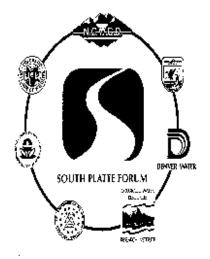
# BRINGING THE RIVER BACK ... TO THE FUTURE URBAN AND RURAL WATERSHED MANAGEMENT



Proceedings of the 1996 South Platte Forum October 29-30 Northglenn, Colorado

David Graf, Editor

October 1996

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# Bringing the River Back ... to the Future Urban and Rural Watershed Management

# Proceedings of the 7th Annual South Platte River Basin Forum

David Graf, Editor

## **Sponsored by:**

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# October 29 - 30, 1996 The Holiday Inn Northglenn, Colorado

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

## Preface

The South Platte River Basin 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 between disciplines to increase awareness and understanding of South Platte River Basin issues and public values".

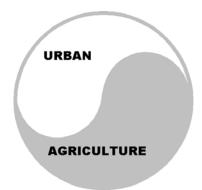
Past Forums have successfully identified important issues to resource managers in the basin. This year's South Platte Forum will investigate how a nation-wide movement toward restoration and conservation of rivers is being played out in our region. What are the costs and benefits of river restoration or watershed planning? What are the relationships between water supply, water quality, and restoration? How do projects move from an idea toward implementation? Today's natural resources decisions are defining the future of the South Platte Basin. We will examine this future by presenting some of the many ongoing river restoration and watershed planning efforts, and by providing the economic, social, legal and political context for these projects. Perhaps the 7th Annual Forum can help define your own vision for the future of the South Platte Basin, and give you the ideas and tools necessary to help implement that vision.

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# The Yin and Yang of Urban and Agricultural Economies --Or, Without Water We're Dead!

Ann Azari<sup>1</sup> and Janet Duval<sup>2</sup>



## Ann Azari - <u>A Case in Point: The Northern Colorado Neighborhood</u>

- From a Historical Definition of Livestock to P3
- Emerging as a Strong Player in Colorado
- Janet Duval <u>Choices We're Exploring in the North or</u> <u>How We Might Have Our Cake and Eat it Too</u>
  - Value-Added Agriculture
  - High-Value Crops
  - Economic Development for Agriculture
  - Working With Natural Systems

<sup>&</sup>lt;sup>1</sup> Mayor, City of Fort Collins

<sup>&</sup>lt;sup>2</sup> Larimer County Commissioner

# Estimating the Benefits of Urban Stream Restoration Using the Hedonic Price Method

## John B. Loomis<sup>1</sup> and Carol F. Streiner<sup>2</sup>

The hedonic price method was used to estimate residents' willingness to pay for improvements in urban streams. This study examined California's Department of Water Resources Urban Stream Restoration Program to determine the economic value of stream restoration measures such as reducing flood damage and improving fish habitat. Seven projects from three counties--Contra Costa, Santa Cruz, and Solano--were pooled for analysis. Property prices in areas with restored streams were found to increase by \$4,500 to \$19,000 due to stabilizing stream banks and acquiring land for education trails. This amounts to 3 to 13% of the mean property price in the study. Recommendations for facilitating further analysis are made and implications for quantifying the benefits of similar programs in other states are provided.

<sup>&</sup>lt;sup>1</sup> Department of Agricultural and Resource Economics, Colorado State University

<sup>&</sup>lt;sup>2</sup> Integrated Utilities Group, 5200 DTC Parkway, Suite 530, Greenwood Village, CO 80111

## Who Will Speak for the River?

**Richard L. Knight** Department of Fishery and Wildlife Biology Colorado State University

Outdoor recreation is growing exponentially, both in America and in the American West. With the increasing human population growth along the Platte River Watershed, there will be ever-increasing demands placed on recreational facilities, such as trails. Heretofore, we have viewed outdoor recreation as benign in regards to wildlife. Increasingly, we are beginning to appreciate that outdoor recreation, unregulated, alters wildlife communities. The general finding associated with outdoor recreation is that the wildlife community loses members that are sensitive to disturbance and gains members that thrive in associated with humans. The upshot of these changes is an increase in conservation-related problems associated with declining populations of sensitive species. My talk will address this issue and provide suggestions that encourage the coexistence of wildlife and recreationists.

