Managing Colorado's Water Resources

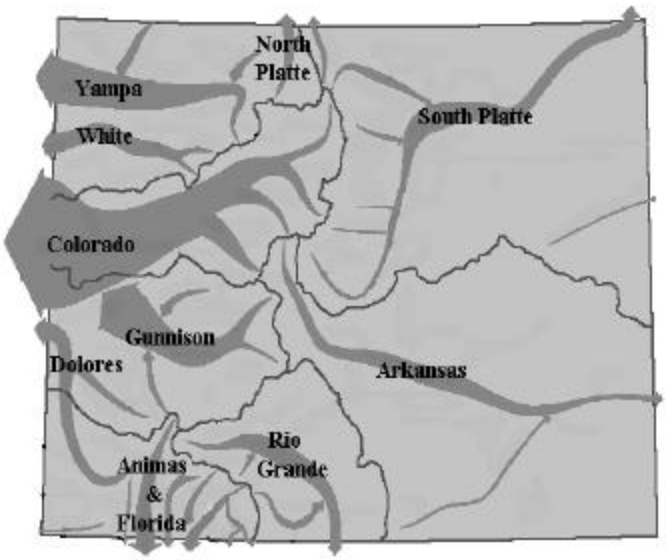
The recent drought and Colorado's rapid population growth have heightened interest in Colorado's water supply. During the upcoming session, Colorado's citizens may look to the legislature and state government for long-term solutions to the state's water supply challenges. The purpose of this pamphlet is to outline the major features of Colorado's water policy landscape including its water law, state water agencies, state financing mechanisms for water supply projects, and water supply alternatives.

Overview of Colorado's Water Challenges

Irregular precipitation. Colorado is a semi-arid state that receives a statewide average annual precipitation of 15 inches, with large areas receiving less than 10 inches annually. It periodically experiences extended droughts. In an average year, approximately 16 million acre feet (MAF) of water flows in Colorado's rivers. However, this year, natural flows were only 4 to 6 MAF. One acre foot of water is the amount of water needed to flood an acre of land to a depth of one foot, or 325,851 gallons.

Reliance upon snow melt and water storage. The majority of water in the state falls as snow in the mountains. Consequently, most of the annual stream flow occurs during the three-month spring run off, from May through July. To manage the state's inconsistent water supply, over 2,000 dams and reservoirs have been constructed throughout the state. Combined, these reservoirs can hold over 6 MAF of water. As of October 1, 2002, statewide storage was 48 percent of average. The Continental Divide also runs through the state and separates much of Colorado's water supply from its population centers. Approximately 80 percent of the rain and snow falls in the state west of the divide, however, most of the state's population lives on its eastern side. Colorado is a headwaters state. Its waters flow out to many states but very little water flows in. In fact, the state is the source for several major river systems including the Arkansas, Platte, Colorado, and the Rio Grande that provide water to a number of neighboring states.

River Water Flows



Water Law for a Semi-Arid Land

To address the state's unique water supply challenges, Colorado developed a legal system that is very different from the riparian system used in the wetter eastern states. In the riparian system, the landowners own the water that is found on their land. In Colorado, however, water is a property interest that is separate from the land. By creating a separate property interest, Colorado's water law allows water to be moved across the state to where it can be used. Eight other western states have adopted a similar water law, called the doctrine of prior appropriation, including Alaska, Arizona, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. The remaining western states have adopted a modified version of this law.

Different laws for different waters. In Colorado, there are two basic types of water: water in streams and ground water that is not connected to streams. Water in streams is regulated according to the doctrine of prior appropriation. This law has governed the use of the state's water since before statehood. Colorado also contains large amounts of ground water that is isolated from streams and essentially nonrenewable. To help address the unique challenges of using this water, Colorado created a different law and regulatory system.

