

declines below 175 cfs and largely maintains flows above 200 cfs within the Wise River to Melrose reach. Because flow triggers last year were predicated on readings outside the treatment reach, we recommend that the original DMP reach triggers of ADF's of 250, 200, and 150 cfs be re-established for the DMP actions.

**For Information Contact:**

Randy Smith, BHWC Chairman 406-835-3451  
Noorjahan Parwana, Director 406-782-3682  
[nparwana@bhwc.org](mailto:nparwana@bhwc.org)

**Other Contacts:**

Montana Department of Fish, Wildlife & Parks  
Jim Olsen, Big Hole River Fisheries Biologist –  
406-533- 8451

Montana Drought Monitoring  
406-444-5354

**Internet Resources**

Drought Report  
<http://www.nris.state.mt.us/drought>

USGS Real Time Flow Data  
<http://waterdata.usgs.gov/mt/nwis/current?type=flow>

NRCS Snowpack Monitoring  
<http://www.wcc.nrcs.usda.gov/snow/>

Montana Fish, Wildlife & Parks Closure Policy  
<http://www.fwp.state.mt.us/drought/closurepolicy.asp>  
<http://www.fwp.state.mt.us/drought/default.asp>



*The purpose of the Big Hole Watershed Committee is to seek understanding of the river and agreement among individuals and groups with diverse viewpoints on water use and management in the Big Hole watershed.*

## 2008 Drought Newsletter May, 2008

[www.bhwc.org](http://www.bhwc.org)

### To All Members of the Big Hole Community:

I am writing this Chairman's report as everyone is waiting for spring but winter is not ready to let loose yet. I thought Global Warming meant a warmer earlier spring, but I guess it is just another year that changes the average a little. I remember coming home from college for spring break in the middle of March and spending it on the tractor plowing. This year there are still frozen spots in the field nearing the end of April!

So much for the complaints, but there are bright sides to a late spring! Finally, we will have spring runoff at the appropriate time. We will probably have a larger event this year which will change the river and start the process over again for the next few years. The river moving gravel around is good every once in a while; just like plowing; cleaning fines from the top and aerating the top part of the soil then depositing the fines to start repair of a damaged bank or to start the narrowing of a channel. This allows for all sorts of biological diversity to occur and for Mother Nature to do her thing while we watch. At times patience is not a strong human virtue. The river has been doing its thing for a lot longer than we have been around. Sometimes we can help but sometimes we get in the way too.

Last year brought many challenges to the watershed and the Committee. Once again the dry conditions forced many of us to do things differently, whether we wanted to or not. A lot of the ranching community was short of feed for their livestock; the outfitting community had to cut back in their business; and the general public was not allowed as much recreation as usual because of the dry conditions. There were times when I felt like it was all falling apart and then everyone came together and did what they had to help this resource survive

another year. I know not everyone is happy and not everyone tried to help, but the point is, if we don't tackle this problem together we will all fail. It is the same as everything in life. We all have something to offer; thankfully it's not all the same!

In early April I was contacted by the Montana Stockgrowers Association and the National Cattlemen's Beef Association. I was asked to travel to Washington, DC, and give testimony at a hearing regarding Senate bill 1870 introduced by Senator Feingold from Wisconsin. The legislation is more commonly known as the Clean Water Restoration Act (CWRA). The invitation ultimately came from the Environment and Public Works Committee of the US Senate. I had seen a copy of the legislation earlier in the year and had been concerned about its effect on Montana and agriculture specifically. The call for change is due to two Supreme Court decisions that some say weakened the clean water act. The change in the CWRA is to remove the word "navigable" from the original clean water act and insert "all the waters of the United States". This may seem like a small change but is actually a giant grab for more federal jurisdiction over water. In states like Montana, we have many areas that are wet for short periods of time each year that could be covered by this act. I can only imagine the amount of permits my family would be required to obtain just for normal everyday ranching. Then if you look at what this could do to the cities and counties it becomes overwhelming not to mention the interpretations of the new laws and the lawsuits that would come of this "simple" change. I was assured by the committee leadership that a "savings clause" would take care of all the troubles I outlined in my testimony.

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My opposition is not to clean water. We all want clean water for domestic use as well as livestock, wildlife, and all other uses. My opposition to this legislation comes in the form of a growing bureaucracy that is unable to function and do its job. I pointed out that the agencies, EPA and DEQ, are not able to handle the job and have continued to delay deadlines for TMDL's. We have streams listed that have no impairments, yet we are unable to remove them from the 303d list. My main point was that our Watershed Committee is able to handle these problems more effectively as we already have all the interests at the table. This legislation in effect would eliminate a lot of the agencies from the process as well as alienate them. I urge anyone reading this newsletter to research the legislation, make up your own mind and contact your Senators and Congressman on the issue.

Jim Hagenbarth, Bill Cain, and I (BHWC board members) also journeyed to Washington, DC to tell our BHWC story. We were well received by folks at the agencies and the congressional offices. The offices we dealt with in Washington know who the Big Hole Watershed Committee is and are very easy to

work with. It is very important to keep this relationship going at the DC level. As they find funding harder to come by, they like to see and support projects that are so local oriented and have a proven record. It is a whole lot easier to explain something to the American people when all the players of the community are present for the discussions that lead to decisions. It is far better to have these decisions explained by the leaders of the BHWC to their constituencies than to always be in litigation over some important issue.

On that positive note, I say congratulations BHWC for the good work and congratulations to the different groups that form the BHWC and make it successful. We are going forward and helping to keep the Big Hole River one of the last best places! It's the people of the Big Hole Valley that are the key to our success!