# Navigating the Rocky Shoreline: The Political and Social Context for Integrated Watershed Projects

#### **Susan Kirkpatrick**

Department of Political Science University of Northern Colorado

Citizen support for public policy is fundamental to legitimacy in a representative political system. Some attributes of integrated watershed projects are interesting and understandable for the public at large. For example, recreational and watchable wildlife features enjoy public support and attract citizen interest. By the same token, highly technical aspects of projects often fail to attract the interest of the general public. If some elements of watershed projects attract attention because of scientific or technical concerns, integrated watershed projects face significant hurdles in moving toward implementation.

This presentation will examine strategies to "educate" the public about watershed management programs and policies. Participants will focus on the importance of citizen support for success in future urban and rural watershed management.

# Great Outdoors Colorado: Opportunities for Planning and Partnerships

#### Will Shafroth Executive Director Great Outdoors Colorado

Great Outdoors Colorado (GOCO) is the result of a citizen initiative passed by 58 percent of the voters in 1992. The initiative amended the Colorado Constitution to redirect Lottery proceeds being used for capital construction to the Great Outdoors Colorado Trust Fund (GOCO). The mission of GOCO is to help the people of Colorado preserve, enhance, appreciate and enjoy our parks, wildlife, trails, rivers and open space by making strategic grants. The Trust is governed by a fifteen-member board appointed by the Governor. To date, the Board has awarded \$72 million for than 500 projects all across the state. Between now and 1999, the Trust will receive \$10 to 20 million annually. Beginning in 1999, provided the Legislature reauthorizes the Lottery, the Trust will receive up to \$35 million annually adjusted for inflation.

## I. What Great Outdoors Colorado does and does not do

- \* Constitutional mandate
- \* Specific objectives
- \* Creation of planning grants
- \* Creation of Legacy grants
- \* While GOCO can participate in funding for watershed planning and river corridor protection, there are elements of these projects that are not related to GOGO's mission and should be funded through other mechanisms

## II. Importance of coordinated planning and projects from GOGO's perspective

- A. Board recognizes the need to support coordinated projects
  - \* bang for the buck
  - \* regional cooperation and partnerships important
  - \* opportunity to leverage GOGO funds with other funding related to overall watershed planning
  - \* criteria recognizes multiple objectives, integrated projects, multi-jurisdictional efforts, leveraging, partnership and support
- B. Board created planning grants in recognition of the need to help communities get to the project stage and to encourage multi-jurisdictional efforts
- C. Board created Legacy grants in recognition of the multi-jurisdictional planning that has already occurred and to promote projects of regional and statewide significance
  - \* must integrate at least two of the four GOGO funding areas

## III. Examples of how GOCO has participated in river corridor and watershed planning to date

- \* Yampa
- \* NWCOG Watershed planning

- \* South Platte Corridor
- IV. Future opportunities

## PANEL DISCUSSION Land, Water and Money

#### John Wilkins-Wells

Department of Sociology Colorado State University

Most locations where irrigated agriculture developed early in the West have become prime locations for urban development over the years. There are many economic and social reasons for this. While many areas throughout the West often lack the attractiveness for urban development due to insufficient water and vegetation, other areas where water was brought to land for irrigation purposes more than 100 years ago by mutual irrigation companies and later by specially legislated irrigation districts have allowed the development of very attractive vegetation and water supplies for urban growth and recreation. This has resulted in the need to consider planning for urban growth in a way that can hopefully accommodate the continued existence of irrigated agriculture and protect a significant portion of the millions of dollars that have been invested in the development of local water supplies and agricultural lands over the years.

Irrigation enterprises, that is to say, nonprofit mutual irrigation companies and special irrigation districts who serve farmers throughout the West, are undergoing important business transitions to accommodate urban growth while maintaining some degree of control over their water rights, and in how land is developed in their traditional service areas. One of the most important business innovations being undertaken by these two long-standing forms of irrigation enterprises is the delivery of raw water to non-irrigation customers, such as urban subdivisions, fractional shareholders or small landowners, small municipalities (both urban and rural), small agricultural or non-agricultural industries, and recreational concerns. These so-called secondary water supply systems are developing into major sources of revenue for traditional irrigation enterprises. A workshop conducted in Fort Collins on October 21-22, 1996 in conjunction with an eight-state regional research project on the business history of these irrigation enterprises, provided an excellent opportunity to review current trends in secondary water supply management, and what they mean to the continued viability of irrigated agriculture in urban corridors. A brief discussion summarizes the results of this recent workshop which involved participants from five states.

