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Pt III
1994

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
NATURAL RESOURCE DAMAGE PROGRAM

OLD LIVESTOCK BUILDING
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NOTICE OF ASSESSMENT PLAN PART III

and

Public Comment Period until July 15, 1994

The State of Montana, acting on behalf of the people of Montana, as trustee of the natural resources in the state, hereby provides notice pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9601-9675, the U.S. Department of the Interior ("DOI") Natural Resource Damage Assessments ("NRDA") Regulations, 43 C.F.R. Part 11, and the Montana Comprehensive Environmental Cleanup and Responsibility Act ("CECRA"), Mont. Code Ann. §§ 75-10-701 to 75-10-724.

1. The Atlantic Richfield Company ("ARCO") has been identified by the State of Montana as the primary responsible party for facilities located at the Clark Fork River Basin National Priorities List ("NPL") sites, including the Silver Bow Creek/Butte Area site, the Anaconda Smelter site, the Montana Pole site, and the Milltown Reservoir site. There have been multiple and continuing releases of hazardous substances, including but not limited to arsenic, beryllium, cadmium, copper, creosote, lead, pentachlorophenol ("PCP"), polycyclic aromatic hydrocarbons, selenium, silver, volatile organic compounds, and zinc, from these facilities. Injuries to natural resources, including surface water, fish, sediments, ground water, air, soils, vegetation and wildlife, have resulted from these releases.

2. On October 10, 1991, the State of Montana issued its Notice of Intent to Perform an Assessment ("Notice") and released its Preassessment Screen: Clark Fork River Basin NPL Sites, Montana ("Preassessment Screen"). The Notice and Preassessment Screen were provided to ARCO, other interested parties, and members of the public. In accordance with the DOI NRDA regulations, Montana invited ARCO to participate in the development of a natural resource damage assessment and in the performance of the assessment. ARCO was requested to provide to the State of Montana a damage assessment plan pursuant to the DOI NRDA regulations, if ARCO wished to participate in the assessment. ARCO subsequently submitted written comments to the State of Montana regarding the Preassessment Screen and the State's decision to perform a natural resource damage assessment. ARCO did not submit an assessment plan, nor did it indicate any intention to do so in the future. The State reviewed and considered the comments provided by ARCO in its preparation of Part II of the Assessment Plan.

3. On January 27, 1992, the State of Montana issued its Assessment Plan, Part I, Clark Fork River Basin NPL Sites, Montana. Part I identified the methodologies for conducting injury determination and quantification for the surface water, fisheries,

sediments, and ground water resources. Comments on Part I were received from several interested parties including ARCO. All comments have been reviewed by the State.

4. On April 24, 1992, the State of Montana released its Assessment Plan, Part II, Clark Fork River Basin NPL Sites, Montana ("Part II of the Assessment Plan"). This assessment plan identified the methodologies for conducting injury determination and quantification for the air, soils, vegetation and wildlife resources. Part II also contained methodologies to be used for assessing economic damages. In addition, a description of field sampling of surface and ground water was contained as a supplement to methods defined in Part I of the plan. Part II of the Assessment Plan was made available for review and comment by ARCO, other natural resource trustees, other affected federal or state agencies or Indian Tribes, and any other interested members of the public.

5. The State of Montana hereby releases Assessment Plan, Part III, Clark Fork River Basin NPL Sites, Montana ("Part III of the Assessment Plan"). This assessment plan identifies the methodologies for conducting additional assessment work for injury determination and quantification of aquatic resources. Part III of the assessment plan is being made available for review and comment by ARCO, other natural resource trustees, other federal agencies or Indian Tribes, and any other interested members of the public. Comments concerning the assessment plan should be made in writing and mailed by July 15, 1994 to:

Robert G. Collins
State of Montana
Natural Resource Damage Program
Old Livestock Building, 1310 East Lockett
Helena, MT 59620

The State of Montana may modify Part III of the Assessment Plan following its review of submitted comments. Any modifications, which in the judgment of the State of Montana are significant, will be made available for subsequent review and comment.

5. At the conclusion of the Natural Resource Damage Assessment, the State of Montana will prepare and make available a Report of the Assessment. The report will include a summary of the comments received to Parts I, II and III of the Assessment Plan and the State's responses to those comments.

DATED this 9th day of June, 1994.

