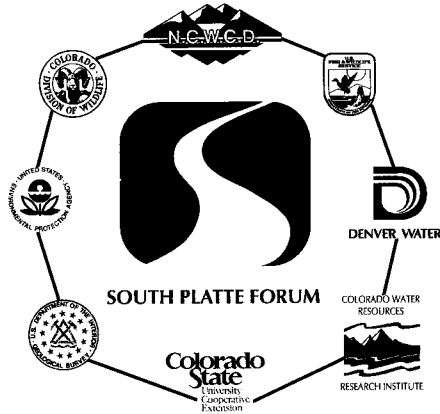


The South Platte: Old River – New Course? Changes in Land and Water Use in the South Platte Basin

*Proceedings of the 10th Annual
South Platte Forum
October 27-28, 1999
Longmont, Colorado*



Lindsay Martin, Editor

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Sponsored by:
Colorado Division of Wildlife
Colorado Water Resources Research Institute
Colorado State University Cooperative Extension
Denver Water
Northern Colorado Water Conservancy District
U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency
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**Colorado
State**
University

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U.S. Environmental Protection Agency
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Jay Skinner, CO Division of Wildlife
Robert Ward & Lindsay Martin, CWRI

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**Colorado Water Resources Research Institute
Colorado State University
Fort Collins, Colorado 80523-2018
Robert C. Ward, Director**

Preface

The South Platte Forum was initiated in 1989 to provide an avenue for the multi-disciplinary exchange of information and ideas important to resource management in the South Platte River Basin. Its stated mandates are:

- to enhance the effective management of natural resources in the South Platte River Basin by promoting coordination between state, federal, and local resource managers and private enterprise, and
- to promote the interchange of ideas among disciplines to increase awareness and understanding of South Platte River Basin issues and public values

The South Platte River is the principal water source for Colorado's ever-growing Front Range. The management of growth issues in the South Platte Basin is moving traditional water and land uses beyond historical patterns. Potential interstate litigation, the Endangered Species Act, and federal permitting requirements are limiting water use. Can these changes in traditional water and land uses be integrated in a way that satisfies the competing demands of various interest groups?

Colorado's position as an upstream state places us in a unique situation. We are faced with challenges from downstream states, new federal and state legal requirements, and rapidly-changing perspectives. Instream flow requirements, groundwater quality, endangered and threatened species, and the use of new technologies in watershed management are all issues that need to be addressed. The 1999 South Platte Forum examines many of these issues.

KEYNOTE PRESENTATIONS

Wednesday, October 27th Luncheon ----- Bill Brown

Mr. Brown is a water lawyer with Fischer, Brown and Gunn in Ft. Collins, and is currently the South Platte Representative to the Colorado Water Conservation Board

Thursday, October 28th Luncheon ----- Greg Walcher

Mr. Walcher is the new Executive Director of the Colorado Department of Natural Resources, appointed by Governor Bill Owens