# MEASURING SUCCESS THROUGH WATER-QUALITY MONITORING: "How do we know where we're going, if we don't know where we've been?"

## **Kevin F. Dennehy<sup>1</sup>** U.S. Geological Survey

Determining changes and trends in surface- and ground-water quality over time is a goal to which scientists aspire when conducting long-term water-quality monitoring. However, because of financial and operational difficulties, it is a goal that is almost never achieved. The question usually asked is, "Why should we care?" It is important to have a trends network because a variety of Federal, State, and local agencies implement, enforce, or pass laws that call for some sort of long-term water-quality monitoring to ensure compliance with some regulation or validation of a new activity. Commonly these monitoring requirements are constituent specific and are inadequate to examine the overall water quality of a specific site. After some period of sampling the effort ends. Can we then answer simple questions like, "Has this activity improved ambient water quality? Can we discern between anthropogenic and naturally caused changes and trends in water quality? Are things better or worse?" Answers to these questions appear simple, but with today's mostly compliance-driven monitoring, they can't be answered.

Defining baseline water-quality conditions for a variety of important environmental settings is necessary before initiating trends monitoring. Detecting changes and trends in water quality in a variety of settings and explaining the causes of these changes and trends to the extent possible are the challenges before us. It is not unusual for several agencies to collect water-quality samples independent of one another at the same sites. The opportunity exists to coordinate monitoring activities that can be designed to meet the needs of each interested agency. Selected areas and sites to be sampled need to be chosen for highest priority water-quality concerns, and the frequency of sampling needs to vary depending on the monitoring objectives and media sampled. To understand if measures taken to improve water-quality conditions are working, we need to have some basis for comparison. Without such comparisons it will be difficult to draw conclusions of statistical significance from the observations. With today's financial and operational constraints, that baseline does not exist. However, if partnerships were formed among interested agencies, the goal of long-term trends monitoring, whereby baseline conditions are defined and project success is measured, could be accomplished.

<sup>&</sup>lt;sup>1</sup> Denver Federal Center, MS 415, Denver, Colorado, 80225

## **Centennial Land Trust**

# **Rick L. Sandquist**

President Centennial Land Trust

Centennial Land Trust (CLT) was established in response to a U.S. Fish and Wildlife Service proposal to develop a National Wildlife Refuge in the Weldon Valley area of the South Platte River in western Morgan County. Extreme local opposition to the proposal started a two-year task force committee process to determine an alternative solution to environmental conservation and habitat protection issues. Water users, political leaders, federal, state, and local government agencies, conservation groups and local landowners were represented on the thirty-plus member committee. The final unanimous decision of the committee was to recommend the establishment of a locally governed and operated land conservancy, operating in a geographic area between Kersey and Ft. Morgan within five miles of the South Platte River.

Primary puproses and goals of Centennial Land Trust are:

"...To preserve open space, farmlands, grasslands, wetlands, forest lands, water use and quality, wildlife habitats, and river corridors...through the acquisition of conservation easements, development rights and land, and other means...";

"...To preserve or improve environmental conditions...associated with agriculture, wildlife management and habitats, and rural living, including local decision making and ownership, water rights administration, irrigation company operations and maintenance, and maintenance of property tax bases...";

"...To facilitate conservation and preservation projects...";

"...To maintain close working relationships with government agencies and non-profit conservation groups...";

"...To distribute information on creative conservation techniques and promote public/private land conservation arrangements...";

"...To educate the general public regarding the value of open space and the orderly planning for land use and development...".

CLT will be assessing properties, and developing and administering conservation easements, purchase of development rights, management options, and conservation projects on private and public lands in perpetuity. Any number of funding sources and partnerships are being explored.

The private land conservancy is a valuable tool in land use planning, can be tailored to specific local requirements, and is a viable option to government land ownership and management.

