Chapter 1. Introduction

Purpose of the CRRRS

This study addresses the general physical, environmental, financial, and institutional aspects of a large-scale water delivery system to satisfy much of Colorado's future water needs. Because this potential water system would pump or "return" water from the Colorado River near the Utah border for upstream uses in the South Platte, Arkansas and Colorado River basins, it is called the Colorado River Return Project or CRRP. This study is the first analysis of this concept and is, therefore, called the Colorado River Return Reconnaissance Study (CRRRS or Study).

"Reconnaissance" studies, such as this one, provide preliminary project assessments to help water supply agencies and other affected parties determine if additional studies are warranted. Reconnaissance studies utilize information that is readily available and are typically performed under relatively short time frames. The overall goal is to quickly characterize major benefits and potential impacts so that the involved parties can have more focused discussions than they could have otherwise. Reconnaissance studies often lead to the identification of data deficiencies and provide insight on where future data collection efforts should focus. If the results of reconnaissance studies are generally positive, or if the results indicate that additional information or analysis is needed, further reconnaissance level analysis is authorized, or feasibility-level studies are begun. Chapter 8 provides additional information on the general process of developing a water supply and the time frames generally required for each phase of implementation.

The CRRRS is a reconnaissance-level investigation conducted in sufficient detail to:

1. determine whether a need currently exists or may exist in the future for the water made available from the CRRP;
2. establish operational requirements and the preliminary size, type and location of CRRP facilities;
3. identify the most significant environmental and water quality issues;
4. distinguish the major differences between alternative CRRP configurations and the advantages and disadvantages of those configurations;
5. provide a preliminary indication of feasibility for each configuration; and
6. identify the types of potential CRRP sponsors and funding alternatives.

The CRRP would help supply water needs using water that is potentially available to the State in accordance with the Colorado River Compact, a long-standing agreement between the seven

states in the Colorado River Basin. The CRRRS identifies and evaluates CRRP configurations for three levels of water diversion and demand: 250,000, 500,000 and 750,000 acre-feet/year (af/yr). To put the CRRP in context with other possibilities for supplying Colorado's future water needs, this study describes alternatives to the CRRP, including water conservation, construction of other water development projects, and transfers of water from current agricultural uses to municipal and industrial uses.

The CRRRS was authorized under Senate Bill 110 passed by the 64th Colorado General Assembly in the spring of 2003. This bill, generally referred to as the annual "Construction Fund Bill" of the Colorado Water Conservation Board (CWCB), also authorized several other activities, notably, the on-going Statewide Water Supply Initiative (SWSI). The CRRRS will provide useful information to the river basin planning groups being organized under the SWSI since this is the first formal assessment of diverting the State's Colorado River Compact Entitlement downstream of other Colorado water users. The information contained herein will help the basin planning groups, the CWCB Board and Staff and other potentially affected parties visualize how this project may, or may not, fit in with numerous other water supply projects for which other engineering, environmental and economic assessments have been already prepared.

Many engineering, financial and environmental issues affect the feasibility of the CRRP. The CWCB understands these issues are present, but also understands that the entire state faces increasing challenges in the provision of safe, reliable supplies of water for domestic, municipal, industrial, environmental, recreational and other uses. After more than a century of water project construction, the lowest cost sources of supply have generally been developed and the environmental effects of water consumption are evidenced by complex federal, state, and local laws, regulations and policies.

The geographic extent and the magnitude of the water deliveries contemplated under the CRRP generate issues that will likely be of statewide interest. These issues include:

- Colorado River Compact Entitlement – Colorado's total Colorado River Compact entitlement in relation to the amount of water available in the mainstem near the Utah state line is subject to interpretation; the amount of the total compact entitlement that is taken from the Colorado River mainstem will directly affect the developable compact entitlement for the Yampa, White, Dolores, and San Juan basins.

- Endangered Fish Species and the Upper Colorado River Recovery Plan – Although the "15-Mile Reach" receives the most attention in the implementation of the recovery plan, the critical habitat designation extends upstream and downstream of this reach and upstream on the Gunnison River. The Recovery Program contemplates an additional 120,000 acre feet of depletions. All of the studied capacities for the CRRP are greater than this.

- Integration with Existing Water Bodies – the CRRRS is based on conservatively high cost assumptions regarding potential levels of treatment and disposal of treatment waste streams. These topics will require considerable additional study if the CRRP is considered further. Alternative treatment levels are presented in this report to address potential impacts to natural water bodies and to existing water supply systems.

- Impacts to Rural Economies – as cities grow, agricultural water rights are being purchased and transferred to municipal use. This practice can adversely affect entire rural economies and communities.

- State's Role in CRRP Development – a project of this magnitude will generate discussion of the appropriate role of the State of Colorado in developing the state's water resources. The State's current and potential future roles in all aspects of water supply planning, design, permitting, construction and operation will likely be raised. The discussion may include the State's planning responsibilities, funding programs, regulatory authorities, interstate compacts and cooperative programs, and interfaces with federal project operations, funding sources, and regulatory authorities. The possibility of the State owning and operating a water supply system could also come to the forefront as it has in other western states.