STATE OF MONTANA

By 

Robert G. Collins
Natural Resource Damage Program
Old Livestock Building, 1310 East Lockett
Helena, MT 59620

**ASSESSMENT PLAN:
PART III
CLARK FORK RIVER BASIN NPL SITES
MONTANA**

**STATE OF MONTANA
NATURAL RESOURCE DAMAGE PROGRAM**

JUNE 1994

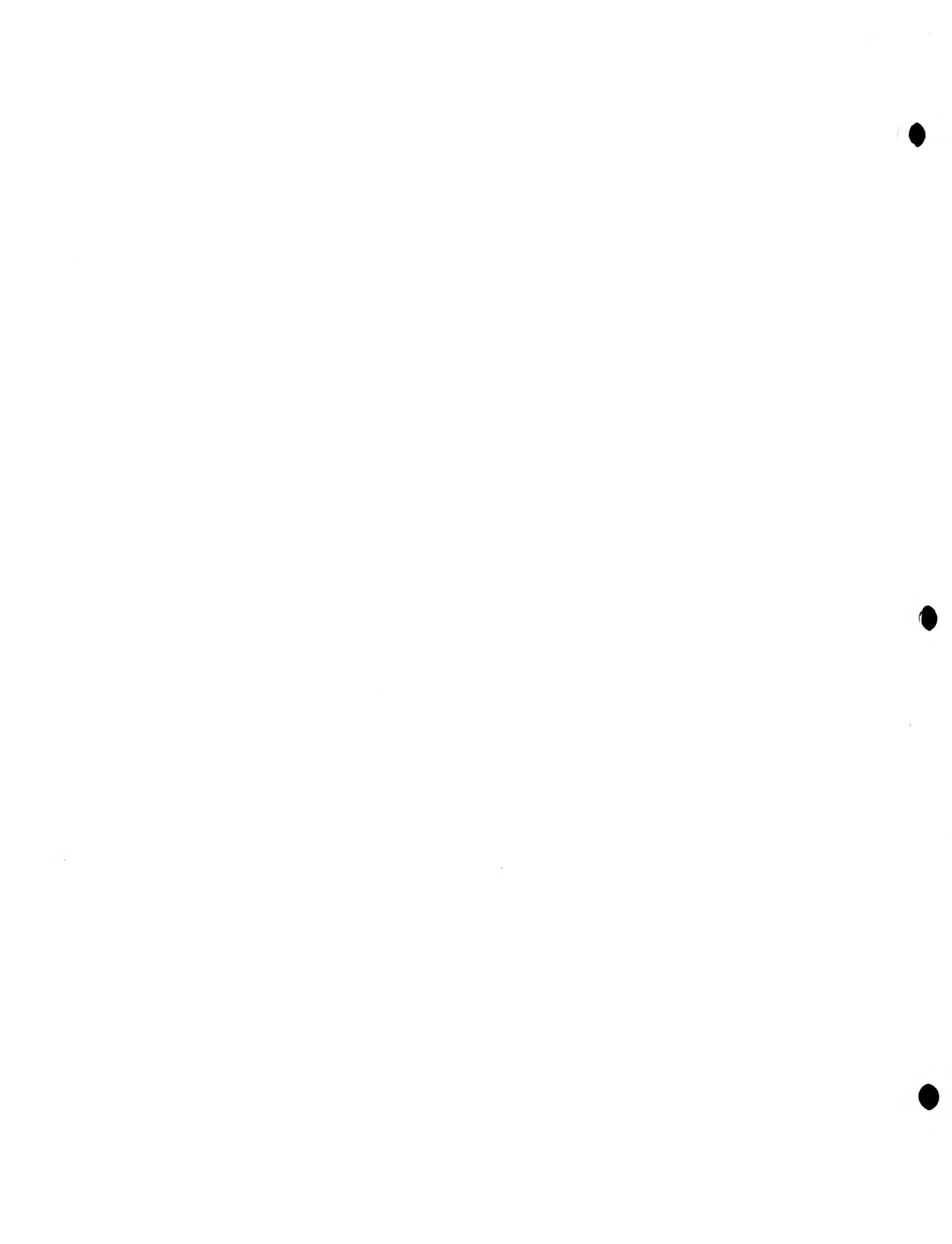


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LIST OF ACRONYMS

ARCO	Atlantic Richfield Company
CFR	Code of Federal Regulations
DOI	United States Department of Interior
EPA	United States Environmental Protection Agency
FPM	Field Procedures Manual
MDHES	Montana Department of Health and Environmental Sciences
NRDP	Montana Natural Resource Damage Program
QAPP	Quality Assurance Project Plan
USGS	United States Geological Survey



1.0 INTRODUCTION

1.1 CASE HISTORY AND DESCRIPTION AND ASSESSMENT PLAN CONTENT

The State of Montana ("the State") has commenced an action against the Atlantic Richfield Company ("ARCO") in the United States District Court for the District of Montana (Civil Action No. CV 83-317-HLN-PGH) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9601-9675, and the Montana Comprehensive Environmental Cleanup and Responsibility Act ("CECRA"), Mont. Code Ann. §§ 75-10-701 to 75-10-724. In this action, Montana seeks to recover damages for injuries to natural resources resulting from releases of hazardous and/or deleterious substances from facilities for which ARCO is the primary responsible party. In March 1993, the State and ARCO entered into a Memorandum of Understanding pursuant to which the parties entered into settlement negotiations while the litigation was stayed. If settlement is not reached by September 15, 1994, litigation between the State and ARCO may resume.