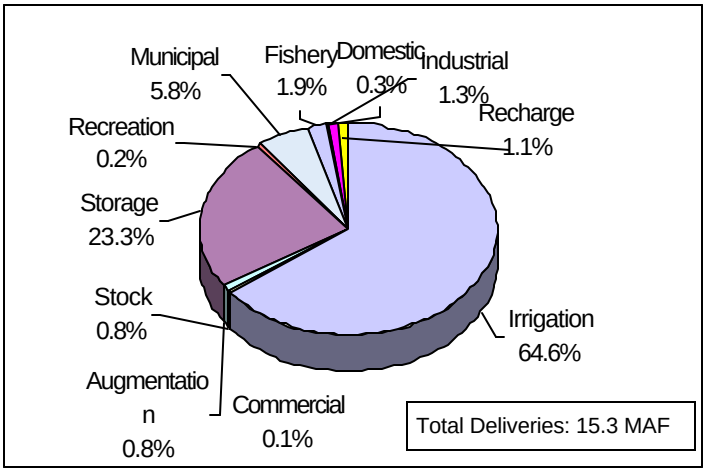
Water Law for Streams

Stream water right. A water right is created by using available river water for a legally recognized use. In general, a potential water user first goes to water court to determine if water may be removed from the stream without injuring existing water rights. If approved, a water judge sets a priority for the right to use a specific amount of water, the location of the diversion, the purpose, and if necessary any conditions to protect senior water rights. The earlier the date of the appropriation, the more "senior" the water right. Some of Colorado's most senior water rights date to the 1860s. Court recognition of a water right enables the owner to make an enforceable "call" for the curtailment of upstream uses by "junior" water rights until senior water rights have been satisfied. Once granted, a water right may be changed, amended, or transferred if approved by a water court.

A use-right. A water right is a right to use water. People who take water from a stream, also known as appropriators, must allow all unconsumed water to return to the stream for use by others. For example, an acre of corn consumes approximately 40 percent of the water applied to it. The law requires that the remaining 60 percent of the water taken from the stream be allowed to return to the stream for use by others. Water users may lose all or part of their rights if a water court determines that the water has not been put to a beneficial use within legal deadlines or the user has abandoned his or her right.

Types of water rights. Water rights may be obtained for a number of beneficial uses. Agricultural, domestic, and mining are the oldest types of legally recognized uses. To accommodate changing public values, beneficial uses now include the impoundment of water for recreation and the preservation of natural habitat.

2001 Water Deliveries



Source: Colorado Division of Water Resources

Tributary ground water. Many wells in Colorado pump ground water that is connected to a nearby river, called tributary ground water. For example, over 600,000 AF is pumped annually from wells near the South Platte and Arkansas rivers, primarily for agricultural purposes. Tributary ground water is regulated according to the same principles as water in streams. This policy helps maximize the use of Colorado's large tributary aquifers while protecting surface water rights. Consequently, most well users along the South Platte and other Colorado rivers are administered in priority. During times of shortages, pumping maybe curtailed to protect senior water rights.

Interstate compacts. Approximately 10.7 MAF flow across Colorado's borders each year. Of this amount, 8 to 9.6 MAF is legally obligated to downstream states and Mexico by interstate compacts and federal court decisions. A compact is an agreement between two or more states that is approved by Congress. Compacts and court-ordered decrees are administered in the same

manner as other water rights in the state. During times of shortage, certain in-state water rights may be prohibited from diverting water until a compact obligation is satisfied.

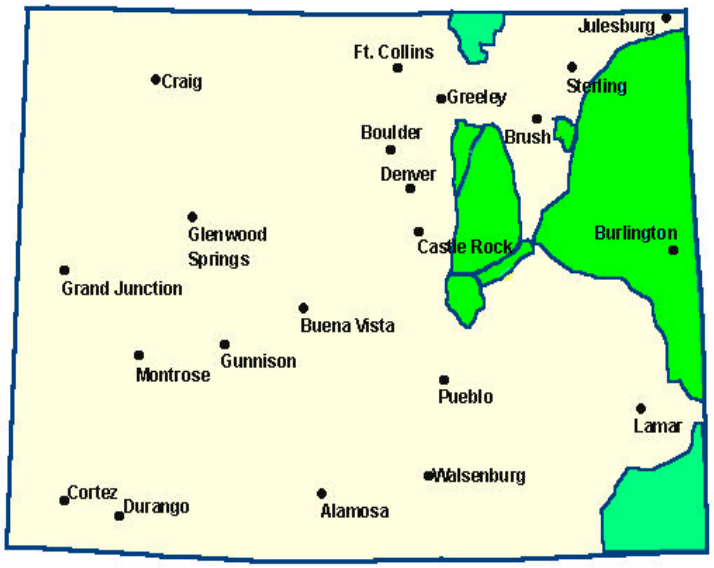
Average Stream Flow for Colorado's Major Rivers at the State Border in Acre Feet	
Colorado	4,632,000
Yampa	1,656,000
Animas	680,500
White	590,100
Dolores	573,100
South Platte	408,900
Rio Grande	328,400
North Platte	316,900
Arkansas	163,200

