

Muddy Creek Performance Goal

As part of the Atlantic Rim performance goals, a plan was developed in 2008 to monitor geomorphic, aquatic habitat, and water quality within the upper Muddy Creek watershed in the Atlantic Rim Project Area. The goal of this monitoring plan is to determine if activities associated with the Atlantic Rim Project have an impact on Muddy Creek that adversely affects the BLM sensitive, non-game, native fish population.

| Item | Performance Goal |
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| Muddy Creek Sensitive Fish | maintain adequate water quality, water quantity, species distribution, and aquatic habitat components |

Triggers that initiate the adaptive management process for the performance goal; “maintain adequate water quality, water quantity, species distribution, and aquatic habitat components” include:

- Changes in channel geomorphology, bank stability, and residual pool depths.
- Changes in fish species distribution or population size.
- Water quality and quantity triggers are the same as the water quality standards set forth by the State of Wyoming Department of Environmental Quality.

The main focus of the Muddy Creek working group has been the development, implementation, and review of the Muddy Creek monitoring efforts conducted by a third party contractor. Annual reports have been produced for three consecutive years as outlined in the original CDM Muddy Creek Monitoring Plan. Additional monitoring within the Muddy Creek watershed includes: (1) channel morphology, water temperature, water quality, and fish species distribution within the tributaries to lower Muddy Creek, (2) an investigation of fish, sediment, and water toxicity throughout the watershed, (3) fish species distribution and population estimates for upper and lower Muddy Creek, and (4) installation of a USGS gaging station in upper Muddy Creek, and (5) rain gages placed within the Atlantic Rim project area. The Muddy Creek working group meets periodically to discuss monitoring results from these efforts, current conditions, adaptive management opportunities, and future monitoring for the Atlantic Rim Area.

The Muddy Creek working group has also identified the need for monitoring upland erosion within the Atlantic Rim project area. The goal of this monitoring is to address erosion issues before they reach Muddy Creek. Numerous meetings and field trips were held to discuss this monitoring need. A draft upland monitoring proposal was prepared by the BLM in cooperation with the working group. The upland monitoring plan addresses erosion issues that should already be addressed by the State of Wyoming’s storm water pollution prevention (SWPP) permit for Atlantic Rim. Consequently the working group is in the process of reviewing the SWPP and will assess the effectiveness of the SWPP before moving forward with the upland monitoring plan developed by the BLM.

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| | Outline of Monitoring within the Muddy Creek watershed |
| | 2005 – Habitat associations and fish species in Upper Muddy Creek |
| | 2005 – Fish distribution and characterization of flow regime |
| | 2005 – Wyoming Game and Fish – native non-game population inventory |
| | 2006 – Genetics research on 3 warm water fishes |
| | 2007 – Fish population estimate and movement barrier in Muddy Creek |
| | 2007 – Fish presence and species distribution in Tributaries to Lower Muddy Creek (BLM) |
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| | 2008 – Selenium Study, biotic and abiotic elements of the aquatic environment |
| | 2008 – Hydrologic watershed assessment of Muddy Creek |
| | 2008 – Fish presence and species distribution in Tributaries to Lower Muddy Creek (BLM) |
| | 2008 – Aquatic habitat component monitoring – 3 rd party contractor |
| | 2008 – Aquatic toxicology research (BLM, U.S. Fish and Wildlife Service) |
| | 2009 – WETT testing of Double Eagle surface discharge – 3 iterations to date |
| | 2009 - Fish population estimate lower Muddy Creek (BLM) |
| | 2009 – Aquatic habitat component monitoring – 3 rd party contractor |
| | 2009 – Aquatic toxicology research (BLM, U.S. Fish and Wildlife Service) |
| | 2009 – Installation of Hydrolabs on tributaries to Lower Muddy Creek |
| | 2010 – Installation of USGS gaging station on upper Muddy Creek |
| | 2010 - Aquatic habitat component monitoring – 3 rd party contractor |
| | 2010 - Aquatic toxicology research (BLM, U.S. Fish and Wildlife Service) |
| | 2010 – Installation of Hydrolabs and rain gauges on tributaries to Lower Muddy Creek |
| | 2010 – Fish presence, species distribution, and channel morphology in Tributaries to Lower Muddy Creek |

2010: Update.

- Third year of CDM Muddy Creek monitoring and report completed.
- BLM fish and channel morphology within tributaries to lower Muddy Creek monitoring completed. Report will be completed during the winter.
- BLM installed Hydrolabs (water temperature, conductivity, pH, total dissolved solids, dissolved oxygen, and turbidity) on Wild Cow Creek and Muddy Creek, and 7 rain gauges throughout the watershed. Report will be completed during the winter.
- Fish tissues, sediment, and water quality samples were collected in the spring and fall as part of the fish toxicity project. Currently the USGS is analyzing samples but we have more samples than funding. Completion of this project and a final report is dependent on funding.
- A USGS gaging station was installed on upper Muddy Creek. Information on the gaging station is provided below.