The State of Montana has assessed natural resource damages in accordance with the regulations of the U.S. Department of the Interior (DOI) as set forth in 43 CFR Part 11 and as modified by Ohio v. U.S. DOI 880 F.2nd 432 (D.C. Cir. 1989). In January 1992, the State released for public review and comment Part I of its Assessment Plan. Part I of the Plan addressed activities associated with injury determination and quantification phases for four potentially injured natural resources: surface water resources, fisheries resources, sediment resources, and groundwater resources. In addition, Part I of the Assessment Plan contained information on coordination with ongoing remedial investigation/feasibility studies at the four National Priorities List sites in the Clark Fork River Basin, procedures for sharing data and duplicate or split samples with ARCO and other natural resource trustees, confirmation of exposure to hazardous substances, and a Quality Assurance Project Plan (QAPP).

In April 1992, the State released for public review and comment Part II of the Assessment Plan. Part II contained methodologies for conducting injury determination and quantification for air resources, soils resources, vegetation resources, and wildlife resources. In addition, a description of field sampling of surface and groundwater was contained as a supplement to the methods described in Part I of the Plan. Part II of the Plan also contained a preliminary determination of recovery periods for potentially injured resources, as well as methodologies for assessing economic damages. ARCO and other interested parties submitted comments on Parts I and II of the Plan. The State has reviewed and considered all of the comments.

In accordance with Parts I and II of the Plan, the State identified and quantified injury to numerous natural resources. These injuries are described in three reports. The Groundwater Resources Report was released in May 1993. The Aquatics Resources Report (surface water, sediment, benthic macroinvertebrates, and trout) was released in June 1993. The Terrestrial Resources Report (upland and riparian soils, vegetation, and wildlife resources) was released in September 1993.



In December 1993, the State released three economics reports that described and quantified the compensable damages that have resulted from natural resource injuries. In March 1994, the State released its Restoration Report that displayed various alternatives for restoring injured resources.

Based on further evaluation and consideration of comments received, the State has identified several additional tasks that it desires to undertake this summer. This document (Assessment Plan, Part III) describes the methodologies and sampling that will be implemented to perform these tasks.

1.2 Public Review and Comment

In accordance with the DOI regulations, Part III of the Plan is being made available for review and comment by ARCO, other natural resource trustees, Federal agencies or Indian Tribes, and any interested members of the public for a period of 30 days. Comments may be submitted in writing to:

Natural Resource Damage Program
Old Livestock Building
1310 East Lockey Avenue
Helena, MT 59620

The State may modify Part III following its review of submitted comments. Any modifications that in the judgment of the State are significant will be made available for subsequent review and comment.

2.0 ASSESSMENT TASKS

The tasks described in Part III focus exclusively on aquatic resources. The tasks include:

- trout population surveys of the Clark Fork River and reference streams
- temperature monitoring of the Clark Fork River, tributaries, and reference streams
- dissolved oxygen monitoring of reference streams
- periphyton analysis of Clark Fork River riffle environments
- analysis of Clark Fork River trout gut contents
- dissolved organic carbon monitoring of the Clark Fork River

The Aquatics Resources Report of Assessment and Appendices (Lipton et al., 1993a, 1993b) may be consulted for information on the assessment and details of original assessment work on which many of these tasks are based.



3.0 TROUT POPULATION SURVEYS

3.1 Objectives

Trout population densities in Silver Bow Creek, the Clark Fork River, and matched reference streams were surveyed over the July - October 1991 period using snorkeling and electrofishing techniques. Populations in test and reference reaches were compared to quantify injury to trout caused by releases of hazardous substances. Trout populations in Silver Bow Creek were found to be non-existent. Trout populations in the Clark Fork River were found to be substantially less than populations in reference streams.