Table of Contents

The Mouse That Roared

Moderator: Jenny McCurdy, Denver Water

Preble's Meadow Jumping Mouse Listing

Peter Plage

1

Management for Endangered Species: Preble's Meadow Jumping Mouse

Steve Dougherty

2

Implementation of the Endangered Species Act at the Local Level

James R. Sullivan

3

Dealing with the Preble's Meadow Jumping Mouse Listing

Bennett W. Raley

4

The Bird-Dog Session

Moderator: Jay Skinner, Colorado Division of Wildlife

Status of the Mountain Plover Listing

Robert Leachman

5

Mountain Plover

Fritz L. Knopf

6

Status of the Black-tailed Prairie Dog Listing

Gary T. Skiba

7

To Your Health

Moderator: Marcella Hutchinson, EPA

Source Water Protection in the South Platte Basin

Dick Parachini

8

When Less Than is More Than Enough

Ben Alexander

9

Colorado Rural Water Association and Source Water Protection

Herman Wooten

10

Amendment 14, It's the Law

Moderator: Regan Waskom, CSU Cooperative Extension

Air Quality Control Commission and Amendment 14

Margie Perkins 11

Colorado Livestock Association and Amendment 14

Brad Anderson 12

Water Quality Commission Responsibilities to Amendment 14

Cindy Hickert 13

Panel Discussion - Fishes and Feathers: Three States Agreement

Moderator: Curt Brown, South Platte EIS

Wyoming

Rebecca Mathisen 14

Nebraska

Shari Miller 15

Colorado

Kent Holsinger 16

Criteria for Constructing Platte River Cooperative Agreement Water Action Plans

Daniel F. Luecke 17

From Your Backyard and Your Back 40 to My River

Moderator: Gene Schleiger, Northern Colorado Water Conservancy District

Nonpoint Source Pollution Issues and Solutions

Doug Lofstedt 18

Colorado Corn Growers' 319 Project

Jim Geist 19

League of Women Voters' Colorado Water Protection Project

Jeannette Hillery 20

Poster Session

Adoption of Irrigation Technology in Colorado – Is There a Research Gap? Troy Bauder, Regan Waskom, Marshall Frasier, Dana Hoag	22
The Colorado Collaborative Rain and Hail Study Nolan J. Doesken	23
Preliminary Investigations into the Sources and Nature of Salinity in The South Platte Basin, Northeastern Colorado P.A. Haby, J.C. Loftis	24
DNA Identification Markers for Differentiation of Western Jumping Mouse, Meadow Jumping Mouse, and Threatened Subspecies, Preble’s Meadow Jumping Mouse Barbara Karl, Nancy, Duteau, Bruce Wunder	25
Platte Watershed Program A Community-Based Watershed Awareness Initiative Gary Lingle, Tom Franti	26
Cache La Poudre Decision Support System Project Overview Paul Weiss, Todd Williams	27

Preble's Meadow Jumping Mouse Listing

Peter Plage¹

In May of 1998, the Preble's Meadow Jumping Mouse was listed as a federally-threatened species under the Endangered Species Act. Full federal protection was instituted one month later. In the past 16 months many Front Range residents have been treated to a crash course in what might be called "Endangered Species Act 101". Section 7 consultations, Section 9 take prohibitions, Habitat Conservation Plans, mouse consultants, Section 10 take permits, and 4(d) rules have become common jargon for some. The U.S. Fish and Wildlife Service, in cooperation with the State of Colorado, local governments, and a host of stakeholders, is attempting to conserve and recover the species while minimizing impacts to property owners and industries within its range.

¹Biologist, U.S. Fish and Wildlife Service and National Biological Service,
755 Parfet, Room 361 Lakewood, CO 80215 (303) 275-2370

Management for Endangered Species: Preble's Meadow Jumping Mouse

Steve Dougherty¹

With the May 1998 listing of Preble's meadow jumping mouse as federally threatened, landowners, developers, and local governments have scrambled to comply with the Endangered Species Act. Activities that potentially affect the mouse and its habitat and require federal authorizations, such as Section 404 permits, must comply with Section 7 of the Endangered Species Act, which requires consultation between federal agencies to address potential impacts to federally listed species. For most project proponents and local governments, the Section 7 consultation process is not new. Section 9 of the Endangered Species Act prohibits take of listed wildlife species and applies to activities with or without a federal nexus. Compliance with Section 9 of the ESA is relatively new for Coloradoans, and typically is accomplished through development of a habitat conservation plan (HCP) and a Section 10 permit that authorizes a level of take of a federally listed species incidental to the proposed project.

Project proponents with activities that may affect the mouse and its habitat have several options to address potential effects:

- Design the project to avoid direct mouse habitat
- Mitigate for unavoidable effects to the mouse and its habitat
 - Mitigation as part of a Section 7 consultation for a federally action (6 to 9 months);
 - An individual HCP and Section 10 permit (12 to 18 months);
 - Subregional HCP (24 to 36 months);
 - Interim measures?
 - Mitigation banking?

¹Ecologist, ERO Resources Corporation, 1842 Clarkson Street Denver, CO 80218 (303) 830-1188

Implementation of the Endangered Species Act At the Local Level

James R. Sullivan¹

The federal listing of the Preble's Meadow Jumping Mouse as a threatened species last year required local governments to become experts on the impacts of the Endangered Species Act. Commissioner Sullivan's talk covers becoming familiar with the ESA, identifying and understanding the options on how to deal with the law (i.e. activity by activity, regional habitat conservation plans, etc...), and one approach to handling the implementation of the law during the interim period before the HCP is finalized. In addition, Commissioner Sullivan will discuss some of the challenges of this partially funded federal mandate.

