

IMPACTS OF THE TRANS-BASIN DIVERSION IN GRAND COUNTY

Before 1852 the history of water in the West Slope county of Grand was written in geologic time. This is the year that the Territory of Colorado adopted Prior Appropriation as its method of distributing ownership of water. Prior appropriation is a first come first serve system that grants senior priority to the earliest filings for water ownership. In 1876 the Prior Appropriation Doctrine was incorporated into the constitution of the newly formed state of Colorado.

In the late 1800's there were ranchers filing on water rights and diverting water from the rivers and streams in Grand County. Almost all of the water diverted from the river by the ranchers returned to the river. There was so much water historically that many of the ranchers on the main stem of the Colorado River (known as the Grand River at the time) never built diversion structures or filed on water rights. Their flood irrigation came from the out of bank flows of the river in the spring and early summer. This would become a problem later when so much of the Colorado River was diverted that this type of flooding seldom took place. Now ranchers that were using Colorado River water in the 1800's were forced to build diversion structures and file on water rights that are junior to most of the trans-basin diversions.

1890 signaled the beginning of a new era. This is the year that the Grand Ditch was completed and water from the West Slope in Grand County began flowing east through a low spot in the Never Summer Mountains. This new form of diversion had no return flows to the river that the water was diverted from. In 1890 the Grand Ditch was an 8 mile hand dug ditch that carried about ½ of the flows of the headwaters of the Colorado River located today in Rocky Mountain National Park. In 1936 this ditch, with the help of machinery, was enlarged to 14 miles and even more West Slope water began flowing east. An impact of higher water temperatures and a declining fishery were identified that long ago.

In 1929 the Moffat Tunnel was completed and the survey boar used to construct the tunnel was converted to a trans-basin pipe for the purpose of diverting the Fraser River 75 miles east to the City of Denver. The Fraser River is a major headwaters tributary to the Colorado River. In 1933 water from this West Slope river began flowing east. Today 55,000 ac. ft. each year are diverted from the Fraser River and consequently the headwaters of the Colorado River each year. This is around 60% of the native flows of the Fraser River in the Fraser Valley that flow through the Moffat Tunnel to Denver.

1956 signaled another milestone in Front Range diversions. This is the year that the Colorado Big Thompson Project was completed and began diverting through the Alva B. Adams Tunnel. This tunnel is 13.1 miles long and the longest tunnel in America. The length of this tunnel is a good indicator as to the value of water in the arid west. When initiated 100% of the CBT Project water was for agricultural use. Today about 30% is

used for agriculture and 70 % is used as municipal water supply including lawn irrigation. The CBT project consisted of the construction of Granby Reservoir, Shadow Mountain Reservoir, Willow Creek Reservoir and Green Mountain Reservoir. Green Mountain Reservoir is located on the Blue River and is used for augmentation water to meet downstream senior water right calls. This left a dewatered Colorado River from Granby Reservoir downstream to the river's confluence with the Blue River.

The Adams Tunnel flows out of the east end of Grand Lake so the CBT water has to come from the 3 diversion reservoirs through Grand Lake to get to the tunnel so that it can be moved to the East Slope. This flow through concept has turned Colorado's largest natural lake in to a conveyance ditch. Degraded water quality from these reservoirs now flows through Grand Lake. Water clarity in Grand Lake has never been the same since. Shadow Mountain Reservoir is located adjacent to Grand Lake and is the final reservoir in the CBT process of moving water to the East Slope. Shadow Mountain is a very shallow reservoir and heats up quickly. If this reservoir was a natural lake it would be considered eutrophic which is the last stage of a lakes life. This reservoir is a perfect medium for growing weeds and algae. Water from Shadow Mountain flows through Grand Lake and transfers the undesirable growth into this once pristine natural high country lake. There is presently an effort to study the solutions to this problem. One possible answer is to pipe the diversion water around Grand Lake.

Presently 220,000 ac. ft. each year are diverted from the headwaters of the Colorado River through this project. This is around 60% of the native flows of the Colorado River.

1985 saw the most recent change in the health of the Colorado River. This is the first year that the Windy Gap reservoir began pumping the flushing flows of spring up to the Granby Reservoir. The proceeding years, according to a Division of Wildlife study by Barry Nehring, have seen a 95% collapse in the sculpin population and the stone fly hatch and a 38% collapse in all macro-invertebrate life. With a decline in the insect life, which is the bottom of the food chain, has come a decline in the fish population. An important source of income to ranchers with rivers and streams running through their property is selling fishing rights. The decline in fish counts threatens this source of income. This decline in the river's health has been attributed to lack of flushing flows and higher stream temperatures. Removing the flushing flows has eliminated the river's ability to flush out sediment. Now the insects that live on the rocky river bottom are smothered like the people of Pampa when Mt. Vesuvius erupted and these insects have met the same demise. So much sediment has accumulated since 1985 that it has become armored and even rare high flows like last year can't loosen it. With only 40% of the native flows spread out over the native stream bed width, the river is so shallow that it is now built like a solar collector. This raises the stream temperatures to levels that are lethal to a cold water fishery. 65 degrees F will impair cold water fish and make them susceptible to disease. 70 degrees F will kill the cold water fishery. Temperatures over 70 degrees F are being recorded in Grand County. Sediment combined with warmer temperatures creates a perfect medium for growing weeds and algae. This weed and algae growth puts an oxygen demand on the river and further impairs the fish habitat. Ranchers below this reservoir have been plagued by algae and weed problems in the pumps that they are now

forced to use to raise the remaining flows to their head gates. Remember, these are the same ranchers that didn't even need diversion structures to flood irrigate their lands. Now the river is so low that they need to pump water up to their diversion structures.