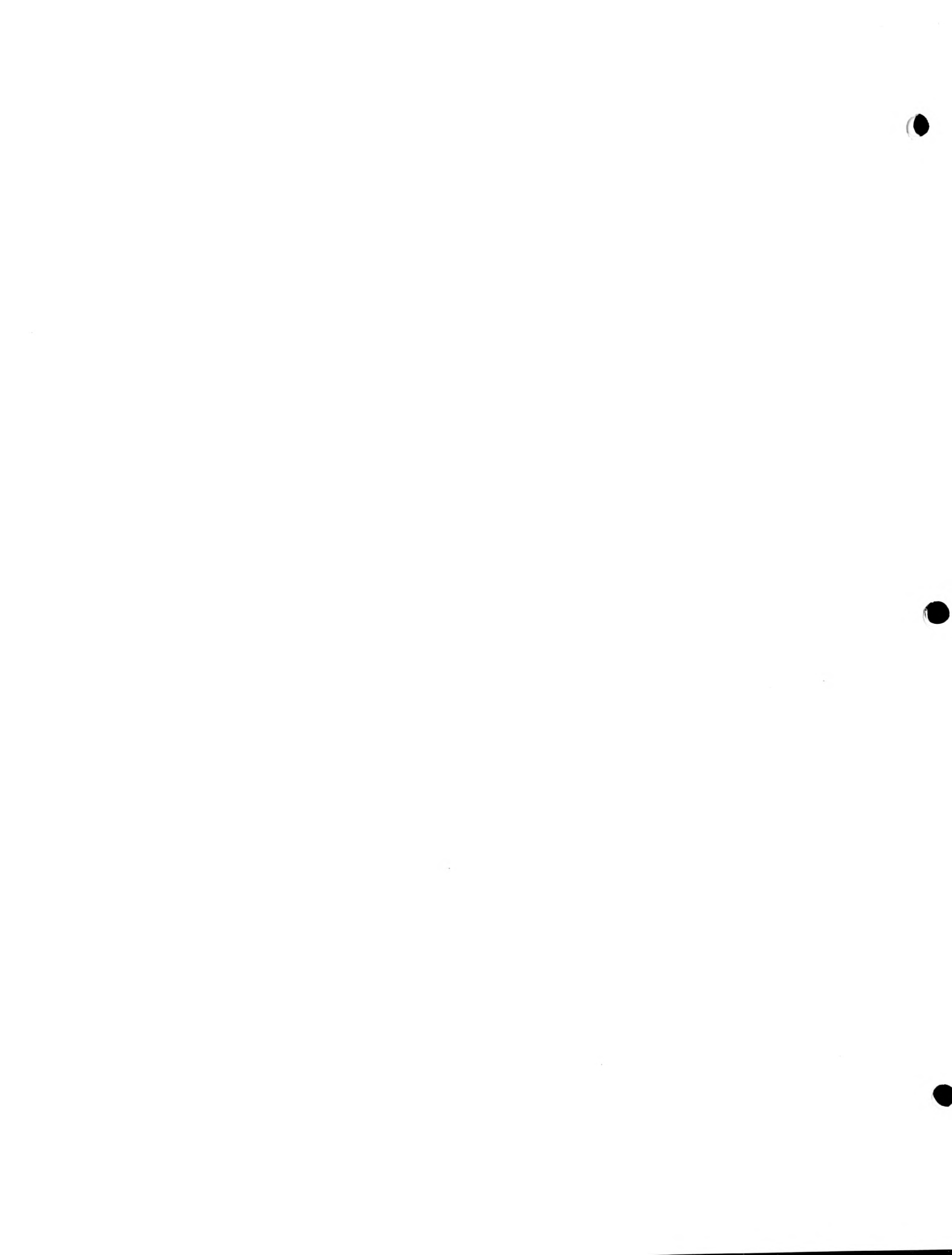
The objective of this study is to evaluate seasonal and annual influences on trout populations in the Clark Fork River and its reference streams, and to compare two trout population estimating techniques: snorkeling and mark-recapture. These objectives will be accomplished in three tasks.

3.2 Methodology

Stream reaches used for trout population work in Tasks 1 and 2 are the same as those used in 1991. Reaches on the Clark Fork River and reference streams were selected using a hierarchical classification that identified distinctive ecologic, geologic, geomorphic, hydrologic, and state or condition segments. Trout populations are estimated by direct underwater observation (snorkeling). More details on site selection and snorkeling methodologies are provided in the Aquatic Resources Injury Assessment Report, Appendix G (Lipton et al., 1993b).

Task 1: This task will be conducted to evaluate seasonal influences on trout populations. Stream reaches located on the Clark Fork River near the confluence of tributary streams, and their matched reaches on reference streams, will be surveyed four times between June and September. Clark Fork River reaches will be located near Racetrack Creek, Little Blackfoot River, Flint Creek, and Rock Creek. Matched reference reaches are located on the Big Hole River, Flint Creek, and Rock Creek. Reaches will be surveyed in June, July, August, and September (times are subject to acceptable flow and water conditions). Trout populations in the Clark Fork River and reference reaches will be compared over the four sampling periods to determine seasonal effects on trout abundance and distribution.

