve and water demands (irrigation and angling pressure) decline. Only under extreme conditions, where resource concerns remain elevated and/or significant impacts from lifting voluntary measures are predicted will the Drought Response be maintained past September 15<sup>th</sup>.