Water Law for Ground Water that Is Separate from Streams

In eastern Colorado, there are few rivers but large ground water resources that are important to agriculture. These waters include Colorado's portion of the Ogallala Aquifer that extends from South Dakota to Texas. Ground water in this area is essentially nonrenewable and isolated from surface streams. Wells are the primary source of water used in this area. To administer these wells, the General Assembly created designated ground water basins that are regulated according to a modified doctrine of prior appropriation. Colorado also has large ground water resources in deep underground rock aquifers, called nontributary ground water. Most of this water is found outside of designated basins. These waters include the Denver Basin Aquifer that underlies much of the Denver metro area and contains as much as 260 MAF of nontributary ground water.

Designated ground water. Over one MAF of water is pumped each year from designated ground water basins in Colorado. Designated basins are created by the 12-member Ground Water Commission. The commission is authorized by the General Assembly to manage and control designated ground water resources according to statutory guidelines. For example, the commission may grant a right to use designated ground water only if the use will not significantly impair existing water rights. Once a basin has been designated, electors in the basin may create ground water management districts. Each district is empowered to regulate the use, control, and conservation of ground waters within the district. District rules and regulations are subject to review by the commission. The water court does not have jurisdiction over water in designated basins.

Designated Ground Water Basins



Source: Colorado State University

Nontributary ground water. Use of nontributary groundwater is based on legislatively defined criteria that allows for the gradual depletion of this nonrenewable resource. These criteria are commonly known as the "SB 5 criteria" after the Senate Bill that was enacted in 1985. Nontributary ground water is defined in statute as ground water that will not, within 100 years, deplete the flow of a stream at an annual rate greater than one-tenth of one percent of the annual pumping rate. Ownership of nontributary ground water is based on overlying landownership. Annual well

pumping is also limited to one percent of the underlying nontributary ground water. A well permit from the State Engineer must be obtained prior to drilling for nontributary ground water. Unlike water in streams, claims for nontributary ground water do not go through water court.

Nontributary Ground Water Basins

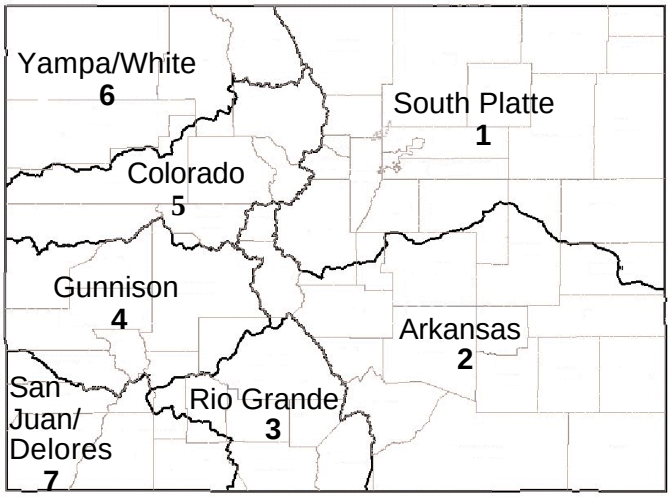
Source: Colorado State University

What Are the Primary State Water Agencies?

Four state entities are primarily responsible for the allocation of water and water policy and planning in Colorado: water courts, the Division of Water Resources, the Colorado Water Conservation Board, and the Ground Water Commission. However, numerous other state agencies also have water-related responsibilities. For example, the Division of Wildlife protects and enhances aquatic wildlife, the Division of Parks and Outdoor Recreation manages water-based recreation, and approximately nine state agencies address water quality issues including the Water Quality Commission and the Colorado Department of Local Affairs.

