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United States
Department of
Agriculture

Forest Service

**Rocky Mountain
Forest and Range
Experiment Station**

Fort Collins
Colorado 80526

**Stream Systems
Technology Center**
General Technical
Report RM-GTR-270a

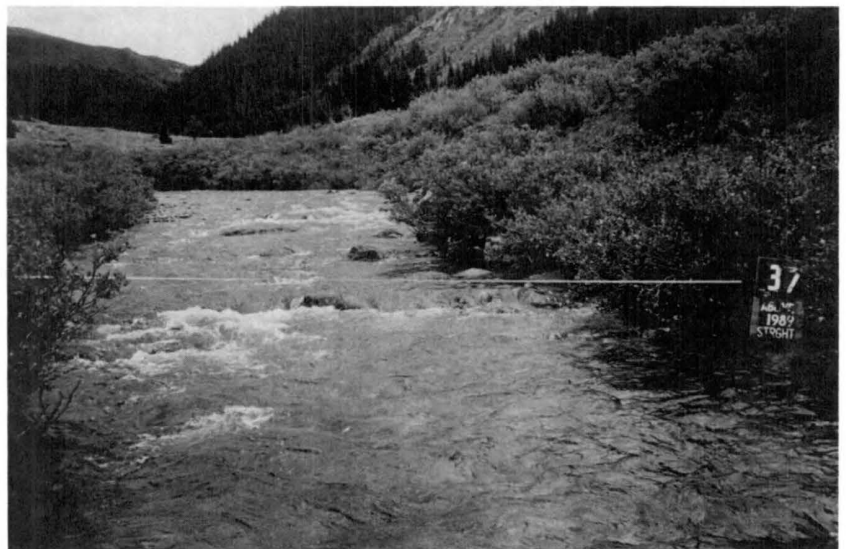


Summary of Technical Testimony in the Colorado Water Division 1 Trial

Executive Summary

Nancy Gordon

Lost Man
Creek
Above
Diversion



Lost Man
Creek
Below
Diversion



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Abstract: Executive Summary

This executive summary, a companion to RM-GTR-270, **Summary of Technical Testimony in the Colorado Water Division 1 Trial**, is intended primarily for managers. The Colorado Water Division 1 water rights trial was one of the most significant federal reserved instream flow water rights cases to occur since the Supreme Court of the United States ruled in the case of *United States v. New Mexico* in 1978. This short document summarizes the history of federal reserved water rights, outlines the major issues argued in the case, and presents the court's decision.

Key Points for Managers to Consider in Approaching Future Adjudications

- **Anticipate and strategically plan for adjudications.** Prioritize resource values and concerns. Identify potential conflict, and determine the availability of data to support instream flow claims. Focus efforts on high priority sites that have the potential for a strong set of facts that will sustain your claim.
- **Make the necessary commitments of dollars and personnel** consistent with strategic needs.
- **Develop a study design** for the adjudication and begin data collection as early as possible.
- **Identify and involve appropriate research personnel and other technical experts** early in the process to assist with study design, data collection, data analysis, and validation of technical theories to support instream flow quantifications.
- **Involve the Office of General Counsel** in all phases of planning.
- **Use standard data collection and analysis techniques** and place special emphasis on quality control. Data must be able to withstand the scrutiny of other experts and the court. Remember, the United States bears the burden of proof in most adjudications.
- **Inform the public** that instream flows are a non-consumptive use of the water, that is, water needed for instream flows remains in the channel and is available for downstream uses by others once it leaves the National Forest. The conflict between instream flows and other uses of water is often more a matter of perception than reality. Emphasize that the public derives multiple benefits from water that is left in the stream.
- **Seek technical advice** from the Stream Systems Technology Center in Fort Collins.

Source: Stream Systems Technology Center



Prepared in support of the National Stream Systems Technology Center mission to enable land managers to "secure favorable conditions of water flows" from our National Forests.

Summary of Technical Testimony in the Colorado Water Division 1 Trial

Volume 1: Overview

**Concerning the application for water rights of the
United States of America for reserved water rights in the
Platte River, in Boulder, Park and Teller counties**

Judge Robert A. Behrman presiding

**Case held at Greeley, Colorado from
January-December, 1990**

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Preface

The Colorado Water Division 1 water rights trial was one of the most significant federal reserved instream flow water rights cases to occur since the Supreme Court of the United States ruled in the case of *United States v. New Mexico* in 1978. The water Division 1 case is unique in the large amount of expert testimony presented and in how the Judge evaluated the testimony and evidence in reaching his decision.