¹Douglas County Commissioner, 100 Third Street, Castle Rock, CO 80104
(303) 660-7400

Dealing with the Preble's Meadow Jumping Mouse Listing

Bennett W. Raley¹

The listing of the Preble's Meadow Jumping Mouse will carry with it many administrative, judicial and legislative issues. What the listing means in terms of implementation and the rights of property owners affected by the listing will be addressed.

¹Trout & Raley, P.C. 1775 Sherman Street, Suite 1300, Denver, CO 80203
(303) 861-1963

Status of Mountain Plover Listing

Robert Leachman¹

The mountain plover has been designated a federal candidate species by the Fish and Wildlife Service since 1982, and since 1989, has been actively monitoring its status throughout its breeding and wintering range. In 1997, the Service was petitioned by the Biodiversity Legal Foundation to list the mountain plover as a federally listed threatened species. The Service issued a proposal to list the mountain plover in 1999 based on a significant population decline combined with ongoing and future threats. The Service is now responding to the comments received regarding the listing proposal, and must publish a final decision in February 2000.

¹Staff Biologist, U.S. Fish and Wildlife Service, 764 Horizon Dr. Building B, Grand Junction, CO 81506 (970) 243-2778

Mountain Plover

Fritz L. Knopf¹

The continental population of Mountain Plovers (*Charadrius montanus*) declined steadily since BBS began keeping records in 1966. The species has been all but extirpated from the eastern portion of its historical range. Studies of the species in California, Colorado, and Montana since 1990 indicate very high rates of reproductive loss to predation in native habitats. Adult survival, however, is high both on the breeding and wintering grounds. In winter, plovers prefer heavily grazed non-native grasslands and recently cropped agricultural fields, but are forced to spend about 75% of their time foraging on plowed fields due to loss of native habitat. Breeding birds also nest on plowed ground across their range, probably due to inadequate/improper grazing of native grasses and invasions by exotic forbs. Organochlorine contaminants in wintering plovers are high, but behavioral and morphological abnormalities have not been seen. Hypothesized causes of population declines will be discussed.

¹USGS Biological Resources Division, 4512 McMurry Avenue Fort Collins, CO 80525 (970) 226-9462

Status of Black-tailed Prairie Dog Listing

Gary T. Skiba¹

The Black-tailed prairie dog, (*Cynomys ludovicianus*), was petitioned for listing under the Endangered Species Act (ESA) by the National Wildlife Federation in July of 1998. This began the listing procedure that the U.S. Fish and Wildlife Service (USFWS) must follow upon receipt of a petition. In March of 1999, the USFWS published a positive finding on the petition, a determination that the petition provided substantial supporting information, requiring further review by the USFWS. The USFWS will publish a 1-year finding (which will either propose that the species be protected under the ESA or determine that such protection is unnecessary) at the end of 1999 or early in 2000.

As a result of the petition, the Colorado Division of Wildlife brought representatives of federal, state, and local governments, along with representatives of several non-governmental organizations, to develop a range-wide conservation agreement for the Black-tailed prairie dog. In addition, the Colorado Division of Wildlife is working with other agencies and organizations to decide how to best manage the Black-tailed prairie dog in Colorado.

No Colorado regulations have changed to date as a result of the listing petition. In Colorado, the Division of Wildlife manages the Black-tailed prairie dog as a small game species, with no closed season or bag limit. Control of prairie dogs through poisoning is regulated by the Colorado Department of Agriculture.

