2021-2022 Water Literate Leaders of Northern Colorado
Homework Assignment for **September 2021**

What was your key takeaway from this film?

- My key takeaway is that there is a larger amount of water being diverted to the Eastern side of the divide than I originally envisioned.
- Water storage is so important for the eastern slope where the growth is happening. Ag is an opportunity for conservation. They are water hogs. Ground water versus snowpack – for both to keep providing our agriculture seems unsustainable.
- I feel that water law and policies in Colorado, and to some extent the greater American West, present users (specifically the senior water right holders) with a bit of a dichotomy. If you don't use the quantity of water associated with your right, then you'll lose your legal holding to that right. That being said, then what are the incentives for users to want to lessen their water use and implement more conservation minded practices?This is one of my greatest take-aways because it demonstrates the extent to which we need to be analyzing the issue of water in Colorado. It's not just behavior or community-level change, but a critical examination of the very laws that have been put in place that didn't take into consideration a number of environmental concerns, as well as bringing up the question of equitable access when it comes to junior water right holders (and other groups without specified legal rights). The Doctrine of Prior Appropriation has obviously had some major benefits and has allowed for some sensible practices, but is it what we need to solve the water challenges of the 21st century? I'm very interested in pursuing this question throughout the program.
- Everybody must work collaboratively to find acceptable solutions for the majority for NoCO's (and Colorado's) water supply, demand and management; working within Colorado (not just locally) and with other western states to find solutions. Virtually all solutions will be compromises among municipal, business, agricultural, recreational, and environmental interests and needs.
- The cooperation that evolves out of conflict. How time increased the size of the pie, new voices, new solutions, and the return to some old ideas that were ignored at the outset. The inclusion of larger groups of people into the discussion. Local interest and organization feeding discussion, providing alternatives and always arriving at a solution that didn't please all but was made for the greater good and progress.
- That our communities need to continue to consider and address climate change and efficient water usage in Colorado in relation to projected population growth. What we have always done is not meeting the needs of communities or our environment.
- Since the beginning the balance between water and development has been key to Colorado's front range. Great leaders and engineered water projects have allowed for growth to happen on the front range. We will need innovative ideas and creative projects to continue the growth into the future as water resources become less and less.
- It's amazing Colorado water law continues to be based on those laws written in the 1880's. Agreeably, many of the same provisions within those laws are still applicable however Colorado was a different place during those times. It would seem certain rights afforded other states to claim water originating from Colorado should be revisited as our population grows. Similarly, I wonder how long "senior" ditch rights

should continue given the reasons and methods behind the first agricultural ditches in Colorado. It's understandable to think in the 1800's how difficult ditch digging must have been and it would certainly seem unfair for someone else to begin using the water in the ditch especially in drought years. Perhaps it's also time to explore more efficient methods for transportation of agricultural or municipal water rather than through open ditches. Introducing programs to help pipe more water may be worth studying.

- What worked in the past will not work in the future. There will need to be a fundamental shift in people's attitudes about the limited resources of water.
- My key takeaway is affirmation of the enormous pressure that a growing population, more diverse water interests (including those who may lack actual water rights, such as environmental and recreational interests), and climate change is placing on Colorado's water resources.
- My key takeaway from the film is how dependent on Colorado a huge part of the western United States is. Colorado really is at the heart of water distribution in a very arid climate in the western US, and you saw in the film how dependent 40 million people are on the Colorado River alone!
- The key takeaway for me as a community leader is that while we see the issues that face us in water scarcity vs continued rapid growth of population throughout the state many of our elected officials and hired staff have been unwilling to make the very difficult decision to change and invest in significant small changes that would make positive impacts to our long-term success.Several quick examples come to mind that I believe would make immediate impacts to our long-term success: 1. Mandated landscaping changes for all 2. Enforcement of irrigation usage.
- We have a precious and finite resource that we need to use wisely. 18 States and Mexico rely on Colorado. Colorado Doctrine. First to use, first to right. Our population will double by 2050 with greater water challenges starting in 2030. Colorado River provides water to more than 40 Million people and facilitates the 12th largest economy in the world. 80% of water is on west side, with 80% of population is on the east side of the divide. The Colorado river rarely reaches the sea (Pacific Ocean). The amazing part is 2/3 of our water is in the snow and we effectively divert it to meet our needs. Not all water demands are satisfied. -
- Water issues are complicated and evolving. Colorado and the nation need to adjust our utilization of water resources to meet the needs of a changing culture. A balanced approach is required, but excessive self-interest of all parties complicates the decision process.
- We have come a long way since the 1800's – from Pike referring to Colorado as the "Great American Desert" to the current opportunities coming forward due to collaboration and cooperation between water users. We have moved from conflict to cooperation which is evident of the work done in response to the 2002 drought. I look forward to future cooperation in Northern Colorado to meet the agricultural and municipal needs.
- Water in Colorado has shaped what we know as Colorado today. The Colorado of tomorrow may look extremely different due to the ever-increasing demands of water consumption. What many fail to realize is that without water, development cannot