We believe that this synthesis of case testimony provides important information regarding fluvial geomorphology, hydrology, and related subjects. More importantly, readers will learn that consistency, quality control and testing of approaches are essential in describing the minimum instream flow necessary to sustain a stream channel. They will also find that the purposes of the federal reservation vitally influence the decision. In having a mandate for conservation and use, the Forest Service must consider how the instream flow regime benefits downstream users that rely on the National Forests for their water supply.

THE PURPOSE OF THIS PUBLICATION IS TWO-FOLD

First, it serves to summarize the large amount of technical data and information pertaining to the disciplines of geomorphology, hydrology, and sediment transport mechanics compiled and presented to the judge during the Water Division 1 trial. Some of the data from fluvial study sites established by the Forest Service in anticipation of the trial are presented in the publication. In addition, the summary discusses channel formation and maintenance as viewed by scientists with differing opinions and allows readers to form their own judgment about the technical merits or validity of differing viewpoints.

Secondly, this publication has been prepared to help managers and scientists understand how one experienced Water Court Judge viewed the testimony and technical evidence presented. By highlighting some of the strengths and weaknesses, we can learn important lessons. This knowledge will help make future cases more understandable and compelling.

THE TECHNICAL SUMMARY IS PREPARED IN TWO PARTS

1. The **Executive Summary** is intended primarily for managers. This short document summarizes the history of federal reserved water rights, outlines the major issues argued in the case, and presents the court's decision.
2. The **Summary of Technical Testimony in the Colorado Water Division 1 Trial** is intended for technical specialists and others interested in a detailed understanding of the case and its technical arguments. It is divided into 8 sections:

- Section 1. Overview of the Water Division 1 Case
- Section 2. History and Policy Issues
- Section 3. Theories on Channel Formation and Maintenance
- Section 4. The Character of Streams in Water Division 1
- Section 5. Field Data Collection and Analysis
- Section 6. Sediment Transport in Mountain Streams
- Section 7. The United States Quantification Procedure
- Section 8. The 1990 Alternative Quantification Procedure

In Water Division 1, the Department of Justice, representing the Forest Service and acting on behalf of the United States, filed federal reserved water rights claims for instream flows based on the Organic Act interpretation of favorable conditions of water flows. These claims to instream flows were challenged by the State of Colorado and water conservancy districts in northern Colorado that divert water from National Forests.

The United States claimed it needed to keep a certain amount of water in National Forest streams to protect stream channels and timber. Opponents feared future development of water storage projects within the National Forests would be nearly

impossible if channel maintenance instream water rights were granted.

The case, which started in 1976, went to trial in 1990 in District Court, Water Division 1, of the State of Colorado. Closing arguments were made in March 1992 and Judge Robert Behrman issued a "Memorandum of Decision and Order" on February 12, 1993.

During the one year duration of the trial, Judge Behrman heard testimony from 49 expert witnesses and evaluated 1,500 exhibits. The case was unusual in that more than one half of the testimony dealt with the highly technical sciences of hydrology and geomorphology.

In his ruling, Judge Behrman recognized that reserved water rights of the United States include channel maintenance purposes. However, with regard to specific claims, Judge Behrman concluded:

- "The applicant (United States) has failed to show that the reserved water rights claimed are necessary to preserve the timber or to secure favorable water flows for private and public uses under state law."
- "The applicant (United States) has failed to establish the minimum amount of water needed to ensure that the purposes of the reservation of the national forests in Water Division 1 will not be entirely defeated."

The court, however, granted the United States reserved water rights for administrative sites and fire-fighting purposes and suggested that the Forest Service could use its special use permitting authority to control diversion within the National Forests in lieu of obtaining water rights.