Randy Smith, Chairman

## BIG HOLE BASIN SNOWPACK SUMMARY

2007– 2008

*Editor's note: Dave Amman is Manager of the Montana Water Measurement Program, a program of the Montana Department of Natural Resources and Conservation (DNRC), which seeks to reduce resource conflicts on water-short streams by providing water measurement expertise to irrigators and resource managers. The program operates statewide. Dave's geographic area of concern in the Big Hole Basin is from Dickie Bridge, near Wise River, to her confluence with the Jefferson River.*

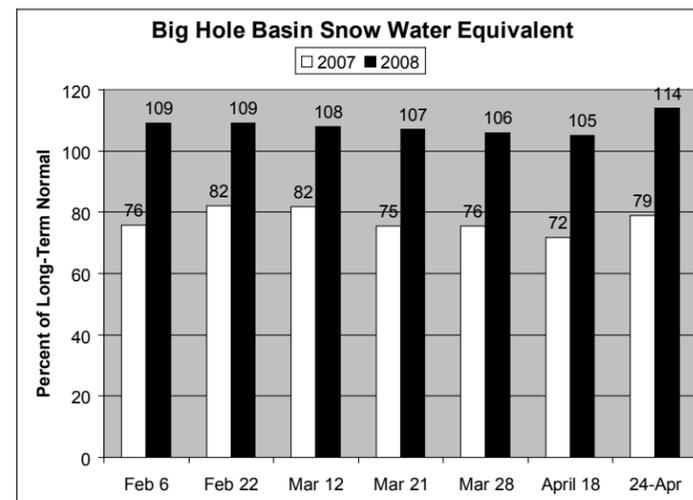
*Mike Roberts is a Surface Water Hydrologist with DNRC and part of a multi-agency effort called the Fluvial Arctic Grayling Candidate Conservation Agreement with Assurances (CCAA) program. The CCAA represents a comprehensive restoration plan that addresses issues facing grayling recovery. The scope of the CCAA is the upper Big Hole River from her headwaters above Jackson, Montana to Dickie Bridge.*

*Jim Olsen was recently hired by Montana Department of Fish, Wildlife & Parks as Fisheries Biologist for the Big Hole Basin. Jim will provide an update on the status of the Big Hole trout fishery in an upcoming newsletter.*

### LOWER BASIN REPORT

by Dave Amman, Hydrologist, DNRC

A cold, snowy spring is creating a bright water supply outlook for the coming summer; quite a contrast to 2007. Nearing the end of April, the Big Hole Basin snow pack sits at about 114% of normal. This is the time of normal peak snow pack and all SNOTEL sites except Basin Creek show above normal snow water. Last year at this time, early warm weather had already reduced the basin wide figure to about 72% of normal, which created another tough summer in terms of water supply.



inappropriate conditions.

**Step 3:** When flows are 70 cfs or less at the USGS Mudd Creek Gauge and temperatures exceed 70° F. for more than 8 hours per day for 3 consecutive days, MFWP will close the Middle Reach to fishing. News releases will be issued and a phone/Email tree will again contact outfitting businesses. The Middle Reach will remain closed until temperatures do not exceed 70° F. for more than 8 hours per day for 3 consecutive days and flows are greater than 80 cfs for 7 consecutive days.

### Addendum 2005 – Voluntary Angling Limits (R.Oswald, MFWP)

Modify the Second Trigger language to request anglers “voluntarily limit their angling activities to earlier, cooler hours of the day”.

**Rationale:** It does not necessarily make sense to limit angling to morning hours when some days, differing climatic conditions and flow regimes result in high water temperatures well before noon while other days exhibit cool water temperatures well into the early afternoon. This approach sends the message to consider the temperature and time of day as diminishing flows compound stress on the system.

### Addendum 2007 – Proposal to replace original language in the Drought Plan with the accepted Amendments.

**Rationale:** The current format of the Drought Plan is confusing. The initial read lists criteria that are no longer in affect and the Amendments in the back appear to contradict the Plan.

**Recommendation:** The original language of the Plan should be replaced by the current appropriate Amendments. Maintain the list of Amendments in the back of the Plan to maintain the history and reasoning behind the changes.

### Addendum 2007 (a) – Split the lower reach into two reaches and incorporate a thermal series into the new lower reach (R. Oswald, MFWP)

**Rationale:** The present reach from Dickie Bridge to the mouth is 71 miles in length and spans a very wide range in flows, species composition, and thermal regime. A single set of triggers often spans a flow range of 200 cfs or more and temperature ranges of 8 degrees or more. Moreover, trout species domination from approximately Melrose downstream favors brown trout which data show to be more severely affected by low flows than rainbow trout which increase in dominance upstream from Melrose.

**Recommendation:** Split current reach from Melrose Bridge (Salmon Fly Fishing Access) (about 33 miles downstream and 38 miles upstream) into the Dickie Bridge to Melrose Bridge Reach and the Melrose Bridge

to the Confluence with the Jefferson River Reach. In the Melrose Bridge to Mouth Reach, maintain original flow triggers generated below the WETP Minimum Flow. Return Dickie Bridge to Melrose Bridge Reach to original 1994 calculations of 260 -200 -140 cfs (see Addendum 2007(b)). Incorporate a series of Thermal Triggers similar to those in place for the upper reaches of the river to be measured at MFWP Thermographs at Notch Bottom and at *Melrose Gauge*.