## South Platte Lower River Group, Inc.

#### Jon Altenhofen<sup>1</sup>

The South Platte Lower River Group, Inc. (Group) is a coalition of water users and the State of Colorado formed to preserve existing water uses while enhancing streamflows and water related wildlife habitat. The area of focus for the Group is the lower South Platte River in Colorado (Water District 64) from about Brush downstream to Julesburg at the stateline. The Group's first meeting was in December, 1995 and the Group became a Colorado non-profit corporation in the Spring of 1996. An Advisory Committee and a four member Board of Directors meets monthly to discuss, coordinate, and plan water management activities. The Colorado Division of Wildlife (CDOW) is a major participant in the Group along with agricultural and municipal water users in the lower river.

The Group received a grant from the Colorado Water Conservation Board for \$75,000 for 1996. In addition, four water user organizations each contributed \$5,000 in 1996 and these four organizations each appointed a Board of Director to the Group. The four organizations are the Lower South Platte Water Conservancy District, Groundwater Appropriators of the South Platte, Northern Colorado Water Conservancy District, and the Platte River Project. The Platte River Project is another coalition of water users formed to assist the State of Colorado in discussions with the U.S. Dept. of Interior and the States of Wyoming and Nebraska on the development of a Platte Basin Recovery Program for endangered species in central Nebraska.

The Group has five work tasks; (1) hydrologic analysis and database development, (2) project identification, (3) demonstration project development, (4) establish project long-term funding, and (5) annual report preparation. The work effort is done by in-kind services of the Group's participants. The major focus has been the identification and development of managed groundwater recharge demonstration projects. Such projects involve the diversion of excess river flows to groundwater recharge basins where the seepage from the basins returns through the groundwater aquifer to the river at a later time to augment river flows. These return flows or accretions can be used to maintain the reliability of existing well augmentation plans and also provide credits at the stateline for Colorado in a future Platte Basin Endangered Species Recovery Program.

For the Fall of 1996, the Group budgeted \$10,000 for demonstration recharge projects under the Julesburg Irrigation District and \$40,000 for demonstration projects at the CDOW's State Wildlife Areas at the Tamarack Ranch near Crook and the Pony Express near Julesburg. The Tamarack Project is a multipurpose project demonstrating how recharge activities can be designed to optimize wetland and waterfowl habitat. In addition, a live stream section is planned between two of the basins to raise and study native South Platte minnow species of concern. Extensive monitoring activities for groundwater levels, water quality, and river accretions are part of the project. River accretions from managed groundwater recharge activites have the potential to enhance warm water sloughs along the river. Along with the Group, CDOW is contributing personnel time, equipment, and funds to the Tamarack Project. It is also anticipated that Ducks Unlimited through their involvement in a GO-CO wetlands grant will be contributing funds and expertise to the development of wetland and waterfowl habitat at Tamarack.

<sup>&</sup>lt;sup>1</sup> Senior Water Resources Engineer, Northern Colorado Water Conservancy District

# Bluff Lake and Sand Creek: A South Platte River Watershed Tributary Case Study

#### Jay Windell

Aquatic and Wetland Consultants, Inc.

The Bluff Lake and Sand Creek restoration site is located at the southeast corner of the former Stapleton International Airport, east of Havana Street and north of Moline Street, encompassing approximately 123 acres. The site is unique to the Denver Metro area with its wide diversity of ecosystems and habitats including lake, stream, wetland, grassland, desert and a relic cottonwood gallery forest. The southern edge of the site is bordered by a high, relatively narrow bluff that rises from 45 to 60 feet above the adjoining floodplain. The uniqueness of the site is reflected in the nine surface-acre Bluff Lake, 30 acres of wetlands, and a 0.7-mile reach of Sand Creek. Sand Creek and its floodplain are a dominant feature of the site, with the creek channel bisecting the area from the southeast to northwest. The upstream boundary elevation is 5,285 feet decreasing 15 feet at the lower boundary to 5,270 feet for a gradient of 0.42%. Channel sinuosity or meander factor is currently 1.35. Wetted streambed width measurements at low flow showed great variation, ranging between 13 and 50 feet. Bankful width, likewise, ranges widely between 26 and 106 feet. Project objectives included the enhancement of severely degraded stream, riparian and wetland habitat by:

- (1) stabilizing severely eroded streambank habitat utilizing bioengineered Best Management Practices (BMPs);
- (2) eliminating channel down cutting, head cutting and a lowered groundwater table by installing drop structures; and
- (3) reestablishing functional riparian vegetation and its stabilizing root structure.