DISCLAIMER

This document was prepared by Nancy Gordon of Engineers Inc. under contract to the Stream Systems Technology Center, Rocky Mountain Forest and Range Experiment Station. The author did not

participate in the case, attend any of the court proceedings, or have in-depth knowledge of Forest Service channel maintenance procedures prior to the contract. Information used to prepare this summary was obtained almost exclusively from a reading of the court reporter's transcripts of the trial (more than 15,000 pages) and examination of trial exhibits.

Any interpretation or representations of Forest Service policy, the legal positions of the United States, the State of Colorado, or others involved in the trial, are those of the author and do not necessarily reflect the policies, viewpoints, positions, or interpretations of the United States, the Forest Service, or others.

Readers will notice that some of the illustrations lack the high quality of original art work usually found in Rocky Mountain Station publications. We purposely chose to use the original court exhibits with only slight editing. We want the reader to have an impression of what was presented and how it was illustrated rather than precise details. Our goal is to maintain high fidelity with the case as presented and to avoid introducing changed or different material than what was offered in court.

ABOUT THE AUTHOR

Nancy Gordon is presently employed as an engineer/hydrologist by Engineers Inc., a consulting firm in Silver City, New Mexico, and is also an Assistant Adjunct Instructor at Western New Mexico University. She has a B.S. in botany from Northern Arizona University and a M.S. in civil engineering with emphasis in hydrology from New Mexico State University. She is senior co-author of the book, *Stream Hydrology: An Introduction for Ecologists*, with Thomas McMahon and Brian Finlayson.

Executive Summary

Overview of the WD1 Case

This case was part of an adjudication process in which the U.S. was claiming water rights for the Arapahoe, Pike, Roosevelt and San Isabel National Forests within Water Division No. 1 (WD1) in Colorado. The National Forests were located on the east side of the Continental Divide, and contained the headwaters of the Laramie and South Platte Rivers (fig. 1).

Opposers included the State of Colorado, City and County of Denver, and several irrigation districts which all had concerns about the potential effects of the U.S.'s claims on existing water rights and on the development of future water supply projects within National Forests. The U.S. also entered into stipulations with a number of water users who didn't participate in the trial. These