¹Wildlife Biologist, Colorado Division of Wildlife, 6060 Broadway Denver, CO 80216 (303) 291-7466

Source Water Assessment and Protection in the South Platte Basin

Dick Parachini¹

Source water assessment and protection is a state-led preventive program designed to protect public drinking water supplies from contamination. This program is part of the 1996 Federal Safe Drinking Water Act amendments and is designed to complement traditional drinking water treatment approaches. The four steps required by the amendments are public participation, delineation of the source water area boundaries, identification of the regulated and unregulated potential contaminants in these areas, and determination of the threat posed to the drinking water source. A final assessment is due to the Environmental Protection Agency by May 2003. The South Platte Basin contains 104 surface water, 657 ground water, 6 combination, and 146 purchased water systems totaling 913 out of the 2201 statewide systems. The extensive water diversion and distribution systems currently used by public drinking water suppliers creates challenges and opportunities regarding the source water delineation and contaminant identification steps. Source water assessment and protection is also pursuing integration with other watershed water quality management programs.

¹South Platte Watershed Coordinator, Colorado Department of Public Health and Environment, 4300 Cherry Creek Dr. South, Denver, CO 80246-1530 (303) 692-2000

When Less Than is More Than Enough

Ben Alexander¹

Eutrophication of storage reservoirs poses serious health, regulatory and aesthetic problems for communities that rely upon those sources for drinking water supplies. It has a cascading impact on drinking water quality and treatment costs. Water quality problems once considered to be merely aesthetic are increasingly found to be health related because of our increased knowledge of the role that organic carbon plays in forming disinfection byproducts. The occurrence of algal toxins is also gaining worldwide attention. A false sense of security can stem from some of our existing monitoring programs. Monitoring such as that required under the Clean Water Act is primarily designed to address toxicity levels for fish and aquatic biota. The recommended analytical methods for algal nutrients such as nitrogen and phosphorus may not be sufficient to detect any change, particularly with some of the more pristine water sources, where phosphorus concentrations are often consistently below detection levels. Nutrients, even in very small amounts, act as food-web catalysts that can bring on a wide array of serious water quality problems. Tracking the results of their sub-detection level presence by indirectly monitoring phytoplankton can be a critical element in understanding how to better manage our watersheds.

¹Senior Process Design Engineer, Fort Collins Water Treatment Facility, 4316 LaPorte Avenue Fort Collins, CO 80521 (970) 221-6681

Rural Municipalities and Source Water Protection

Herman Wooten¹

The Colorado Rural Water Association is a non-profit corporation incorporated in November 1980 under the rules and laws of the state of Colorado. This organization provides technical assistance and training to Colorado's public and private water systems having populations less than 10,000. About 97% of the state's 813 community water systems serve communities with a population of less than 10,000. The association is an affiliate of the National Rural Water headquartered in Duncan, OK. Over forty-five states are now involved and active under the NRWA.

CRWA activities are funded through the NRWA, which in turn receives funds through grants from the US Environmental Protection Agency and the Rural Development Administration. The CWRA cooperates closely with the State of Colorado, Colorado Department of Health, EPA and RDA as well as other state and federal agencies.

Technical assistance is provided on-site on a one-to-one basis and available to all water/wastewater operations on maintenance problems. Training is provided, in part through one-day locally conducted workshops. A groundwater program is also available.

Source Water Assessment and Protection in rural areas and municipalities has become an important concern for organizations like the Colorado Rural Water Association. Small water suppliers attitude towards SWAP, and the role of this organization in educating small water suppliers will be addressed, as well as related issues and how this section of the Safe Drinking Water Act affects small water systems.

¹Colorado Rural Water Association, 2648 Santa Fe Dr. Unit 10, Pueblo, CO 81006 (719) 545-6748

Air Quality Control Commission and Amendment 14

Margie Perkins¹

The Air Quality Control Commission has definitive responsibilities regarding the enactment of Amendment 14, which addresses specific air quality issues. These responsibilities will be addressed, as well as specific implementation plans.

¹Air Quality Control Commission, Colorado Department of Public Health, 4300 Cherry Creek Dr. South, Denver, CO 80246-1530 (303) 692-3115

Colorado Livestock Association and Amendment 14

Brad Anderson¹

The Colorado Livestock Association represents the concerns of livestock producers throughout the state. Compliance and impacts of implementation will be addressed from the viewpoint of the confined animal feeding operations that will be affected by enactment of Amendment 14.