\*\*\*Consider adding an additional component for PM closure under any flows below 260 cfs when temperatures at Notch Bottom or Pennington Bridge exceed 72 degrees for more than 8 hours per day for 3 consecutive days with lifting of closure when daily temperatures do not exceed 70 degrees for more than 8 hours per day for at least 3 consecutive days.

### Addendum 2007 (b) – Return Dickie Bridge to Melrose Bridge Reach Flow Triggers to original 1994 calculations of 260 – 200 –140 cfs (R. Oswald, MFWP).

The original triggers were generated from MFWP WETP Minimum Flow (and Instream Flow Reservation) of 260 cfs which represents a 40% depletion of wetted perimeter from the Upper Inflection Point Flow of 60 cfs. The original closure trigger was calculated to be 140 cfs, representing an additional 21% depletion in Wetted Perimeter from the minimum and closely approximating the August 95% Exceedence flow at the USGS Melrose Gauge. The second stage trigger represents the mid-point between the Upper and Lower Trigger Flows. Dropping the Stage 3 Closure Trigger from 150 to 140 cfs represents an additional loss in Wetted Perimeter of 5 feet and 4% of the total 21% depletion from the 260 cfs minimum. This would maintain a better biologically defensible base for the triggers and bring the Stage 3 (Closure) Trigger into compliance with current MFWP statewide Drought Policy. **Recommendation:** Adjust the Dickie Bridge to Melrose Bridge Reach Triggers as recommended.

### Addendum 2008 – Dickie Bridge to Melrose Reach: Reassign Official Plan USGS Gauge Site from Melrose to Maiden Rock and adjust Flow Plan Triggers back to ADF's of 250, 200, and 150 cfs with Angling re-opening trigger at 7 Consecutive Days at ADF's at or above 200 cfs. (R.Oswald and J. Olsen, MFWP)

**Rationale:** In 2007, the DMP was modified to establish two new management reaches within the old Lower Reach. The Dickie Bridge to Melrose reach was established in recognition of improvements in streamflow and thermal conditions over surrounding reaches as a result of significant tributary input. BHWC obtained funding to re-establish the USGS Maiden Rock Gage Site commencing in Water Year 2008. This Gage site is within the treatment reach and more accurately reflects improved streamflows within the reach. Prior operation of the gage and last year's DNRC flow measurements indicate that the reach rarely

The BHWC will work with MFWP on press releases and other public outreach efforts. The BHWC will work with local newspapers and televisions to secure flow updates in these communication mediums.

The BHWC will issue an annual update in the form of a mailing (hard copy and electronic) which will include: a copy of the most recent Drought Management Plan, flow forecasting, updates on water conservation programs and assistance, and other related news items.

#### **Addendum 2004 - May 15- June 30 Wisdom Reach Flow Levels (J. Magee MFWP)**

##### Upper Reach:

160 cfs May 15 – June 30. When flows decrease below 160 cfs a phone tree will be used to contact water users advising of flow conditions and encouraging conservation measures.

20 cfs MFWP will close the upper river to fishing, and will not conduct electrofishing surveys. (Subject to approval or change by the Fluvial Grayling Workgroup)

##### **Rationale:**

1) The upper and lower wetted perimeter inflection points for the upper Big Hole River are 160 and 60 cfs respectively (MFWP 1989). The upper inflection point is the flow required to maximize standing crop. While this flow may not be realistic in most years it should be the target goal for conservation measures. Maintaining this flow during grayling spawning and emergence in May and June will enhance survival and recruitment. Reduction of wetted perimeter is accelerated below the lower inflection point of 60 cfs. The flow goal for late summer and fall should be to maintain flows at 60 cfs or greater to avoid accelerated losses in standing crop. A minimum survival flow of 20 cfs will provide flows necessary to maintain a wetted channel, allow for migration into flow and temperature refugia and allow survival of some portion of the population during brief, critical periods.

2) Montana Fish Wildlife and Parks will not conduct electrofishing survey in the Wisdom West reach (Wisdom bridge downstream approximately 5 miles) if flows are less than 20 cfs and maximum daily temperatures are greater than 64°F.

#### **Addendum 2004 - Thermal Series for the Middle Reach (R. Oswald, MFWP)**

**Rationale:** Last summer, we encountered extremely high water temperatures at the Sportsman's Park Thermograph (MFWP) in the Middle Reach. These temperatures often exceeded our Upper Reach Drought Plan standard of 70° F for more than 8 hours per day for 3 consecutive days. When we consulted the Drought Plan, we found a somewhat contradictory set of standards at the 3 triggers.

That is, each flow trigger (100, 80, and 60 cfs) contained the same default thermal statement, i.e., "*or temperatures exceed 70° F for over 8 hours per day for 3 consecutive days.*" This left us with a situation in which the river would have closed to angling at any time we encountered the temperature standard at 100 cfs or less. Moreover, the only standard for reopening the river following closure was linked to seven consecutive days of flows greater than 80 cfs. Thus thermal closure at flows less than 80 cfs would have required the same reopening criteria as flows below 60 cfs. The alternative of changing "*or*" to "*and*" in the thermal series also didn't work because that would have rendered any temperature considerations redundant as the drought response actions would have defaulted to the flow triggers. In order to cope with the problem, we (MFWP) merely monitored key segments of the reach for biological indicators of thermal stress.

In order to eliminate this problem in the future, I have drafted the following proposed Thermal set of Triggers for the Middle Reach. The set of Triggers parallels the series currently applied to the Upper Reach.