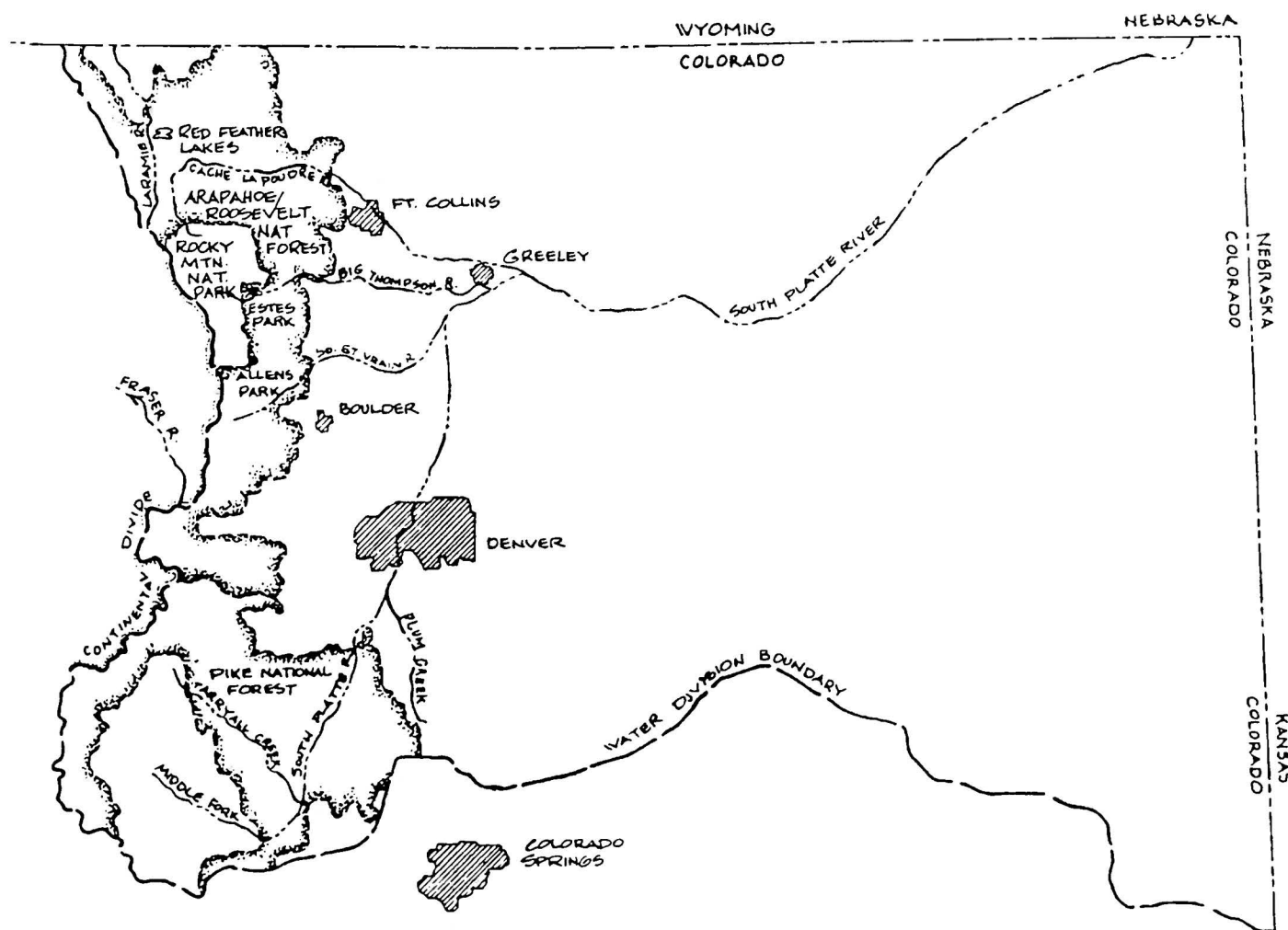


Figure 1.—Location of map for Water division 1 in northern Colorado.

included the cities of Fort Collins, Greeley, Longmont and Thornton. In its settlements, the U.S. subordinated its claims to those of the other water users (i.e. gave them seniority). Appendix A contains information on participants in the WD1 trial.

In its application, the U.S. claimed federal reserved water rights for these purposes:

- fire fighting (an unlimited amount),
- administrative sites (not more than 10 acre-feet per site per year and not more than 1 site per 100,000 acres of national forest, with actual quantities to be determined when the need arose),
- instream flows for channel maintenance (including baseflow, bankfull and rise/recession components, with the total amount claimed averaging 50% of average annual runoff).

Water rights for the first two purposes met little opposition and were approved by the Court. In the judge's words, the third purpose was the focus of "a lengthy trial" in which "a vast number of exhibits were introduced" (2/12/93 Decision, p. 1).

Appendix B provides a brief chronology of the WD1 case. The U.S. originally filed its applications for water rights in WD1 in 1976. The case was not tried until 1990, and the Court's final decision was issued February 12, 1993. The U.S. spent an estimated \$10 million on its case and the opposers' costs also ran into the millions of dollars. The case was important in that its outcome would influence future adjudications on National Forest lands not only in Colorado but across the country (Walch 1/8 at 4-5). The U.S. had never before been awarded reserved water rights for instream flows on National Forest lands (Woodward 1/8 at 71).

HISTORY OF FEDERAL RESERVED WATER RIGHTS

The history of the WD1 case was strongly influenced by ongoing legislation concerning federal reserved water rights; in fact, this case would play a key role in defining these rights on National Forest lands.

Reserved water rights on Federal lands exist by implication rather than by statute. In the 1963 Arizona v. California case, the court referenced the Winter's case of 1908 which defined the Reserved Rights Doctrine. In the Winter's case, which involved an Indian reservation, the Court stated that when the U.S. reserved lands for a particular purpose, there was also sufficient water reserved to

meet the purposes of that reservation. The water rights had a priority date as of the date of reservation. The U.S. was still required to identify and quantify those rights in state courts. In the WD1 case, the U.S. maintained that federal reserved water rights in WD1 were obtained when lands were set aside as public forest reservations during the period 1892-1916 (U.S. brief 9/9/91 at 1).

The 1978 U.S. Supreme Court decision in U.S. v. New Mexico (the "Mimbres Decision") concluded that water could be reserved for National Forests:

"only where necessary to preserve the timber or to secure favorable water flows for private and public uses under state law" (2/13/90 Decision, p. 2-3)."