USGS 09258050 Muddy Creek above Olson Draw, near Dad, WY

<http://waterdata.usgs.gov/nwis/uv?09258050>

DESCRIPTION:

Latitude 41°28'42", Longitude 107°36'09" NAD83

Carbon County, Wyoming, Hydrologic Unit 14050004

Datum of gage: 6,835 feet above sea level NGVD29.

The following parameters are included:

#00010 - Temperature, water, degrees Celsius
#00020 - Temperature, air, degrees Celsius
#00025 - Barometric pressure, millimeters of mercury
#00061 - Discharge, instantaneous, cubic feet per second
#00095 - Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius
#00191 - Hydrogen ion, water, unfiltered, calculated, milligrams per liter
#00300 - Dissolved oxygen, water, unfiltered, milligrams per liter
#00301 - Dissolved oxygen, water, unfiltered, percent of saturation
#00400 - pH, water, unfiltered, field, standard units
#00403 - pH, water, unfiltered, laboratory, standard units
#00405 - Carbon dioxide, water, unfiltered, milligrams per liter
#00900 - Hardness, water, milligrams per liter as calcium carbonate
#00904 - Noncarbonate hardness, water, filtered, field, milligrams per liter as calcium carbonate
#00905 - Noncarbonate hardness, water, filtered, lab, milligrams per liter as calcium carbonate
#00915 - Calcium, water, filtered, milligrams per liter
#00925 - Magnesium, water, filtered, milligrams per liter
#00930 - Sodium, water, filtered, milligrams per liter
#00931 - Sodium adsorption ratio, water, number
#00932 - Sodium fraction of cations, water, percent in equivalents of major cations
#00935 - Potassium, water, filtered, milligrams per liter
#00940 - Chloride, water, filtered, milligrams per liter
#00945 - Sulfate, water, filtered, milligrams per liter
#00950 - Fluoride, water, filtered, milligrams per liter
#00955 - Silica, water, filtered, milligrams per liter as SiO₂
#01000 - Arsenic, water, filtered, micrograms per liter
#01002 - Arsenic, water, unfiltered, micrograms per liter
#01005 - Barium, water, filtered, micrograms per liter
#01007 - Barium, water, unfiltered, recoverable, micrograms per liter
#01010 - Beryllium, water, filtered, micrograms per liter
#01012 - Beryllium, water, unfiltered, recoverable, micrograms per liter
#01025 - Cadmium, water, filtered, micrograms per liter
#01027 - Cadmium, water, unfiltered, micrograms per liter
#01040 - Copper, water, filtered, micrograms per liter
#01042 - Copper, water, unfiltered, recoverable, micrograms per liter
#01045 - Iron, water, unfiltered, recoverable, micrograms per liter
#01046 - Iron, water, filtered, micrograms per liter
#01049 - Lead, water, filtered, micrograms per liter
#01051 - Lead, water, unfiltered, recoverable, micrograms per liter
#01055 - Manganese, water, unfiltered, recoverable, micrograms per liter
#01056 - Manganese, water, filtered, micrograms per liter
#01065 - Nickel, water, filtered, micrograms per liter
#01067 - Nickel, water, unfiltered, recoverable, micrograms per liter
#01090 - Zinc, water, filtered, micrograms per liter
#01092 - Zinc, water, unfiltered, recoverable, micrograms per liter
#01105 - Aluminum, water, unfiltered, recoverable, micrograms per liter
#01106 - Aluminum, water, filtered, micrograms per liter
#01145 - Selenium, water, filtered, micrograms per liter
#01147 - Selenium, water, unfiltered, micrograms per liter
#22703 - Uranium (natural), water, filtered, micrograms per liter
#28011 - Uranium (natural), water, unfiltered, micrograms per liter
#29801 - Alkalinity, water, filtered, fixed endpoint (pH 4.5) titration, laboratory, milligrams per liter as calcium carbonate
#30209 - Discharge, instantaneous, cubic meters per second
#39086 - Alkalinity, water, filtered, inflection-point titration method (incremental titration method), field, milligrams per liter as calcium carbonate

#63676 - Turbidity, water, unfiltered, broad band light source (400-680 nm), detectors at multiple angles including 90 +/- 30 degrees, ratiometric correction, NTRU
#70300 - Dissolved solids dried at 180 degrees Celsius, water, filtered, milligrams per liter
#70301 - Dissolved solids, water, filtered, sum of constituents, milligrams per liter
#70302 - Dissolved solids, water, tons per day
#70303 - Dissolved solids, water, filtered, tons per acre-foot
#71890 - Mercury, water, filtered, micrograms per liter
#71999 - Sample purpose, code
#82398 - Sampling method, code
#84164 - Sampler type, code
#90095 - Specific conductance, water, unfiltered, laboratory, microsiemens per centimeter at 25 degrees Celsius