##### **Temperature (July 15 – September 1)**

**Step 1:** When Temperatures exceed 70° F. for more than 8 hours per day for 3 consecutive days at the MFWP Sportsman's Park Thermograph and flows exceed 90 cfs at the USGS Mudd Creek Gauge, a phone/Email tree is used to contact outfitting businesses and a news release is issued advising publics and anglers of potential stressful conditions to the fishery and encouraging anglers to seek other destinations (reservoirs, mountain lakes and streams, spring creeks, etc.).

**Step 2:** When flows are 70 – 90 cfs at the USGS Mudd Creek Gauge and temperatures exceed 70° F. for more than 8 hours per day for 3 consecutive days, and evidence of thermally induced stress to the fishery occurs\*, MFWP will close the Middle Reach to fishing. News releases will be issued and a phone/Email tree will again contact local outfitting businesses. The Middle Reach will remain closed to fishing until temperatures do not exceed 70° F. for more than 8 hours per day for 3 consecutive days and flows are greater than 80 cfs for 7 consecutive days.

\* Thermally induced stress as observed by trained, experienced observers may include any of the following: Observed mortality in significant numbers of Age I and older mountain whitefish and other salmonid species in lieu of other logical sources of mortality; Outbreaks of stress related piscid diseases such as Bacterial Furunculosis; Extraordinary concentrations of fish in thalweg or riffle tailout habitats; Hyperactivity to include gasping, rolling, jumping, etc., of large, concentrated numbers of fish; and Frenzied feeding activity at inappropriate times and under

The actual flow volume for the Big Hole River near Melrose for April through September 2007 was about 60% of normal. This low yield resulted partially from the early melt, which caused very high water in March. The latest NRCS flow volume estimate for May through September 2008 is for 102% of normal at this USGS gauge.

Last year on August 2, the river dropped below 200 cfs at the USGS gauge near Melrose. By August 14, both the Melrose and Glen gauges registered below 150 cfs, and downstream at the High Road Bridge the flow dropped to a 2007 low of 25 cfs.

Last summer, the DNRC installed water level recorders at Divide Bridge and at Pennington Bridge. These gauges are part of intensified efforts to understand the hydrology of the lower basin, and are a valuable addition to river

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#### **UPPER BASIN REPORT**

*by Mike Roberts, Hydrologist, DNRC*

Streamflows in the upper Big Hole River basin in 2007 were once again less than average. Warm temperatures in March facilitated early runoff of low to mid-elevation snow followed by a mid-June melt of high elevation snow approximately two to three weeks earlier than the long term average. Record breaking heat in July further exacerbated instream flow issues throughout the upper basin.

The water supply outlook for spring and summer of 2008 shows much improvement over last year for the upper Big Hole. Big Hole Basin snowpack as of late April was near 110% of normal. Below average March and April temperatures along with continued snow accumulation have resulted in keeping low and mid-elevation snow from melting earlier than average and adding to higher elevation snowpack. The most recent NRCS flow volume estimate (4/17/08) for streamflows between May and September at the USGS gage on the Big Hole River near Wisdom calls for 100% of average assuming average precipitation for that same period.

Recent years such as 2006 suggest that an average or slightly above average snowpack does not necessarily translate to adequate streamflows throughout the duration of the water year. In 2006, snowpack peaked at 102% of average but less than average spring precipitation and

monitoring. Additional flow measurements were made at the Melrose bridges, and those efforts will continue more regularly this summer. The DNRC also anticipates assisting some lower basin canal companies to install water measuring devices and measure diversions from the river.

The Watershed Committee and Montana Trout Unlimited received funding from the Bureau of Reclamation, US Geological Survey, and Montana Department of Fish, Wildlife and Parks, that has resulted in installation of real-time gauges at two more sites in the lower basin. One is close to the river mouth below the High Road Bridge, and the other is near Maiden Rock, north of Melrose. Both real-time gauges are viewable through the USGS website and will give us instant access to river conditions at these sites, as well as collecting valuable flow data.

warmer than average summer temperatures resulted in low river flows and stream closures during the summer months.

This year it is anticipated that landowner participation in the Candidate Conservation Agreement with Assurances (CCAA) will provide additional support of instream flows as the beginning stages of flow management plans associated with the program begin implementation. While at this time no CCAA site specific plans have been completed, the DNRC is in the process of committing most of the 31 enrollees to voluntarily reduce diversions during low flow periods.

In addition to the USGS continuous streamflow sites on the Big Hole River at Wisdom and the Mudd Creek bridges, the DNRC will continue to operate gages at six mainstem sites and 10 tributaries in the upper basin. Most of the data associated with these gages is used in the planning and implementation of flow management strategies associated with the CCAA. Funding has been secured from the U.S. Bureau of Reclamation to upgrade at least four of the mainstem gages with real-time capability. The result will be on-line access to daily flows at these upper basin sites. It is anticipated these upgrades will take place in August of 2008.

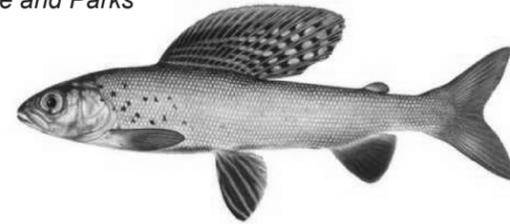
**BIG HOLE GRAYLING POPULATION STATUS AND PROJECTS**

By Jim Magee, Grayling Biologist, Montana Department of Fish, Wildlife and Parks

Grayling population surveys in 2007 showed a population structure similar to last year. Young-of-year (YOY) grayling were found in tributaries and the mainstem Big Hole River near Wisdom, and the majority of adults and larger fish were found down stream in the mainstem Big Hole and in tributaries near Dickie Bridge. The majority of grayling captured (71%) were YOY, and the abundance of adult fish remains low.