¹Colorado Livestock Association, 11990 Grant St. Suite 402, Denver, CO 80233
(303) 457-2232

Water Quality Commission Responsibilities to Amendment 14

Cindy Hickert¹

General information about Amendment 14 includes:

- Required adoption of implementing water quality regulations by March 31, 1999 and issuance of permits by July 1, 1999.
- New permit requirements apply to HCSFO and include the following:
 1. operations capable of housing 800,000 lbs. of swine
 2. Smaller operations related by "common or affiliated ownership or management" if together they exceed 800,000 lbs. and meet one of four other statutory tests,
 3. Operations deemed to be HCSFO under local zoning or land use regulations.

Water Quality Control Commission responsibilities to Amendment 14 and their decisions include:

- WQCC conducted a rulemaking hearing on February 8 & 9, 1999.
- All HCSFO's must obtain a permit from the WQCD, and regulations include provisions to implement the following specific requirements of Amend 14:
 1. Land application of swine manure and wastewater from HCSFO's must be limited to "agronomic rate."
 2. All HCSFO's must obtain Division approval of construction, operations, and swine waste management plans.
 3. Setbacks for maintaining water quality are established for land application areas and waste impoundment's, and the location of waste impoundment's and manure stock piles in floodplains is restricted.
 4. Financial Assurance
 5. All HCSFO's submit quarterly, comprehensive monitoring reports.
 6. Spill or contamination reported to the state and county.
 7. Restrictive requirements on state trust lands.
 8. Annual permit fee at 20 cents per animal.

Issues which the Commission exercised flexibility

1. "integrated in any way"
 2. "In a common watershed"
 3. Operators and common industry practices
 4. Existing operations obtain variances
 5. Implementation of the requirement for quarterly monitoring
 6. Variance from setbacks
 7. Deferral of application of the requirements for certain operations of less than 800,000 lbs.
- Conclusions will include an update on Permits and current lawsuits and their status

¹Water Quality Control Commission Representative, 4300 Cherry Creek Drive South, Denver, CO 80246-1530 (303) 692-3468

Three States Agreement: Wyoming

Rebecca Mathisen¹

"The Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats Along the Central Platte River, Nebraska" is an opportunity for non-traditional alliances among water users, land interests, environmental groups and governmental entities of many flavors. Most participants in this process have been surprised to find themselves agreeing and aligning with at least one concern of an unlikely ally. As the Cooperative Agreement enters its third year, the three signatory states and the US Department of Interior are trying to resolve issues that will help determine whether a species recovery program that involves the entire Platte River Basin is financially, technically and politically implementable.

¹Administrator, Technical Services, Wyoming State Engineer's Office, Herschler Building 4E, Cheyenne, WY 82002 (307) 777-6148

Three States Agreement: Nebraska

Shari Miller¹

The Platte River has often been called the "lifeline" as it flows through Nebraska from border to border. A description used earlier to capture the importance was "The Great Platte River Road," as thousands of pioneers made the long trek across Nebraska a century and one-half ago. The interest in the river continues as we approach the next century. High demands for irrigation water along with greater municipal needs and maintenance of flows for two endangered and one threatened species of birds in a stretch of the river between Lexington and Chapman, Nebraska has created conflicts. The development of an "Adaptive Management Plan" will prove essential to assure the river can continue to be lifeline for human use as well as supporting the "critical environmental zone" for endangered species.

¹Nebraska Natural Resources Commission, P.O. Box 98, Kearney, NE 68848-0098, (888) 877-8497

Colorado: Platte River Cooperative Agreement

Kent Holsinger¹

A brief history of the Platte River Cooperative Agreement will be presented, as well as why Colorado is participating. Also highlighted will be the current status of negotiations between Colorado, Wyoming, Nebraska, and the Department of the Interior.

¹Assistant Director for Water, Colorado Department of natural Resources, 1313 Sherman Street, Room 718, Denver, CO 80203 (303) 866-3311

Criteria for Constructing Platte River Cooperative Agreement Water Action Plans

Daniel F. Luecke¹

The recently completed Platte River Water Conservation/Supply Study (Draft) offers a wide range of options for meeting the commitment of Colorado, Wyoming, and Nebraska to reduce target flow shortages in the Big Bend Reach of the Platte by 60,000 acre feet to 80,000 acre feet. Under the provisions of the Platte River Cooperative Agreement, the states are required to prepare and “Action Plan” to meet this obligation. This presentation will describe a variety of criteria for plans that will reduce shortages in an efficient, equitable and flexible manner. The plans are based on constrained cost minimization accompanied by a water options trust fund. Different constraint sets lead to a variety of plan alternatives and costs.