Task 2: This task will be conducted to evaluate annual variation in trout populations. Stream reaches in the Clark Fork River and matched reference streams that were surveyed in 1991 will be resurveyed in July 1994. Stream reaches on Silver Bow Creek and its reference streams will not be resurveyed.



Task 3: This task will be conducted to compare the two trout population estimation techniques: snorkeling and mark-recapture. Immediately following snorkeling accomplished under Task 2, trout will be shocked, marked and then recaptured in at least three reaches of the Clark Fork River to estimate population number. Populations estimated by direct visual observation (snorkeling) and mark-recapture will be compared.

3.3 Data collection, sampling methodologies and sample analysis

Data collection will include number of trout per reach, trout species, size or age, and length measurements to develop biomass information using length-weight regression relationships. Streamflow will be obtained at sites where United States Geological Survey (USGS) gauging stations exist. Water temperature at the time of snorkeling will also be measured.

4.0 TEMPERATURE MONITORING

4.1 Objectives

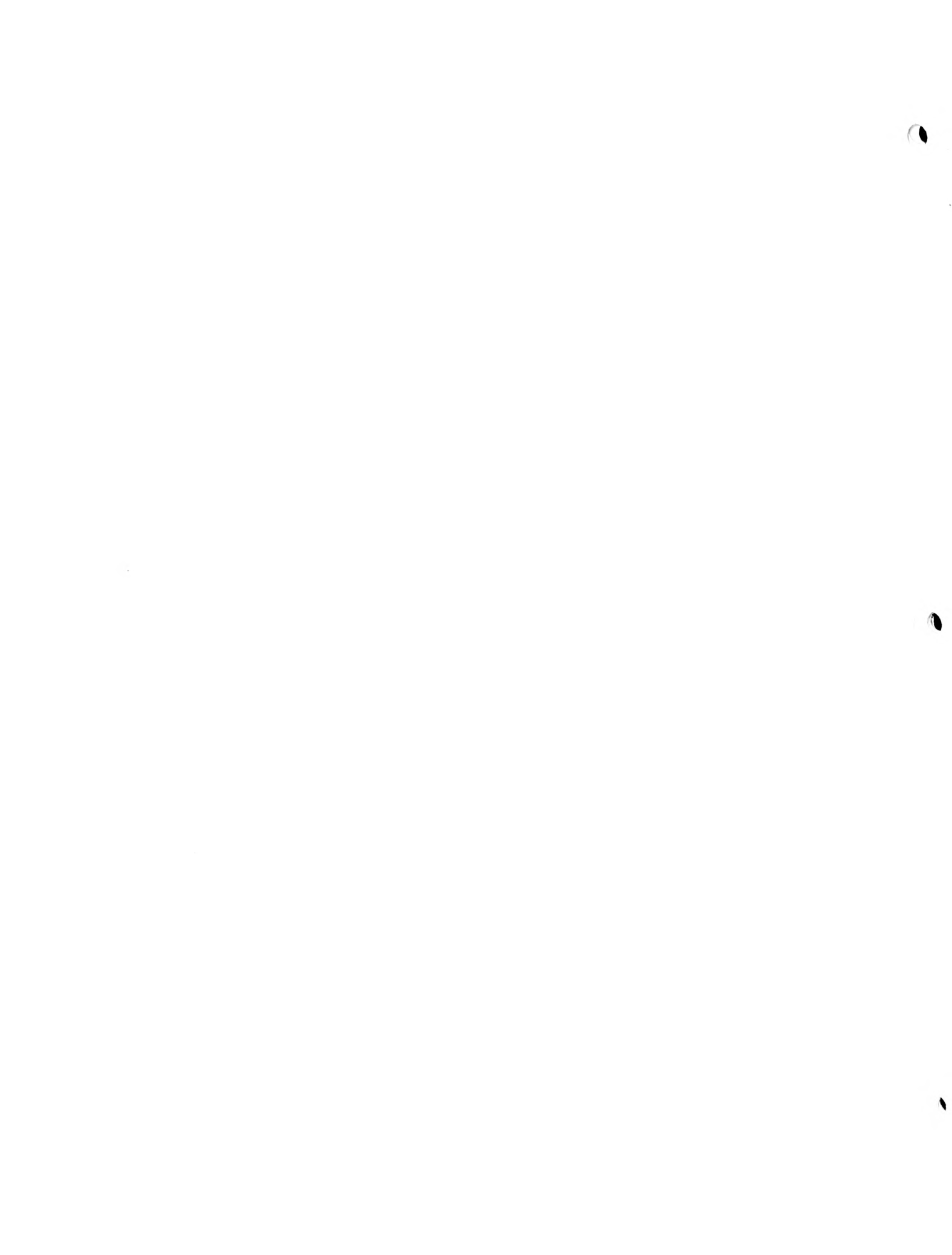
The objective of temperature monitoring is to characterize water temperature profiles of the Clark Fork River, tributaries to the Clark Fork River, and other non-tributary reference streams during post-runoff and summer low-flow conditions.