An increasing abundance and distribution of brown trout in the upper Big Hole is of concern. Changes to the fishing regulations for 2008 address this concern. New regulations for 2008 allow for the harvest of five trout, any size, upstream of Dickie Bridge. Brook trout harvest is also promoted from the headwaters to the North Fork Big Hole River. In this reach, brook trout harvest is open the entire year.

MFWP, the Arctic Grayling Recovery Program, US Fish and Wildlife Service Partners Program, Natural Resources Conservation Service, DNRC, Bureau of Land Management, The Nature Conservancy, the Big Hole Watershed Committee, Big Hole River Foundation, and numerous other NGOs and funding partners have collaborated on seventeen stream and riparian habitat



restoration projects from the headwaters of the Big Hole to Dickie Bridge, at a total cost of over one million dollars. These habitat improvement projects will improve conditions for over 156 riparian obligate species, including Arctic grayling. Projects include 9 miles of stream restoration, approximately 68 miles of riparian fencing, 37 stock water wells for off-stream livestock watering, 15 irrigation improvement projects, 9 fish ladder projects, and 6 confined-animal feeding operation cleanups. Projects will progress with conservation goals to improve riparian health and stream function, improve instream flows, improve fish passage and reduce entrainment. Conservation easements are also being pursued to build upon these restoration efforts by providing long-term protection to the Big Hole watershed and ranching operations.

For more information visit [www.graylingrecovery.org](http://www.graylingrecovery.org)

Step 3: When flows are 180 cfs or less at the USGS Glen Creek Gauge and temperatures exceed 70° F. for more than 8 hours per day for 3 consecutive days, MFWP will close the Melrose to the Mouth Reach to fishing. News releases will be issued and a phone/Email tree will again contact outfitting

businesses. The Middle Reach will remain closed until temperatures do not exceed 70° F. for more than 8 hours per day for 3 consecutive days and flows are greater than 200 cfs for 7 consecutive days.

**Notification and Monitoring Process**

Montana, Fish, Wildlife and Parks and Montana Department of Natural Resources and Conservation Service will keep the Big Hole Watershed Committee fully informed throughout the year regarding stream flows, water temperature, and snow pack data. This will allow for timely information to help in encouraging appropriate courses of action.

Stream conditions, water temperature, and snow pack levels will be a standing agenda item at each Big Hole Watershed Committee meeting. Based on the year long monitoring of weather conditions that may influence flow, the Big Hole Watershed Committee will publish a notification of impending dry year conditions. Notifications will be sent to the press, ranchers, municipalities, outfitters, conservation and sportsmen groups, and posted on the "world wide web".

While most attention is on late summer conditions, it is crucial to certain species, including Fluvial Arctic Grayling, that spring flows are closely monitored. The BHWC will issue weekly updates to irrigators during drought periods. Weekly updates will be provided in hard

copy, electronic mailings and on the BHWC web site. In non-drought periods the BHWC will issue regular updates as needed. The BHWC will work with MFWP on press releases and other public outreach efforts. The BHWC will work with local newspapers and televisions to secure flow updates in these communication mediums.

The BHWC will issue an annual update in the form of a mailing (hard copy and electronic) which will include: a copy of the most recent Drought Management Plan, flow forecasting, updates on water conservation programs and assistance, and other related news items.

Montana Fish, Wildlife and Parks will offer assistance to irrigators who are willing to cut back on water diversions. The BHWC will hold an open public meeting to present the information and conduct discussions with all parties concerning proposed actions.

Each caucus within the BHWC will communicate with their respective groups concerning implementation of the plan and secure support.

**Public Education**

The BHWC will develop and distribute educational material with agency assistance, describing the need for a drought management plan, its provisions, and anticipated benefits. Information will be provided on the possible actions people can take to mitigate damage from dry years including but not limited to:

- ❖ Voluntary reduction of irrigation and diversion stock watering during critical times;

- ❖ Increase flood irrigation during spring runoff to augment return flows;
- ❖ Water conservation policies by municipalities and industries during sensitive times;
- ❖ Emergency water reduction policies by municipalities and industries during critical times;
- ❖ Reduced recreation uses during sensitive times; and
- ❖ Elimination of fall recreation uses at critical times.

**Chronological Listing of Amendments**

**Addendum 2002 – Definition**

Flow trigger levels will be based on the Average Daily Flow measured in cubic feet per second (cfs). Therefore, flows will be reviewed the following day to determine trigger levels and fishing closures.