This decision was based on the Supreme Court's interpretation of the Organic Act which defined the purposes for which forest reservations could be made. Section 1 of the Organic Act, dated June 4, 1897, contained this statement (1/8 at 7):

"No public forest reservation shall be established except to improve and protect the forest within the boundaries or for the purpose of securing favorable conditions of water flows and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States."

As a result of the Mimbres decision, the WD1 applications were amended in 1984 to limit claims to the amount required to secure favorable conditions of water flows in streams, along with claims for administrative sites and fire-fighting which were deemed necessary for both timber and water protection. This was the U.S.'s first attempt to quantify instream flows for channel maintenance in a courtroom setting.

In a subsequent case, U.S. v. Jesse (1987), the Colorado Supreme Court concluded that the U.S. could claim instream flow rights to achieve the purposes of the Organic Act (2/12/93 Decision, p. 1). In the Jesse case, the Court had stated that for each federal claim for reserved water rights, the trier of fact must (1/8 at 10):

- "examine the documents reserving the land from the public domain and the Organic Act,
- determine the precise federal purposes to be served by such legislation,
- determine whether water is essential for the primary purposes of the reservation, and finally,
- determine the precise quantity of water necessary to satisfy such purposes."

In the WD1 case, both sides presented evidence addressing each of these areas.

Work to further refine the WD1 claims was accelerated after the Jesse case. After consultation

with renowned experts in fluvial geomorphology, the U.S. developed its position that the term "favorable conditions of water flows" referred to the timing and magnitude of flows necessary for maintaining channels so they would not become clogged with sediment and encroaching vegetation, which would reduce their capacity for passing flood flows. Without channel maintenance flows, "unfavorable conditions" of accelerated streambank erosion, channel instability and accelerated deposition of sediment in reservoirs could occur. U.S. teams carried out an extensive field data collection and analysis program in 1988 and 1989 using a refined claim methodology. Another amended application was filed in 1989. This application and methodology were the basis for the WD1 trial which began in January 1990.

ISSUES IN THE WD1 CASE

The U.S. had the burden of proof in this case. During the trial, expert witnesses argued both sides of the historical evidence for channel maintenance flows, and about the technical theories and methodologies used for forming the claims. Data collection was also continued during the course of the trial in the 1990 field season. The U.S.'s procedures for claiming instream flows were outlined in Chapter 30 of a Forest Service handbook; however, the actual methodology was continuously evolving. The WD1 claims represented a departure from procedures given in the version of Chapter 30 which was in place at that time. This was one of the main points of contention made by the opposition. A brief summary of issues in the WD1 case is presented in Table 1.

Table 1.—Summary of major issues argued in the Water Division No. 1 case.

Issue	U.S. position	Opposition position
Reserved water rights	The U.S. was entitled to water under the Reserved Rights Doctrine for channel maintenance purposes.	The U.S. didn't have a reserved water right for channel maintenance flows. It didn't need water rights because it had other mechanisms for controlling diversions such as special use permits.
Meaning of "favorable conditions of water flow"	Forest and channel conditions which would ensure conveyance of water to valleys below without excessive flooding, erosion or sedimentation.	Streamflow hydrographs which matched demands of irrigation and domestic users, e.g. by using reservoir storage to store spring runoff for use later in the summer.
Form of the U.S. claim hydrograph	The amounts claimed were the minimum amount needed and were non-consumptive. They left an average of 50% of the annual runoff for diversion. The 1990 claims addressed many of the criticisms given by opposition witnesses.	Because of variability in the claim methodology and in quantifying sediment load in the streams, the U.S. claims were for more water than what was really needed. The 1989 claims didn't match the actual runoff hydrographs, so they didn't even accomplish the purposes of channel maintenance.
Injury to other water users	Injury was not really an issue. Allowances had been made for other water users in the structure of the claims, the location of quantification points, and through settlements with water users.	Injury was a main issue. The U.S. claims would restrict diversion of water during the critical spring runoff period. The error bands on the U.S.'s claims were significant amounts of water. Colorado's water rights had developed over a long period of time without allowing for a senior U.S. water right, and to impose it now was injurious.
Bankfull flow level	This level had a geomorphic definition as the level of the present floodplain, identified in the field by the tops of bars or changes in vegetation or substrate.	The physical top of the streambanks, identified by a break in slope in the cross-section profile.
Adjustable nature of channels	The channels would adjust to frequently occurring flows. Bankfull flow was the effective discharge which controlled channel shape.	Because channel boundaries contained large boulders transported by megafloods or glacial action, and bedrock, log jams and beaver dams, they would not adjust to bankfull discharge.
Sediment transport	The mountain streams transported a substantial amount of sediment which would accumulate without the channel maintenance flows. Bedload was hydraulically-controlled.	The streams transported minimal amounts of sediment. There was less material available than what the stream could carry (i.e. the streams were supply-limited).
The effect of diversions	Measurements taken above and below diversions generally showed a decrease in channel size and an increase in vegetation downstream. Some downstream channels had almost disappeared entirely.	The U.S.'s measurements were biased. The effect of diversions was overwhelmed by other factors such as changes in geology and slope. Channels downstream of 100-year old diversions did not show adverse impacts.