4.2 Methodology

Water temperature data will be collected from four reaches of the Clark Fork River located near important tributaries, and from these same tributary streams. These tributaries are Racetrack Creek, Little Blackfoot River, Flint Creek, and Rock Creek. Flint Creek and Rock Creek are also reference streams for the trout population work described in Tasks 1 and 2 of the trout population study. Water temperature data will also be collected from the other trout population reference streams not tributary to the Clark Fork River (Big Hole River and Ruby River). Temperature monitoring will be coordinated with similar monitoring that will be undertaken by the Montana Department of Fish, Wildlife, and Parks this summer. Continuous temperature data loggers (Onset "StowAway" water temperature data logger) will be deployed in early June, prior to the first of four repeat surveys described in Task 1 of the trout population survey.

4.3 Data Collection, Sampling Methodologies and Sample Analysis

Water temperature data will be collected continuously from early June through the duration of the trout population surveys (mid-September) at an interval of approximately 15 to 30 minutes. Maintenance of data loggers and retrieval of temperature data will be undertaken monthly.



5.0 DISSOLVED OXYGEN MONITORING

5.1 Objectives

The objective of dissolved oxygen monitoring is to measure and evaluate dissolved oxygen concentrations in the reference streams used for trout population surveys.

5.2 Methodology

Dissolved oxygen will be measured in the four trout population reference streams (Big Hole River, Ruby River, Flint Creek, Rock Creek). Measurements will be made during the early morning hours (about midnight to 6am) on one or two mornings during the summer when streamflows are low, water temperatures are relatively high, and dissolved oxygen concentrations are generally lowest (i.e. mid-July through mid-August).

5.3 Data Collection, Sampling Methodologies and Sample Analysis

Dissolved oxygen will be measured using the Winkler titration method following Field Procedures Manual (FPM) Method 5.2.3 (MDHES 1991).

6.0 ANALYSIS OF TROUT GUT CONTENTS

6.1 Objectives

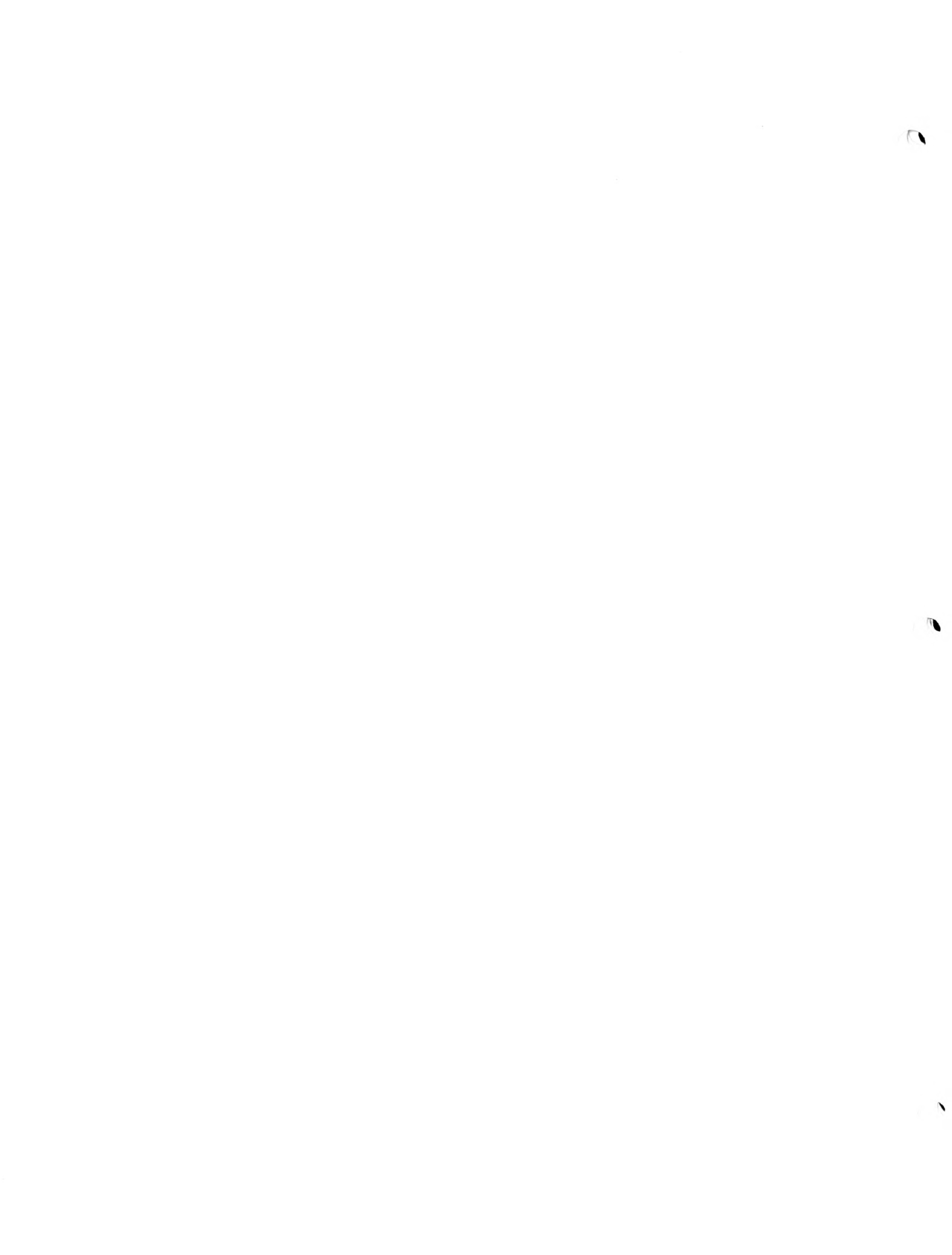
The objective of this task is to measure hazardous substance concentrations in the gut contents of brown trout in the Clark Fork River and a reference stream (Big Hole River).