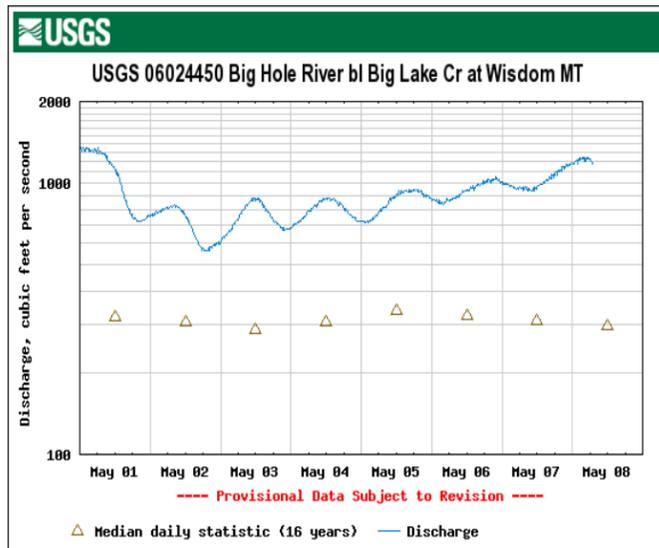
**Addendum 2002 – Publicity**

It is recognized that flow levels, forecasting and angling closures affect local businesses and residents. Whenever

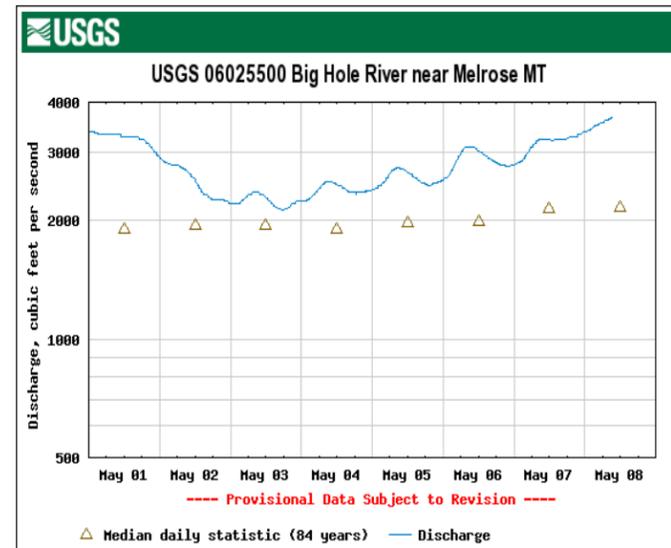
possible, maps and specific locations will be included in press releases and other communications (MT FW&P website).

**Addendum 2004 – Publicity and Outreach**

The BHWC will issue weekly updates to irrigators during drought periods. Weekly updates will be provided in hard copy, electronic mailings and on the BHWC web site. In non-drought periods the BHWC will issue regular updates as needed.



As of May 8, streamflow at the USGS real-time gauge near Wisdom, Montana is 1,180 cubic feet per second (cfs), or nearly four times median flow (298 cfs) for this site and date based on 16 years of data.



Streamflow at the USGS real-time gauge near Melrose, Montana, is 3,160 cfs; 1.7 times median flow (2,160 cfs) for this site and date based on 84 years of data.

### III. Dickie Bridge to Melrose Bridge

#### Flows – Monitored at USGS Melrose Gauge

250 cfs DNRC and MFWP officials meet with Big Hole Watershed Committee to present data; formulate options including the voluntary reduction of irrigation, municipal water use, and angling; and prepare to take action. A phone tree is initiated to advise irrigators and outfitters of stream flow conditions.

200 cfs Notice to outfitters and anglers requesting they voluntarily limit their angling activities to earlier, cooler hours of the day. The phone tree will inform local water users, anglers and outfitters of stream flow conditions. The media will be contacted and news articles released to inform public of low flow conditions.

150 cfs FWP will close the river to fishing and not conduct electrofishing surveys. Voluntary reduction of irrigation and water use is initiated. A phone tree and media releases inform water users, outfitters, anglers, and public of the continued decline of in stream flows and encourages water conservation. The river will remain closed until flows exceed 200 cfs for seven consecutive days.

Temperature triggers are the same as previous Reach.

### IV. Melrose Bridge to confluence with the Jefferson River

#### Flows – Monitored at USGS Glen Gauge

250 cfs DNRC and MFWP officials meet with Big Hole Watershed Committee to present data; formulate options including the voluntary reduction of irrigation, municipal water use, and angling; and prepare to take action. A phone tree is initiated to advise irrigators and outfitters of stream flow conditions.

200 cfs Notice to outfitters and anglers requesting they voluntarily limit their angling activities to earlier, cooler hours of the day. The phone tree will inform local water users, anglers and outfitters of stream flow conditions. The media will be contacted and news articles released to inform public of low flow conditions.

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#### Temperatures: Monitored at the MFWP Notch Bottom Thermograph Site (July 15 – September 1)

Step 1: When Temperatures exceed 70° F. for more than 8 hours per day for 3 consecutive days at the MFWP Notch Bottom Thermograph and flows exceed 230 cfs at the USGS Glen Gauge, a phone/Email tree

is used to contact outfitting businesses and a news release is issued advising publics and anglers of potential stressful conditions to the fishery and encouraging anglers to seek other destinations (reservoirs, mountain lakes and streams, spring creeks, etc.).

Step 2: When flows are 180 – 230 cfs at the USGS Glen Gauge and temperatures exceed 70° F. for more than 8 hours per day for 3 consecutive days, and evidence of thermally induced stress to the fishery occurs\*, MFWP will close the Melrose to the Mouth Reach to fishing. News releases will be issued and a phone/Email tree will again contact local outfitting businesses. The Melrose to the Mouth Reach will remain closed to fishing until temperatures do not exceed 70° F. for more than 8 hours per day for 3 consecutive days and flows are greater than 200 cfs for 7 consecutive days.

**Note:** Thermally induced stress as observed by trained, experienced observers may include any of the following: Observed mortality in significant numbers of Age I and older mountain whitefish and other salmonid species in lieu of other logical sources of mortality; Outbreaks of stress related piscid diseases such as Bacterial Furunculosis; Extraordinary concentrations of fish in thalweg or riffle tailout habitats; Hyperactivity to include gasping, rolling, jumping, etc., of large, concentrated numbers of fish; and Frenzied feeding activity at inappropriate times and under inappropriate conditions.