occur. Because of this, I believe that agricultural activities will continue to decrease over time and the "buy and dry" model will continue to facilitate the increase of residential, commercial and industrial growth. -

- My key takeaway from *The Great Divide* is how critical water is to every aspect of life in Colorado and the West. It is our most precious resource and it's critically important that we as a state manage its use effectively. What seems to create the best outcomes in water policy is when different interest groups: urban centers, agriculture, recreation, environmental groups, etc., work in a cooperative manner to achieve the best outcomes for all. We need to be intentional in crafting policy that is focused on future needs and the health of watersheds. As water becomes even more scare in the future as a result of climate change, it's becoming even more vital that we negotiate the good water policy recognizes the importance of river vitality. Although conservation has helped decrease water consumption there is still so much more we can do to promote responsible water use such as more efficient delivery, drip irrigation systems, xeriscaping, planting native plants, incentivizing water saving appliances and rethinking lifestyles. I think we also have this incredible opportunity to create innovative policy (for example - land use code) that can help safeguard Colorado's water future.
- Everyone from farmers, livestock owners, to municipalities need to have an open and established relationship to create a healthy dialogue and chances for communication. We need to be able to share each part's goals and needs to figure out comprehensive solutions to complex problems. The ATMs are a good start but more is and will be needed. This is going to take a large group effort: between farmers, environmentalists, elected officials, ... there are so many effects, whether intended or not, that needs to be analyzed by multiple parties to ensure we are making the best solutions for everyone.
- Amazing to learn a little bit more about the history of Colorado. The perception that much of this state was seen as unlivable due to the dry landscape and the realization about the precious nature of the original source of water on the Continental divide.

What did you learn that encouraged you, discouraged you, or captured your attention to the extent that you could see yourself engaging in it further?

- I am encouraged and discouraged by the environmental groups that have inserted themselves into the storage projects. Encouraged that they are starting to work with the other side. Discouraged by the fact that they tend to be money driven for their own projects and ultimately not really concerned with the habitat they are trying to save.
- Encouraged me – I think if we can prioritize our needs we can come to solutions – is supporting growth important and building storage versus environmental needs, etc. Discouraged me – I'm not sure where in the world I could move to in order to get away from drought, fires, hurricanes, flooding, etc.
- The "Alternative Water Transfer Methods" captured my attention, and I'm curious to learn more about those and how they might be providing for more innovative agricultural and conservation practices as they pertain to water usage. I felt

exceptionally discouraged with it was mentioned that the Department of Natural Resources says that there will be a significant water use gap by 2030. We're less than a decade away from this marker, which further demonstrates the considerable urgency. The mention of hydraulic turbines in reservoirs not being effective sources of energy production due to lowering water levels was another discouragement and something that had not crossed my mind as we promote cleaner sources of energy. Aurora's water recycling practices was very encouraging in the sense that it could be used as a further blueprint for communities/urban areas to follow in the next decade.