6.2 Methodology

Gut contents of brown trout will be collected from three locations on the Clark Fork River (Warm Springs, Gold Creek and Turah) and one reference stream (Big Hole River).

6.3 Data Collection, Sampling Methodologies and Sample Analysis

Gut contents will be analyzed for the hazardous substances cadmium, copper, lead and zinc. Sample collection and analysis will adhere to the QAPP (NRDP, 1992), and will follow standard U.S. Environmental Protection Agency (EPA), USGS, and Montana Department of Health and Environmental Sciences (MDHES) methodologies.



7.0 COLLECTION OF SAMPLES FOR DISSOLVED ORGANIC CARBON

7.1 Objectives

The objective of this task is to characterize concentrations of dissolved organic carbon in the Clark Fork River.

7.2 Methodology

Grab samples for dissolved organic carbon will be collected at seven locations on the Clark Fork River: Warm Springs, Perkins Lane, Galen, Deer Lodge, Gold Creek, Bearmouth, and Turah. Samples will be collected in August during summer low-flows.

7.3 Data Collection, Sampling Methodologies and Sample Analysis

Sample collection, preservation and analysis will adhere to the QAPP (NRDP, 1992), and will follow FPM Method 6.1.1 and NRDP SOP 9.1. Dissolved organic carbon will be analyzed by EPA Method 415.1.

8.0 PERIPHYTON ANALYSIS OF RIFFLE ENVIRONMENTS

8.1 Objectives

The objective of periphyton analysis is to characterize hazardous substance contamination of riffle environments in the Clark Fork River, tributaries to the Clark Fork River, and a reference stream. Riffle environments are the preferred habitat of many benthic macroinvertebrate species.