# Big Hole River Drought Management Plan

## The Big Hole Watershed Committee

### Adopted 1997

(Amended 1999, 2000, 2002, 2004, 2005, 2007, 2008)

#### Purpose

The purpose of the drought management plan is to mitigate the effects of low stream flows and lethal water temperatures for fisheries (particularly fluvial Arctic grayling) through a voluntary effort among agriculture, municipalities, business, conservation groups, anglers, and affected government agencies.

#### Overview

The Big Hole Watershed Committee has agreed on this dry year plan to help mitigate damage to the fishery during dry years as indicated by flows and temperature. This plan has been designed to take into full account the interests of all affected parties including ranching, municipalities, anglers, and conservation groups.

The Big Hole Watershed Committee agrees that if this plan is to be successful in a dry year, it will need broad-based support and understanding. Big Hole Committee members are committed to helping secure the support of their constituencies for the successful implementation of this plan.

This initial plan is intended as a starting point from which modifications can be made based on the lessons learned from research projects, such as the Big Hole Watershed Committee's return flow study, increased information from new river gauges, and from the experiences gained by implementing this plan. The plan will be reviewed by the Big Hole Watershed Committee every January for modifications.

#### Roles and Responsibilities

Big Hole Watershed Committee roles:

- ❖ Educate interested and affected parties;
- ❖ Develop, adopt, and modify annually the dry year plan;
- ❖ Receive, monitor, and act on information regarding stream conditions and snow pack levels throughout the year;
- ❖ Notify interested and affected parties of implementation and secure support; and
- ❖ Evaluate the environmental, social, and economic impact of the plan.

Montana Fish, Wildlife and Parks (MFWP), Montana Department of Natural Resources and Conservation (DNRC), and the United State Natural Resource Conservation Service (NRCS) roles;

- ❖ Provide accurate and timely information regarding stream conditions and snow pack levels throughout the year;
- ❖ Provide technical assistance in reviewing the plan and monitoring its implementation; and
- ❖ Ensure coordination of effort among all affected government agencies.
- ❖ *Contacts and informs media of dry year plan implementation and stream flow and temperature status.*

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### Definition of Dry Year Conditions and Recommended Actions

The Big Hole Watershed Committee will monitor snow pack levels and forecasted low stream level information provided by the USGS and NRCS throughout the year to prepare for potential water conservation measures. Stream flow information gathered from the USGS Wisdom, USGS Mudd Creek, USGS Melrose, and USGS Glen gauging stations will be used to initiate specific voluntary actions to conserve water and mitigate the effects of dry year conditions on fisheries from May 1 through October 31.

The following flow targets take into consideration preparation time necessary to implement this voluntary plan. The annual evaluation of the effectiveness of the dry year plan will provide information to more intensively analyze the minimum in stream flows necessary to sustain adequate habitat quality and buffer water temperatures.

## I. Rock Creek Road to Mouth of the North Fork

### Flows – Monitored at the USGS Wisdom Gauge

160 cfs May 15 – June 30. When flows decrease below 160 cfs a phone tree will be used to contact water users advising of flow conditions and encouraging conservation measures.

60 cfs DNRC and MFWP officials will meet with the Big Hole Watershed Committee to present data; formulate options including voluntary reduction of irrigation, stock water diversions, municipal water use, angling, and encourage the use of stock watering wells; and prepare to take action. A phone tree is initiated to advise water users, outfitters, and anglers of low water conditions and encourage conservation measures.

40 cfs Notice to outfitters and anglers requesting they voluntarily limit their angling activities to earlier, cooler hours of the day. Well use will be encouraged for stock watering. A phone tree will advise water users and outfitters of low water conditions and encourage conservation measures. The media will be contacted and news articles released to inform publics of low flow conditions.

20 cfs FWP will close the upper river to fishing, MFWP will close the upper river to fishing, and will not conduct electrofishing surveys (subject to approval or change by the Fluvial Grayling Workgroup). Voluntary reduction of irrigation and public municipal water use is initiated, and continued well use for stock watering encouraged. The phone tree is again initiated to contact water users advising of extreme low water conditions and encourage conservation measures. The media is contacted and informed of fishing closures and encourages public conservation efforts. The river remains closed until flows exceed 40 cfs for seven consecutive days.

**Note: Definition:** Flow trigger levels will be based on the Average Daily Flow measured in cubic feet per second (cfs). Therefore, flows will be reviewed the following day to determine trigger levels and fishing closures.

### Temperature July 15-September 1:

Step 1 When temperatures exceed 70°F for over 8 hours per day for three consecutive days at the USGS Wisdom gauge and flows are above 30 cfs, a phone tree is used to contact outfitting businesses and a news release is issued advising publics and anglers of potential stressful conditions to the fishery and encouraging anglers to seek other

destinations (mountain lakes and streams, spring creeks).

Step 2 When flows are 25-30 cfs at the USGS Wisdom gauge and temperatures exceed 70°F for more than 8 hours per day for three consecutive days, and evidence of thermally induced stress to the fishery occurs, MFWP will close the upper river to fishing. News releases will be issued and a phone tree will again contact local outfitting businesses. The upper river will be closed until temperatures do not exceed 70°F for more than 8 hours per day for three consecutive days and flows are greater than 30 cfs for seven consecutive days.