As shown later in this report, the project's costs (per unit of water delivered) are significant, but might not be insurmountable. Two other large challenges must be met if this project is to come to fruition: 1) matching the amount of project water delivered (and cost incurred) to the increases in water demands (and utility revenues available) over time and 2) mitigating the environmental effects of the project.

CRRRS Schedule

The contract between Boyle Engineering Corporation and the CWCB was executed on June 6, 2003. The "fast-track" study was conducted with many work tasks performed simultaneously over the following four months. A "75 percent" draft report was submitted for internal CWCB review on October 9, 2003 and a "camera ready" final report was submitted to the CWCB on November 14, 2003 per the deadline specified in SB 110.

CRRRS Process and Report Organization

In the process of performing the CRRRS, three general categories of information were developed and are presented in the following seven chapters: 1) background information on water demands and the degree to which the CRRP could supply water to meet the demands given Colorado's physical, economic, and institutional conditions; 2) formulation and evaluation of alternative CRRP configurations; and 3) study conclusions and recommendations.

The formulation and evaluation of alternative CRRP configurations is presented in Chapter 2 including the three-phase process that was used. This chapter also presents the technical factors affecting possible pipeline corridors and summarizes the relevant physical conditions in the Colorado, Gunnison, White/Yampa river basins especially for readers unfamiliar with these areas. The chapter mentions the potential for future integration of the CRRP with existing facilities and other potential local water supply projects. A primary result presented in Chapter 2 is the identification of three potential pipeline corridors.

To understand the context in which the State embarked on this study of the CRRP, Chapters 3 and 4 provide background information on why the CRRP is being studied and physical and institutional factors that affect implementation of the project. Chapter 3 characterizes the magnitude of future water demands and the types of water sources (other than the CRRP) that could supply water to meet those demands. The chapter begins with a general overview of the Colorado economy then uses State Demographer population projections to provide a very general characterization of the magnitude of future water demand in the Colorado, Arkansas, and South Platte river basins that could be served by the CRRP. Chapter 3 concludes with a description of other types of water supplies currently being considered by water suppliers. Chapter 4 describes the institutional setting affecting the potential development of the CRRP. Involved agencies, environmental laws and other statutes potentially affecting the CRRP, and water supply funding programs are described.

Given the magnitude of the potential water quality and water treatment issues on this project, Chapter 5 is dedicated solely to these topics. Four treatment processes are evaluated at a reconnaissance level. The selection of a specific process is beyond the scope of this reconnaissance study and any future studies will require additional water quality data and regulatory input on the level of treatment that would be required under current statutes and administrative policies. The environmental effects of each of the four treatment processes will also require considerable additional study. The most expensive treatment option considered in Chapter 5 was used in the Chapter 6 summary of estimated construction costs. In addition to treatment, costs for river diversion, pump stations, pipelines, tunnels, operational storage, hydroelectric plants, ancillary facilities, land acquisition and other costs are also estimated. In Chapter 7, five of the 31 pipeline alignments considered in Chapter 6 were used as a basis for assessing economic, financial and environmental effects of these wide ranging CRRP alternatives.

The CRRRS's conclusions and recommendations are summarized in Chapter 8. Although it appears that the CRRP may be financially possible under certain conditions, there are also many environmental and institutional issues that would need to be resolved. More detailed analysis of these issues will require additional data to support them and the State is encouraged to begin this process if the State anticipates having a central role in any future assessments of the CRRP or variations of the CRRP that could potentially provide the same types of benefits as the CRRP.

Acknowledgements

A Technical Committee, consisting of four CWCB Board members: Mr. Greg Hoskin (representing the Colorado River mainstem), Mr. Eric Wilkinson, CWCB Chair (representing the South Platte River basin), Mr. Don Schwindt (representing the San Miguel, Dolores, Animas, and San Juan Rivers) and Ms. Carolyn McIntosh (representing the City and County of Denver) provided guidance regarding the scope of the study and reviewed draft work products. Mr. Hoskin and Mr. Wilkinson provided testimony at legislative hearings leading to the authorization of the CRRRS and also participated in public input meetings. Mr. Hoskin was especially involved with securing legislative approval for the CRRRS, not as a proponent of project construction, but

as a proponent of preparing a study with reliable reconnaissance-level information upon which to base any future studies of the feasibility and reasonableness of a CRRP.

The CRRRS was prepared under the direction and management of Mike Serlet, P.E., Chief of Water Supply Planning and Finance, of the Colorado Water Conservation Board. Mr. Rod Kuharich, Executive Director and Mr. Dan McAuliffe, Assistant Director provided guidance on CWCB policies and programs. Mr. Rick Brown reviewed the CRRRS process in relation to the Statewide Water Supply Initiative (SWSI) he is managing. Ms. Catherine Gonzales, Board Coordinator and Public Information Officer organized the public input programs.

Many other local, state, and federal agency employees provided input as the CRRRS progressed. Their insights on potential positive and negative attributes of the CRRP are appreciated. General input was received via public meetings and information sent to the CWCB and directly to the consulting team.

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