Water courts. Seven water divisions are established in statute that correspond to the state's seven major river basins. These are: the Arkansas, Colorado, Rio Grande, Gunnison, San Juan/Dolores, South Platte, and Yampa/ White river basins. Each water division has a water court. The Colorado Supreme Court appoints district judges from each water division to act as water judges. Water judges have exclusive jurisdiction over determination of water rights, changes of water rights, approval of plans to protect senior water rights, findings of reasonable progress on water construction projects, approval of exchanges, and approvals to use water outside the state. A water judge may also order a water user to obey a division engineer's order to cease injury to senior water rights or to cease diversions that are not being used beneficially. There are no juries in water court cases and judgments entered by water courts may only be reviewed by the Colorado Supreme Court. The General Assembly appropriated $1.08 million in Fiscal Year 2002-03 from the General Fund for water judges and their staff.

Colorado Water Divisions



Division of Water Resources (DWR). The DWR is headed by the State Engineer and housed in the Department of Natural Resources. The State Engineer administers water rights, issues water well permits, monitors stream flows and water uses, inspects dams for safety, and represents Colorado in interstate water compact proceedings. The State Engineer and his staff are allowed to enter private property and inspect the transportation, storage and uses of water, and to stop diversions that injure senior water rights or are not being used beneficially. For FY 2002-03, the General Assembly appropriated

$18.3 million and 246.6 full time employees (FTE) to the division, primarily from the following sources: $16 million from the General Fund, $620,000 from fees, and $1.6 million from other sources, primarily the Colorado Water Conservation Board Construction Fund.

Colorado Water Conservation Board (CWCB). The CWCB is the state's primary water policy and planning agency. Its 15-member board is charged with conserving the state's waters to promote utilization and prevent floods. Nine of its members are appointed by the Governor for three-year terms to represent eight river basins and the City and County of Denver. Other members include the Executive Director of the Department of Natural Resources, the Commissioner of Agriculture, the State Engineer, the Colorado Attorney General, the Division of Wildlife Director, and the CWCB Director. Its major programs include water supply protection, flood protection, water supply planning and finance, stream and lake protection (instream flow program), and conservation and drought planning. The CWCB is part of the Department of Natural Resources. For FY 2002-03, the General Assembly appropriated $11.3 million and 38.5 FTE to the board primarily from the following sources: $1.3 million from the General Fund, $8.8 million primarily from the CWCB Construction Fund and the Operational Account of the Severance Tax Trust Fund (funded by a tax on the extraction of nonrenewable natural resources), and $223,409 from federal funds.

Ground Water Commission. The 12-member Ground Water Commission regulates the use of water in designated ground water basins. Nine of the board members are appointed by the Governor for four-year terms, including six agriculturalists from designated ground water basins, one agriculturalist from the San Luis Valley, and two municipal or industrial water users from the state.

What Are Some of the Major Water Supply Alternatives and Challenges?

Colorado's rapid population growth and current drought have caused many water providers to look at other ways to manage supply and demand. Depending on geography, financial resources, and other factors, a community and its water supplier may have several sources from which to obtain water, including river water, ground water from the Denver Basin Aquifer, transfers from agricultural water rights, and vegetation management. Water providers may also be able to extend existing supplies through water conservation and water reuse.

River water. Water rights have been granted for most of the water in Colorado's rivers or the water is obligated to downstream states. Of Colorado's seven river basins, only the Colorado River Basin has a significant amount of water that may be developed for new diversions. The Colorado River Basin may have between 200,000 and 450,000 AF of water that may be used by municipalities, farmers, and anyone else in the state who can apply it to a legally recognized use. Although substantially less than the Colorado River, the lower South Platte River also may have some developable water.

Several obstacles could delay or limit the use of additional river water. For example, new diversions potentially affect many water rights, including rights that have been granted for projects that are being planned or constructed. Consequently, the legal process for determining the availability of developable water could be long and contentious. Also, several endangered species depend on water from Colorado's rivers. The federal government may prohibit or greatly restrict proposed and existing water diversions that threaten the survival or recovery of these species. Large dams typically require more than 20 years to plan and build. Legal challenges based on federal environmental laws may add to a project's cost and delay construction. Public opposition may also limit the development of river water if the proposed project will flood a popular recreational resource such as a scenic canyon or trout stream. Water projects that divert Colorado River water to eastern Colorado, called transbasin or transmountain diversions, may also face opposition because such diversions remove water that could be used for future economic development in western Colorado.