Step 3 When flows are 25 cfs or less at the USGS Wisdom gauge and temperatures exceed 70°F for more than 8 hours per day, for three consecutive days, MFWP will close the upper river to fishing. News releases will be issued and a phone tree will again contact local outfitting businesses. The upper river will be closed until temperatures do not exceed 70°F for more than 8 hours per day for three consecutive days and flows are greater than 30 cfs for seven consecutive days.

The wetted stream perimeter (flow below which standing crops of fish decrease (DNRC 1992)) of the upper Big Hole River is 60 cfs. While this flow may be reasonable to maintain in ample moisture years and should be the goal for flow preservation efforts, in most years it is not a realistic quantity. Data from the USGS Wisdom gauge from 1988 -1999 recorded flows below 60 cfs in each of the twelve years. Population and flow data indicate 40 cfs is feasible to maintain while still sufficient to protect the Arctic Grayling population. A minimum survival flow of 20 cfs will provide flows necessary to maintain a wetted channel and ensure survival of the grayling population during brief, critical periods.

Temperatures above 70°F are generally considered stressful to salmonids. Warm water temperatures typically occur between July 15 - September 1 in the Big Hole River. Although temperatures above 70°F can occur before and after this period, cooler night temperatures alleviate long periods of warm daytime temperatures. The upper incipient lethal temperature (e.g. that temperature that is survivable indefinitely for periods longer than one week by 50% of the population) for Arctic Grayling is 77°F (Loher et. al. 1997). Critical thermal maximum temperature is 85°F resulting in instantaneous death.

## II. Mouth of the North Fork to Dickie Bridge

### Flows: Monitored at USGS Mudd Creek Gauge

100 cfs When flows decrease to 100 cfs or temperatures exceed 70°F for over 8 hours per day for three consecutive days. DNRC and MFWP officials will meet with the Big Hole Watershed Committee to present data; formulate options including voluntary reduction of irrigation, stock water diversions, municipal water use, angling, and encourage the use of stock watering wells; and prepare to take action. A phone tree is initiated to advise water users, outfitters, and anglers of low water conditions and encourage conservation measures.

80 cfs When flows decrease to 80 cfs or temperatures exceed 70°F for over 8 hours per day for three consecutive days. Notice to outfitters and anglers requesting fishing be voluntarily limited to morning hours. Well use will be encouraged for stock watering. A phone tree will advise water users and outfitters of low water conditions and encourage conservation measures. The media will be contacted and news articles released to inform public of low flow conditions.

60 cfs When flows decrease to 60 cfs or temperatures exceed 70°F for over 8 hours per day for three consecutive days, MFWP will close the river to fishing and not conduct electrofishing surveys. Voluntary reduction of irrigation and water use is initiated. A phone tree and media releases inform water users, outfitters, angler, and public of water the continued decline of in stream flows and encourages water conservation. The river remains closed until flows exceed 80 cfs for seven consecutive days and temperatures do not exceed 70°F for more than 8 hours per day for three consecutive days.

### Temperatures: Monitored at the Sportsman's Park Thermograph Site (July 15 – September 1)

Step 1: When Temperatures exceed 70° F. for more than 8 hours per day for 3 consecutive days at the MFWP Sportsman's Park Thermograph and flows exceed 90 cfs at the USGS Mudd Creek Gauge, a phone/Email tree is used to contact outfitting businesses and a news release is issued advising publics and anglers of potential stressful conditions to the fishery and encouraging anglers to seek other destinations (reservoirs, mountain lakes and streams, spring creeks, etc.).

Step 2: When flows are 70 – 90 cfs at the USGS Mudd Creek Gauge and temperatures exceed 70° F. for more than 8 hours per day for 3 consecutive days,

and evidence of thermally induced stress to the fishery occurs\*, MFWP will close the Middle Reach to fishing. News releases will be issued and a phone/Email tree will again contact local outfitting businesses. The Middle Reach will remain closed to fishing until temperatures do not exceed 70° F. for more than 8 hours per day for 3 consecutive days and flows are greater than 80 cfs for 7 consecutive days.

**Note:** Thermally induced stress as observed by trained, experienced observers may include any of the following: Observed mortality in significant numbers of Age I and older mountain whitefish and other salmonid species in lieu of other logical sources of mortality; Outbreaks of stress related piscid diseases such as Bacterial Furunculosis; Extraordinary concentrations of fish in thalweg or riffle taylor habitats; Hyperactivity to include gasping, rolling, jumping, etc., of large, concentrated numbers of fish; and frenzied feeding activity at inappropriate times and under inappropriate conditions.

Step 3: When flows are 70 cfs or less at the USGS Mudd Creek Gauge and temperatures exceed 70° F. for more than 8 hours per day for 3 consecutive days, MFWP will close the Middle Reach to fishing. News releases will be issued and a phone/Email tree will again contact outfitting businesses. The Middle Reach will remain closed until temperatures do not exceed 70° F. for more than 8 hours per day for 3 consecutive days and flows are greater than 80 cfs for 7 consecutive days.

**Note:** In years with clear-cut drought conditions under which triggers in both the Rock Creek to Mudd Creek Reach and the Mudd Creek to Dickie Bridge Reach are met, or about to be met, these two reaches could be treated as one unit (Rock Creek Road to Dickie Bridge).

The Mudd Creek Gauge has limited data (beginning in 1998). Continued data on various flow scenarios will allow better analysis of wetted perimeter and in stream flow regimes. This plan should be fine tuned or modified as needed as additional data becomes available.