THE COURT'S DECISION

In his final decision on February 12, 1993, Judge Behrman concluded that:

- The U.S. failed to show that the reserved water rights claimed were necessary to "preserve the timber or to secure favorable water flows for private and public uses under state law."
- The U.S. failed to establish the minimum amount of water needed to ensure that the purposes of the national forests would not be entirely defeated.

He ruled that reserved water rights for fire-fighting and administrative sites were necessary, and ordered decrees granting an unlimited amount of water for fire-fighting and an amount for administrative sites as explained earlier. The 1990 amendment was denied. Other than the decrees for water rights for fire-fighting purposes and administrative sites, the U.S. applications were denied (2/12/93 Decision, p. 32-33).

In his ruling, the judge concluded that the Organic Act and other legislation had regarded irrigation and domestic use as the principle purpose for maintaining favorable conditions of water flows. "Favorable conditions" were those which evened out stream-flows for those uses, and included reservoir storage. The U.S.'s assertion that its claims were nonconsumptive did not take into account the effect of timing; i.e. most of the water available for junior storage was during the spring runoff period, which would be most affected by the U.S. claims.

The judge also ruled that the U.S. had "broad powers" to regulate diversions within national forests and that the permitting system had been adequate for over 100 years. He did not see any limitation in the Organic Act restricting uses of diverted water, and said, "diversion for use outside the forests seems clearly to be

anticipated" (Decision, p. 19). He believed that the streams in WD1 would not dry up without the claims because of downstream senior demands. Finally, he concluded that it was inconceivable that Congress had intended for reserved water rights to interfere with use for irrigation and domestic purposes (Decision, p. 20).

According to Walch (pers. comm., 8/3/94), the judge did effectively rule that the Forest Service had reserved water rights for channel maintenance purposes. Walch based this interpretation on these statements in the Court's Decision (p. 20):

"It is this court's view that channel maintenance is necessary to effectuate a purpose of the National Forests. But such maintenance is required only to a reasonable degree consistent with both the requirements of stream flows and the necessities of efficient irrigation and domestic use."

and (p. 13):

"Different considerations may apply to cases where there is a potential for diversions at points above the national forests or in inholdings. Those matters should be resolved in applications limited to such circumstances. In this way the matters can be resolved in a manner suited to the specific requirements of each situation."

Therefore, the Forest Service could make future applications for federal reserved water rights for instream flows where diversion of water from streams in private inholdings might affect streams on surrounding National Forest lands. For diversions located within Forest lands, the Forest Service would have to use special permitting or other methods of control.

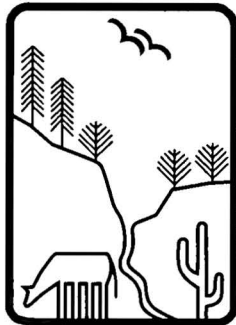
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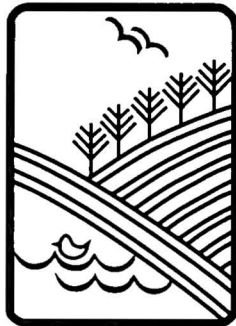




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Rocky Mountain Forest and Range Experiment Station

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