Phase I of III was completed during June 1995 and included bioengineered treatment of 2,650 feet of bank. Specific bank treatments included installing:

- (1) brush layering/wattling combination with erosion control fabric;
- (2) a double boulder toe/brush layering/single terrace; and
- (3) a double boulder toe/brush layer with a double terrace.

Riparian habitat BMPs included:

- (1) native shrub planting;
- (2) cottonwood tree planting;
- (3) willow stake and bundle planting; and
- (4) native seeding and mulching.

Soil guard was applied at several locations.

# Upper Big Thompson River Watershed Needs Assessment Project<sup>1</sup>

## **Dave DuBois** North Front Range Water Quality Planning Association

#### Introduction

The North Front Range Water Quality Planning Association (NFRWQPA) is conducting an evaluation of available water quality information on the upper Big Thompson River watershed. The objective of this evaluation is to identify interested stakeholders, determine the level of work being performed by the various agencies, and provide a mechanism for the various stakeholders to identify and communicate perceived concerns and potential data gaps. The consolidation of the above information will aid NFRWQPA and other stakeholders in their evaluation of watershed management options in the upper Big Thompson River watershed.

#### Purpose

The purpose of this Interim Report is to briefly list the agencies and respective individuals contacted for information on the upper Big Thompson River watershed. In conjunction with initial concerns, the various stakeholders are asked to review the listed entities and work products for completeness.

#### **Contacted Agencies**

The following agencies have been contacted and have identified their primary focus in the watershed, areas studied, and areas undergoing investigation.

- (1) <u>The Northern Colorado Water Conservancy District</u> currently is operating water quality monitoring stations at the following locations: (I) in the Big Thompson River upstream from the Hansen Feeder Canal; (ii) at the Hansen Feeder Canal; and (iii) in the Big Thompson River downstream from the Hansen Feeder Canal.
- (2) <u>The Bureau of Reclamation</u> is currently operating as the "wholesale distributor" of water from the Colorado-Big Thompson project. It operates multiple gauging stations throughout the watershed, although the Bureau is primarily concerned with flow information and does not have water quality data.
- (3) <u>The U.S. Forest Service</u> has done little water quality or supply monitoring since the early 1980s due to cost concerns. The USFS has developed a comprehensive Geographic Information System (GIS) that lists land-use activities such as grazing allotments, roads, vegetation, etc.
- (4) <u>The U.S. Geological Survey</u> is operating approximately 5 gauging stations on the Upper Big Thompson River and has performed limited water quality studies on the river. This information

is being compiled for comparative purposes. Additionally, the USGS has performed an evaluation of meteorological effects on water quality and flow near Loch Vale.

(5) <u>The Larimer County Health Department</u> has information primarily concerned with septic systems.

<sup>&</sup>lt;sup>1</sup> Upper Big Thompson River Watershed Study, Interim Report

This information is not compiled in such a way to easily assess the density of septic systems in areas tha might affect water quality, although efforts are underway to assimilate this information.

- (6) <u>The Colorado Department of Highways</u> is in the process of selecting 8-12 sites statewide to evaluate the effects of sanding/deicing on water quality. The Big Thompson area is being considered as one of the potential sites. For comparative purposes, the Boulder/Nederland corridor receives around 10,000 tons per year of sand that ultimately affects sediment loading on adjacent Boulder Creek.
- (7) <u>The Colorado Division of Wildlife</u> is currently not performing any detailed toxicology studies on the Big Thompson River. The DOW did perform an evaluation on the likelihood of copper being a key player in the fish kill episodes of years past. Results indicated that copper toxicity was not responsible for the observed events.
- (8) <u>The City of Fort Collins</u> is currently conducting a study evaluating natural organic and nutrient levels throughout basins comprising the Colorado-Big Thompson water project. Potential sources include atmospheric emissions, septic leachate, and natural organic matter decay.
- (9) <u>The Boyd Lake Drinking Water Treatment Plant</u> monitors raw water supplying their treatment plant on a monthly basis. The effects of increased urbanization and its effect on the water quality of Lake Loveland and Boyd Lake is being observed.
- (10) <u>The National Park Service</u> is doing limited water quality monitoring. Their primary concerns stem from the potential impact of 3 million visitors annually to Rocky Mountain National Park.