Denver Basin Aquifer. The Denver Basin Aquifer underlies the front range metropolitan area and may contain up to 260 MAF of potentially useable water. According to state law, water in the basin is allocated to overlying landowners, municipalities, and special districts. In addition to providing a long-term water supply for some users, these aquifers may also offer protection from extended droughts or provide an interim water supply until renewable supplies can be obtained. The aquifer may also provide a more environmentally friendly method for storing surplus river water during wet years than dams.

Water in the Denver Basin Aquifer is essentially nonrenewable, and well pumping typically exceeds the natural rate of recharge from rain and snow. Some Denver Basin Aquifer users have had to deepen wells to stay within the declining water table or drill new wells to offset declines in the water level. As the water level in an aquifer declines, well pumping becomes costlier due to additional drilling and well pumping costs. Eventually, use of the aquifer may become cost prohibitive.

Transfers of agricultural water rights. A water right is a property interest that may be sold or transferred, provided that no other water right is injured and the transfer is approved by the division water court. Currently, most of Colorado's water is used by agricultural interests. The market value of this water is steadily increasing as demand for municipal water increases. Selling a water right to a municipality may be the most profitable way for a farmer to benefit from his or her water right.

Large tracts of agricultural lands have been taken out of production to provide water to Colorado's growing municipalities. Permanently transferring a water right from a farm to a municipality may adversely affect local agricultural economies. Farms that have sold their water rights typically pay less property tax, employ fewer persons, and no longer purchase agricultural supplies from local businesses. Temporary transfers of agricultural water to municipalities during droughts may impose fewer impacts on the agriculture community than permanent transfers. However, these transfers may require the construction of additional storage projects to hold agricultural water until needed by a municipality. Also, the water quality of some agricultural water may not be good enough for use by a municipality.

Vegetation management. Trees, shrubs, and other plants consume large amounts of water that could be used for other purposes. For example, tamarisk and Russian olive are two invasive, non-native shrubs that are estimated to infest as many as 75,000 acres of river lands in Colorado and may consume 250,000 AF per year in Colorado. Controlling these rapidly spreading plants may increase stream flows and help restore valuable wildlife habitat. Colorado's forests are also growing denser and using more water due to declines in commercial logging. One study estimates that logging during the first half of the 20th century allowed an additional 116,000 AF annually to flow into the North Platte Basin. Other Colorado river basins are experiencing similar increases in forest density.

Controlling tamarisk and other invasive plants is expensive and may require a long-term treatment program. For example, aerial herbicide treatment costs approximately $200 per acre, and hand clearing may cost $2,000 per acre. Also, the direct incentive for controlling tamarisk is limited because the saved water may only be used after senior water rights have been satisfied, potentially leaving little, if any, water for the controller of the tamarisk. Most of Colorado's forests are on federal lands. Fewer timber harvesting opportunities may be available than 50 years ago due to federal environmental restrictions. Public concerns may also limit logging in roadless areas, near popular recreation areas, or in older growth forests that include more marketable trees.

Water conservation and reuse. Water conservation and reuse help extend existing water supplies and reduce demand for new water sources. Water conservation measures include preventing leaks in pipes, replacing high-water-using appliances, pricing water to encourage wise water use, public education, and landscaping with lower-water-consuming plants. Water may be reused by capturing effluent from municipal sewage treatment plants, agricultural runoff, or other sources and applying it to another use such as irrigation. For example, a municipality could capture the discharge from its

sewage treatment plant, further treat it, and then use the water on a city golf course. Reusable water may also be exchanged with stream water to allow diversions upstream. Current technology can treat sewage water to a level that satisfies federal drinking water standards. According to state law, only certain types of water may be reused including water that is introduced into a river basin from another basin or from nontributary ground water.

The public may be reluctant to pay a premium for increased use or increase conservation if it must convert their lawns to lower water consuming landscapes or pay to install water savings appliances. With regards to water reuse, the public may be reluctant to drink treated effluent, regardless of the taste and quality. Consequently, reused water may require a separate distribution system for nonpotable uses, such as landscape irrigation. Water conservation and reuse may also reduce return flows to a river that may otherwise benefit downstream users or provide wildlife habitat.

What Are the Primary State Funding Sources for Water Projects?

Most of Colorado's largest water projects were constructed with federal moneys, local property taxes, and user fees. The state funds several smaller programs for the planning, construction, and rehabilitation of private and public water supply projects.