¹Director, Rocky Mountain Office of the Environmental Defense Fund,
1405 Arapahoe Boulder, CO 80302 (303) 440-4901

Nonpoint Source Pollution Issues and Solutions

Doug Lofstedt¹

EPA Region 8 provides a variety of funding and staff resources to the nonpoint source (NPS) control efforts in the South Platte basin. Staff resources come primarily from the Community-based Environmental Protection (CBEP) and, of course, the water quality programs. The major source of EPA funds directly for NPS control is through Clean Water Act section 319. These funds are provided in annual grants to the Colorado Department of Public Health and Environment (CDPHE) to support staffing and NPS control projects. Several 319 projects in the basin are either completed or ongoing. More are being proposed for FY2000 funding. CWA section 604(b) funds also support CDPHE water quality staffing and area-wide water quality management planning by the Denver Regional Council of Governments and the North Front Range Water Quality Planning Association. Funds from the Regional Geographic Initiatives (RGI) program support several local community-based environmental efforts, that help address NPS control, such as data inventory and assessment by the Upper South Platte Watershed Protection Association, Big Thompson watershed coordination, Cherry Creek watershed education and coordination, and the James Creek watershed coordinator. RGI funding is generally not very large, but can be very important seed money for local groups. EPA has recently approved Sustainable Development Challenge Grant funds for a watershed coordinator in the upper South Platte watershed. EPA is participating in planning efforts for a Cherry Creek watershed conference scheduled for October 29, 1999. Current EPA initiatives and resources focused on animal feeding operations and total maximum daily loads also relate to NPS control efforts in the basin.

¹Project Officer, U.S. Environmental Protection Agency, 999 18th St. Denver, CO 80202-2466 (303) 312-6835

Colorado Corn Grower's 319 Project

Jim Geist¹

A rural perspective to implementation of nonpoint source pollution prevention will be addressed using the Colorado Corn Growers Association's EPA funded 319 project as an example.

¹Executive Director, Colorado Corn Administrative Committee, Colorado Corn Growers Association, 300 Union Blvd. Suite 425, Lakewood, CO 80228 (303) 989-3098

League of Women Voters Colorado Water Protection Project

Jeannette Hillery¹

Since the formation of the state's Nonpoint Source Council, limited attention has been given to the urban and suburban populations and their contributions to polluted runoff. Through education this population can have heightened awareness to the problems of nonpoint source pollution and how they can reduce impacts to water quality. With new and revised rules and regulations from the EPA, now is the time for a critical discussion of the impacts on water quality from urban and suburban populations and how they can be addressed.

¹League of Women Voters Colorado Water Protection Project, 999 Meadow Glen Dr. Boulder, CO 80303 (303) 494-7718

POSTER ABSTRACTS

Adoption of Irrigation Technology in Colorado Is There a Research Gap?

Troy Bauder¹
Regan Waskom¹
Marshall Frasier¹
Dana Hoag¹

Irrigated agriculture uses more than 80% of the water diverted in Colorado, but competing demands and environmental concerns are challenging how water is managed, increasing the need to improve irrigation management. University and other action agencies promote technologies that improve irrigation efficiency and uniformity. To learn if this technology is being adopted, we surveyed 3,300 irrigated crop producers statewide. Producers returned 1,319 surveys for a 40% response rate. The survey results showed that while current irrigation research focuses on technologies such as computer models and advanced equipment, most producers have not adopted basic management practices such as scheduling, application monitoring and record keeping. Producers also grossly overestimated their irrigation system efficiencies and a majority did not know how much water was applied over the growing season. Although some producer groups were an exception, a substantial gap was identified between University research and its extension to irrigators in Colorado. This poster compares the adoption results of statewide averages to two dissimilar producers groups: South Platte corn growers and San Luis Valley potato growers.