In addition to the above-listed agencies, it will be necessary to continue attempts at determining the concerns of the following agencies:

- U.S. Fish and Wildlife Service
- Colorado Department of Health
- Upper Thompson Sanitation District
- Estes Park Sanitation District

Additionally, several of the nongovernmental organizations that have a history of monitoring environmental conditions in the area will be contacted, including:

- Trout Unlimited
- The Nature Conservancy
- The Sierra Club

#### **Potential Concerns**

- Sediment Loading (USFS)
- Artificial manipulation of flows (USFS, NPS)
- Insufficient instream flow in winter (USFS)
- Manganese levels in Horsetooth Reservoir (City of Fort Collins, Northern)
- Septic system influences (City of Fort Collins, Larimer County Health)
- Natural Organic Loading (City of Fort Collins)
- Urbanization around drinking water sources (Loveland)

#### **Future Collaboration**

Based on initial conversations with individuals involved with the Upper Big Thompson

watershed, there is limited basin or sub-basin evaluation of how the various land and water use patterns affect water quality. Several agencies are monitoring various aspects of the watershed as they relate to water supply (Fort Collins, Northern, Bureau of Reclamation). Concerns about land-use and resulting effects on water quality have been expressed by the Larimer County Health Department, the USFS, and the City of Fort Collins. Based on mutual interests and concerns among stakeholders in the Upper Big Thompson watershed, the NFRWQPA proposed the initiation of a watershed forum to discuss current research and the potential for future collaboration. The date of this **Big Thompson River Watershed Forum** was August 14 in the Northern Colorado Water Conservancy District's conference room.

# Doing More With Less The South Suburban Park Foundation, Inc. A Case Study in Resource Stewardship

# C. Dale Flowers<sup>1</sup> and Robert M. Searns<sup>2</sup>

In an era of limited public funds and concerns about environmental regulation, a broader spectrum of strategies is needed to accomplish water resource stewardship objectives. The concept of greenways implemented through public-private partnerships offers an effective approach to preserving and enhancing urban stream corridors, providing recreational amenities and building a broad-based constituency for river and creek conservation. The approach is non-threatening and non-authoritarian but highly effective in realizing environmental objectives. The South Suburban Park Foundation, Inc. Provides an excellent case study. Starting with \$5 in the treasury and a small, committed group of people, the Foundation transformed eight miles of the South Platte River through Arapahoe County in less than a decade, winning broad-based public approval as well as local and national awards.

Mr. Flowers described the emergence and growth of the Foundation and its role today. Mr. Searns described several key projects including the creation of the mary Carter (formerly the Arapahoe) Greenway. A long-time community activist, C. Dale Flowers is Chair of the South Suburban Park Foundation, Inc. And the Board of Goodwill Industries. He has worked professionally in real estate development and property management. Robert Searns is the founding owner of Urban Edges, Inc. He was Project Director for Denver's Platte River Greenway and developer of the Mary Carter (formerly the Arapahoe) Greenway. He co-authored *Greenways: A Guide to Planning Design and Development* published by Island Press. He has masterplanned numerous greenway projects along the Colorado Front Range and around the United States.

(This presentation included slides and illustrative materials.)

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# Denver's South Platte River Corridor Project Presentation and Field Trip

## **Marc Alston**

The City and County of Denver has made improvements of tis 10.5 mile South Platte Riuver Corridor a mojor priority. Denver's improvements are targeted to the river uses of recreation, parks and open space, flood control, fishing, boating, wildlife and education. Marc will overview the primary issues, summarize the partnership approach being used, discuss current and planned projects, and give an overview of the afternoon field tour.

# Agenda for Field Trip

I. Upper Central Platte Valley (8th Avenue to 13th Avenue)

- Future "integrated" project
- discuss current design status, concepts, and funding issues
- II. Riverfront Park (Central Platte Valley)
  - see park construction (Gates Crescent, Fishback, Rockmont)
  - see future park -- Commons
  - see stretch of habitat/boatability improvement project

#### III. North Denver

- see river restoration project under construction
- see future Northside Treatment Plant redevelopment