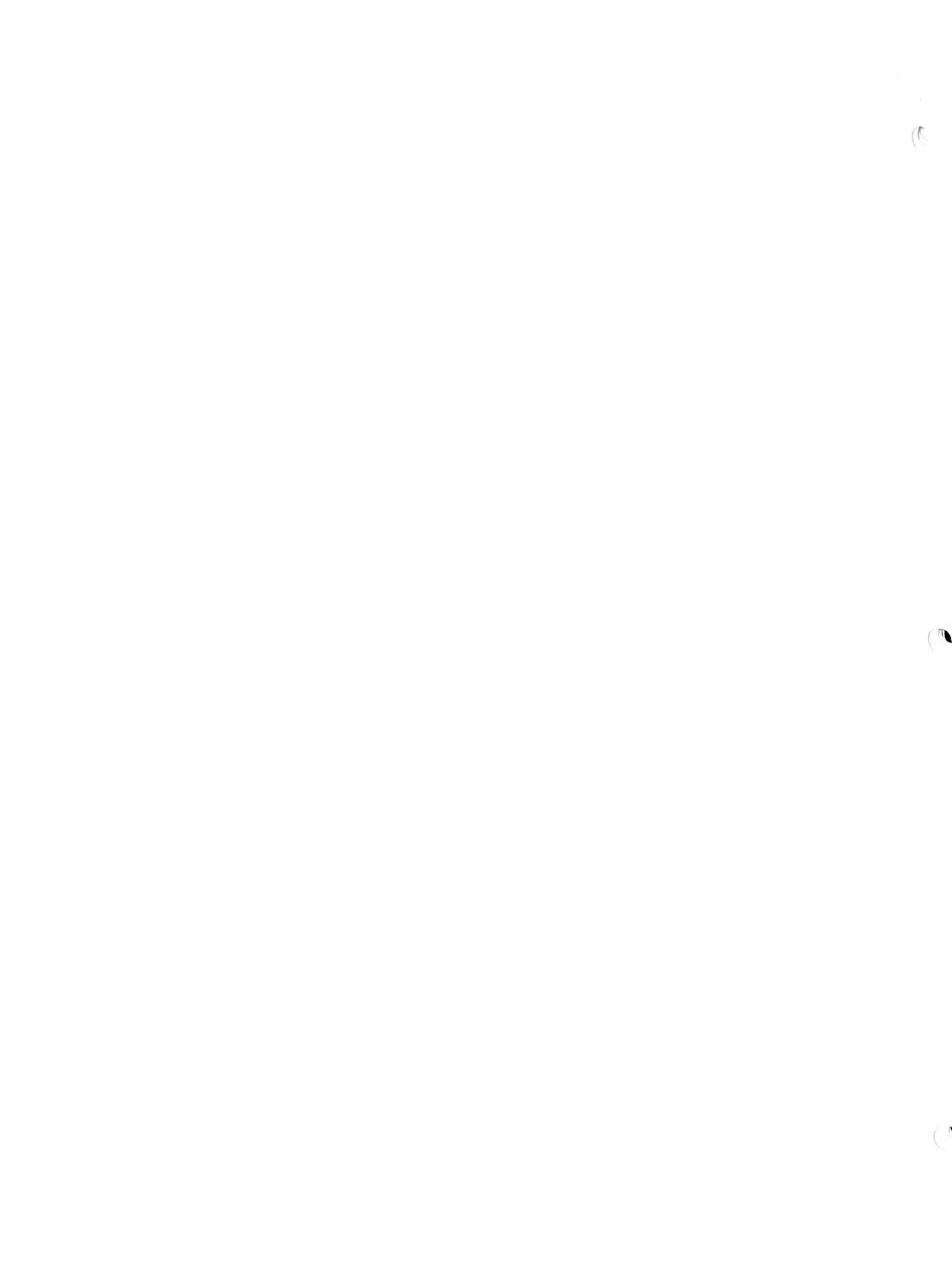
8.2 Methodology

Periphyton samples will be collected from riffle environments in the Clark Fork River and tributary streams. Sampling locations include the Clark Fork River (near Warm Springs, Galen, Deer Lodge, Gold Creek, Bearmouth, and Turah); tributary streams (Warm Springs Creek, Little Blackfoot River, Flint Creek, and Rock Creek); and a reference stream (Big Hole River). Replicate samples will be collected at three locations. Material will be gathered from the flowing riffle areas only, and not from nearby backwater or depositional areas. Sampling will be timed to coordinate with benthic macroinvertebrate and sediment sampling that will be conducted by USGS in July or August for the Clark Fork Basin long-term monitoring study.



8.3 Data Collection, Sampling Methodologies and Sample Analysis

Sample collection, preservation and analysis will adhere to the QAPP (NRDP, 1992). Rocks and cobbles of riffle sites will be scraped to collect periphyton and associated sediment following FPM Method 6.2.2. Periphyton samples will be analyzed for the hazardous substances cadmium, copper, lead and zinc following standard EPA, USGS, or MDHES methodologies.



9.0 References

Lipton, J., Bergman, H., Hillman, T., Kerr, M., Moore, J. and Woodward, D. 1993a. Aquatic Resources Injury Assessment Report, Upper Clark Fork River Basin. Prepared for State of Montana Natural Resource Damage Program. June, 1993.

Lipton, J., Bergman, H., Hillman, T., Kerr, M., Moore, J. and Woodward, D. 1993b. Aquatic Resources Injury Assessment Report, Upper Clark Fork River Basin. Appendices A - G. Prepared for State of Montana Natural Resource Damage Program. June, 1993.

MDHES (Montana Department of Health and Environmental Sciences). 1991. Field Procedures Manual. Collection, Analysis, and Reporting of Water Quality Samples. Water Quality Bureau. Helena. June, 1991.

NRDP (Natural Resource Damage Program). 1992. Assessment Plan: Part 1. Clark Fork River Basin NPL Sites, Montana. State of Montana. January, 1992.