The CWCB Construction Fund. This revolving loan program funds projects that increase the consumption of Colorado's undeveloped river entitlement and that repair and rehabilitate existing water storage and delivery facilities. The CWCB may also provide grants up to 50 percent of the cost of feasibility studies and water supply investigations. Loans may not be used for domestic water treatment and distribution systems. The fund receives revenue from the repayment of loans, interest on the fund in the state treasury, and federal mineral royalty distributions. As of June 30, 2002, the fund's value was $238 million including $142 million in outstanding loans, $11 million in authorized projects under contract, $30 million in special funds, $29 million in authorized projects not yet under contract, and $26 million available for new loans. The CWCB is authorized to adjust loan interest rates that currently range from 2.75 percent for agricultural loans to 5.75 percent for commercial loans. Spending from the fund is approved annually by the General Assembly in a bill. In 2002, the General Assembly approved loans from the fund of $5.3 million and grants of $4.9 million.

Severance Tax Trust Fund Perpetual Base Account loans. The CWCB is also authorized to issue loans for water projects from moneys in the Severance Tax Trust Fund's Perpetual Base Account that was created by the General Assembly in 1997. As of June 30, 2002, the fund's value was $75 million including $27 million in outstanding loans, $1 million for projects under contract, $32 million for projects not yet under contract, and $14 million available for new loans. The severance tax is paid by producers of oil, gas, coal, and other minerals. In 2002, the General Assembly approved two loans from the fund totaling $26 million and $1 million for emergency drought relief for agricultural well users.

Colorado Water Resources and Power Development Authority (the authority). The authority is an independent public entity created by the General Assembly in 1981 to finance water supply projects and later authorized to finance water quality projects. The authority is authorized to issue revenue bonds that are the indebtedness of the authority and do not obligate the state or any political subdivision. The authority is governed by a nine-member board appointed by the Governor. In 2001, the authority committed $20 million for water resources development. These moneys are primarily used to help offset the cost of borrowing money by a project sponsor. For example, the authority's program for small water resources projects finances projects costing up to $15 million by providing bond insurance for small, non-investment grade borrowers. This enables the project sponsor to issue lower-cost AAA-rated bonds. The authority's water revenue bond program helps investment grade borrowers finance projects ranging from $15 million to $100 million by purchasing bond insurance, pooling borrowers, investing proceeds, and providing other cost-saving services. The authority is allowed to provide similar assistance for larger loans, provided the projects are determined to be feasible by the CWCB.

The General Assembly must also adopt a joint resolution authorizing the authority to consider the project, and the resolution must be signed by the Governor. Due to the streamlined approval process, projects under $100 million may receive funds approximately three months after applying for the money. Due to the legislative cycle, the projects over $100 million may require up to one year to complete the approval process.

Key Provisions of Law

Section 5 of Article XVI, Colorado Constitution: Guarantees the right to appropriate available water for a legally recognized use.

Section 6 of Article XVI, Colorado Constitution: Establishes the doctrine of prior appropriation.

Section 7 of Article XVI, Colorado Constitution: Allows for the construction of right-of-ways for ditches, canals, or flumes.

Section 37-60-101, et seq., C.R.S.: Specifies membership and the powers and duties of the Colorado Water Conservation Board including administration of CWCB Construction Fund.

Section 37-80-101, et seq., C.R.S., Section 37-92-301, et seq., C.R.S., and Section 37-92-501, et seq.: Specifies the powers and duties of the State Engineer and the Division of Water Resources.

Section 37-90-101, et seq., C.R.S.: Colorado Ground Water Management Act regulates the use of designated ground water including defining the powers and duties of Ground Water Commission and Ground Water Management Districts.

Section 37-90-137, C.R.S.: Regulates the use of Denver Basin Aquifer and other nontributary ground water located outside of designated basins.

Section 37-92-101, et seq., C.R.S.: The Water Right Determination and Administration Act regulates the use of river water and ground water connected to rivers.

Section 37-92-102, C.R.S.: Defines the basic tenets of Colorado water law.

Section 37-92-301 through 308, C.R.S.: Establishes the water court's process and criteria for determining and administering water rights.

Section 37-95-101, et seq., C.R.S.: Specifies membership and the power and duties of the Colorado Water Resources and Power Development Authority.

Staff contacts: David Beaujon and Scott Grosscup, Legislative Council Staff, 303-866-3521
Thomas Morris, Legislative Legal Services, 303-866-2045