¹Departments of Soil and Crop Sciences and Agricultural and Resource Economics,
Colorado State University, Fort Collins, CO 80523

The Colorado Collaborative Rain and Hail Study

Nolan J. Doesken¹

The nature and variability of precipitation, and the resulting runoff that reaches the South Platte River in Northeastern Colorado, controls most of the hydrology and biology of this complex river system. The precipitation climate of the South Platte Basin is characterized by dry winters on the plains as snow steadily accumulates in the upper reaches of the basin. Spring brings relatively wet weather with storms that can deliver widespread and occasionally heavy rains and wet snows at the same time that high elevation snow pack begins to melt. Summer is characterized by high evaporation rates along with frequently intense but highly localized thunderstorms with extremely variable precipitation.

The Colorado Collaborative Rain and Hail Study, CoCo RaHS, is a science education project initiated by the Colorado Climate Center designed to get local communities, students, teachers, professionals and retired people actively involved with scientists in measuring rain and hail in the South Platte Basin. As of August 1999, more than 300 volunteers (approximately 40% students grades 1-12, 40% working professionals and 20% retired citizens) are helping climatologists, hydrologists and radar specialists in northern Colorado by taking detailed measurements of rain and hail during the growing season. Most of these volunteers transmit data daily via a WEB-based data entry system developed in 1998 by high school student interns working with the project. Rain and hail maps are then prepared automatically and displayed on the CoCo RaHS webpage and made available to volunteers, project sponsors and other interested parties.

The enthusiastic participation of so many volunteers is making it possible to study in great detail the highly localized nature of summer thunderstorm rainfall. Tools are currently being developed to encourage local communities throughout Colorado to set up similar programs to involve citizens of all ages with scientists and water resources professionals in helping to measure rainfall contributions to water resources in the South Platte Basin.

¹Assistant State Climatologist, Colorado Climate Center, Department of Atmospheric Science, Colorado State University, Fort Collins, CO 80523 (970) 491-8545

Preliminary Investigations into the Sources and Nature of Salinity in the South Platte Basin, Northeastern Colorado

P.A. Haby¹
J.C. Loftis¹

Like many agricultural areas in the western United States, soil salinization has been increasing in the irrigated fields of northeastern Colorado. Although the magnitude of the problem is not as large as in some areas with historically severe soil salinity problems, reports indicate that it has been increasing. Additionally, salinization has begun to limit the species of crops that can be successfully grown in these areas and has even reduced the yield of more tolerant species.

A major contributing factor to the increasing soil salinization is the high concentration of dissolved solids in the irrigation water that is withdrawn from the South Platte River. Throughout much of the river's flow through the eastern plains of Colorado, the total dissolved solids (TDS) concentration averages over 1200 mg/l. Recent studies suggest that the majority of the dissolved solids loading actually occurs upstream as the river flows north through the mixed land-use settings of the Front Range Region of the Rocky Mountains.

This study identifies and quantifies the major sources of dissolved solids in the upper reaches of the South Platte River using mass-balance and geochemical techniques. Some of the sources investigated include dissolution from geologic materials, surface and subsurface agricultural return flows, wastewater treatment plants, urban runoff, and oil-producing operations. The resulting salinity model will aid in the development of a salinity management strategy for northeastern Colorado as well as help predict the effects of urbanization and increased water use efficiency on the downstream water users.

¹Graduate Research Assistant and Professor, Department of Chemical and Bioresource Engineering, Colorado State University, Fort Collins, CO 80523 (970) 491-5252

DNA Identification Markers for Differentiation of Western Jumping Mouse, Meadow Jumping Mouse, and Threatened Subspecies, Preble's Meadow Jumping Mouse

Barbara Karl¹
Nancy Duteau¹
Bruce Wunder¹

Two species of jumping mice, the western jumping mouse (*Zapus princeps*) and the meadow jumping mouse (*Zapus hudsonius*), and one subspecies, the Preble's meadow jumping mouse (*Zapus hudsonius preblei*), are difficult to distinguish using morphological characteristics. Each taxon was previously shown to exist on different geographic areas according to elevation and habitat types. However, as further studies have been done, confusion among researchers has arisen as to where the different types presently occur. The Preble's meadow jumping mouse is listed as a threatened species under the Endangered Species Act of 1973. Correct identification of the threatened species is necessary for mitigation and remediation to occur at Front Range hazardous waste sites, like Rocky Flats and the Air Force Academy, Colorado Springs. Therefore, a quick and reliable identification method for species and subspecies is needed that will work at any life stage and condition.