These lower river levels have also led to the dewatering of the riparian zone which relies on the out of bank flows for its recharge. This zone is the thin green line of wetlands plants that act as the filter for the river. With less stream velocity it becomes critical to keep sediment from migrating into the river. Unfortunately, these lower flows also damage the rivers filter and sediment can migrate more easily into the stream bed. The riparian zone also plays a very important role to animal and bird life. 3% of the land mass in Colorado is riparian and yet 90% of the animal life in Colorado use this plant life as part of their survival.

Both the Northern Colorado Water Conservancy District and Denver Water are seeking Federal approval to build additional storage on the East Slope so that they can divert additional water from the Fraser and Upper Colorado Rivers. If approved, these projects will leave 20% of the native flows in the Fraser and Upper Colorado Rivers. History shows us that there are severe impacts to diverting large portions of a river out of its basin. Higher stream temperatures, sediment deposition and weed and algae growth are some of the most dramatic impacts experienced in these 122 years of trans-basin diversions.

Colorado has a conflict between the laws that we use to distribute water and the environment that we use to drive our State's economy. We can see first hand the direction that our environment is headed and need to act now to curtail this decline in habitat. Because 80% of the people in Colorado live on the East Slope and 80% of the water is on the West Slope our State will always rely on the trans-basin diversion. The solution to this problem lies in what resources, we as a State, are willing to put into our de-watered environment on the West Slope.

One solution that requires financial resources would be to size our stream beds to today's flows. A narrower and deeper stream bed would allow sediment transport with lower velocity flows and create deeper pools for cooler temperatures. This reconstructed stream bed would also allow out of bank flows with lower volumes of water in the river. These out of bank flows are greatly needed to recharge the riparian zone. When spread out over all of the water users in the State, the cost per user would be low enough that this type of rechanneling could be one feasible solution. A study done by Trout Unlimited showed that The Fraser River and its tributaries could be reconstructed to be a healthy aquatic habitat for less than \$1/year for each Denver Water customer.

Here in the arid west water conservation will also need to play a vital role in keeping West Slope Rivers alive. With 60% of the residential water use going to keep outdoor landscaping alive, we will need to develop landscaping habits that fit our local environment. The Front Range of Colorado receives an average of 15" of precipitation a year. Blue grass comes from an environment that receives 48" of precipitation a year. Las Vegas saw a 33% reduction in their water use when they limited the amount of Blue grass

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that was allowed. Other cities in the arid West have reduced water consumption by over 50% by limiting the use of Blue Grass. Water to scarce of a resource in the West to squander it on imported plants. This precious resource needs to be used to sustain our population, our agriculture and our natural environment because these are the uses that best benefit our western states.

We need to use Grand County as the “canary in the cage” and decide as a State what percentage of out of basin diversions our environment can handle. While water rights are a personal property right, a damaged West Slope environment hurts every resident in our State. These are tough decisions with high stakes. If we do nothing I can predict the future with certainty. Keeping Colorado’s environment whole while supplying the Front Range with a reliable water supply will only happen if every entity in the State works together towards the common goal of sustaining a healthy environment on the West Slope.

An encouraging example of the type of coordination needed in Colorado took place in recent history. A sediment catch basin on the west side of Berthoud pass was needed to stop traction sand from migrating into the Fraser River and choking out the fish and insect habitat. Denver Water, CDOT, the US Forest Service and local Grand County entities worked together to make this happen. It took 10 years of meetings for this project to finally start construction. In the eleventh hour it was the Forest Service who was the hero and was able to move these stalled out negotiations forward. We were lucky that we had a Forest Service employee who believed in the importance of this project to the environment and knew how to motivate this group of large bureaucratic agencies into action. This is a small piece of the much larger and more complicated water issues in Colorado but it is a perfect example of how each of us has the ability to be the spark that sets a project in motion. Our future depends on our leaders prioritizing our environment and working seamlessly together to keep our most important resource pristine. Hopefully everybody in this room will be in a position, some time, to make the extra effort to keep a good project alive. Please keep your eye on the big picture and make sure that tomorrow’s Colorado is one that you are proud of.

This one small success gives hope that it can be followed by bigger successes. An entire state working toward the common goal of keeping Colorado pristine could some day create West Slope Rivers that flow clear and cool, teeming with life. To settle for less will be to rob future generations of the experiences previous generations were able to enjoy.