Our hypothesis is that genetic changes have accumulated in *Zapus* species and subspecies – through mutation, geographic isolation, and genetic drift, - and that these can be utilized for timely identification. This paper briefly discusses the use of DNA-based methods for species and subspecies identification. A strategy is described for screening a combination of mitochondrial and nuclear markers amplified by Polymerase Chain Reaction (PCR) using DNA from tissue samples. Species-specific and subspecies-specific combinations of these two types of markers will allow definitive identification to be made of the jumping mice and possible hybrids. Single-Strand Conformation Polymorphism (SSCP) Analysis of a mitochondrial 16S rDNA fragment and a nuclear Exon-primed Intron Crossing (EPIC) fragment from the cytochrome C gene was used to compare DNA sequences. SSCP of a 500bp 16S mt rDNA fragment from 70 individuals shows six different sequence types (like alleles) are present. These sequence types show a non-random geographic distribution. Sequences of nuclear EPIC markers were obtained for two individuals from each of the six 16S sequence type groups. Analysis of these also showed geographic variation. The common deer mouse, *Peromyscus maniculatus*, and *Zapus hudsonius luteus* were included as outgroups.

¹Departments of Wildlife and Fisheries Biology, Microbiology, and Zoology, Center for Environmental Toxicology and Technology, Colorado State University, Fort Collins, CO 80523

Platte Watershed Program

A Community-Based Watershed Awareness Initiative

Gary Lingle¹
Tom Franti²

In 1993, the Environmental Protection Agency selected the Middle Platte River Watershed as one of five nationally to be a demonstration project for conducting an Ecological Risk Assessment. It was selected because of its unique mix of ecological, agricultural, socioeconomic, and cultural attributes. The following year, EPA Region VII selected the Middle Platte Watershed as its first Community-Based Environmental Protection Initiative site in the region.

The Platte Watershed Program (PWP) is a grant-funded initiative created in 1994 as part of EPA's Community-Based Environmental Protection Initiative. The mission of this watershed-based Cooperative Extension program is to address the information, education, and research needs of stakeholders in the watershed and link the applicable resources of the University of Nebraska to those needs. Consequently, PWP has been directly involved in the process that ultimately resulted in the signing of the Three States Cooperative Agreement. PWP is viewed as a credible, non-biased source of information and input by a number of stakeholders representing a variety of interests. Other programs lack this reputation and are more limited in scope. In its brief five years of existence, PWP has established an enviable record. Tangible products of PWP will be made available at the poster session.

¹Platte Watershed Program Coordinator, University of Nebraska Cooperative Extension, 1400 E 34, Kearney NE 68847 (308) 236-1235

²Biological Systems Engineering, 234 L.W. Chase Hall, Lincoln NE 68583-0729

Cache La Poudre Decision Support System Project Overview

Paul Weiss¹
Todd Williams¹

In arid western states, water is an extremely valuable resource and in constant demand. Almost every type of water use, from human consumption to environmental enhancement, is competing for its share of this limited resource. But as history has shown, coordinated efforts and partnerships often result in more efficient use of water than antagonistic approaches that focus on separate objectives. Consequently, water resources planning and management is no longer a prudent practice, but a necessity. To aid decision-makers and water managers in their distinct yet interconnected goals, quantitative techniques such as computer based decision support systems have been developed.

The Cache La Powder Decision Support System (CLPDSS) is a combination of databases, simulation models, and user interface intended to promote informed and collective decision making. Development of the CLPDSS has been a shared effort primarily between the City of Fort Collins and the City of Greeley. Valuable input has come from the State of Colorado and the Northern Colorado Water Conservancy District. Parts of the CLPDSS are based upon earlier modeling efforts, and pre-existing data have been incorporated into the database.

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