- Encouraged: It appears from a few examples illustrated in the film that there is a recent track record of deliberative democracy and collaboration to find workable solutions for some of Colorado's water needs and management challenges. Discouraged: Two-thirds of water in the Colorado River must be delivered to other western states. Captured my attention: 1. I'll forever be amazed that history (~270 years) evolved such that ~80% of water used on Colorado's eastern slope comes from the western slope! 2. The concept that "prior appropriation" still holds in Colorado water law — and, the right to move water from basin to basin. 3. The concept of "alternative transfer methods" between agriculture and municipalities is being discussed and perhaps implemented on a limited basis currently. How can that even be a partial solution? 4. Twenty-five to 35% of Colorado's future water needs could be met by conservation.
- The reality of the double population in the state with reserves running out by 2030 sort of gets your first attention. Denver using less water for more area and people overwhelms me. The need to understand the climate where we live and live within those means makes me want to study the process and how it can grow. Plus, the dire needs facing us six years after the film was made are scary.
- The ingenuity and commitment of groups to ensuring that Colorado water gets where it needs to be is remarkable. It is also great to hear stories about how agencies and community members are advocates for healthy waterways, environments and Indigenous American water rights in Colorado. I feel like we need to respect or take care of our environment more along with educating communities. The predictions about what will happen if we don't change is dire. This captured my attention the most and already plays a part in planning the project designs that we coordinate.
- The level of involvement between leaders, environmental organizations, developers, current landowners and attorneys to complete future water projects will be intense. I would like to see how the next water project proceeds under this method and hope to somehow get involved in it. We have done some amazing projects in the past, I am curious to see what we come up with in the future.
- It is encouraging to see how much water delivery and reservoir infrastructure has been built in a relatively short amount of time. Undertaking the massive amounts of underground pipelines with near perfect accuracy is truly a feat worthy of being called remarkable. From a discouraging perspective, it is disheartening to think about the amount of Colorado water that disappears out of the state annually due to agreements hashed long ago. Colorado's population is growing as is our industry yet the same amount of water is available. Colorado could and should be a leading

agricultural state (even more so than it already is) however as the film depicted in the Republican River example, prior agreements seem to prioritize downstream states.

- Encouraged: That people are starting to realize the water is a limited resource. The Aurora project that recycles the water, the use of ATM's. I attended the Northern Water conference in Loveland. There was discussion of cooperation between municipal water districts. This is a regional issue, and it will take a regional response. Discouraged: The outdated water laws to discourage farmers to save. The "use if or lose it" does not encourage conservation. Captured my attention:The magnitude of the water projects in Colorado and their economic impact on the state. I thought these projects were completed prior to 1960. Clearly not the case. The fact that 80% of the population lives on the Eastern slope and 80% of the water is on the Western slope. Education is clearly needed across the state and the region.
- The main thing that captured my attention is the issue of climate change and the unknowns it adds to the equation of water resource planning in Northern Colorado. It raises the uncomfortable notion that the systems and methods we have relied on in the past may no longer serve us well in the future.
- While I knew some of the history of the early settlers to Colorado, I found it fascinating that they were dealing with many of the same issues we do today. The challenges of using water efficiently, water law, and how the early water rights and agreements were set up was very interesting, and how that forms what we do today.
- Overall, I was encouraged by the continued evolution of working for the betterment of all that the film showed. Many examples of different issues and how they were solved. I am interested in learning more about many of the issues and solutions that have occurred over the years. What discourages me is the State is in the process of doubling its population in the next 30 years and without bold action such as mandating user landscape changes, enforcement, changes to design of parks & housing developments, public education and buy in, we will only exacerbate the issues and face more difficult draconian changes that cost significantly more when we are at the precipice of failure. This topic has interested me since I dealt with depleted aquifers in Eastern North Carolina and the film now has me hooked! Given my current position, I believe my greatest impact and the area I see myself immediately engaging and impacting is in the area of water conservation, public education. Additionally, I am looking forward to better understanding the overall water rights history conversation and hopefully aiding in the discussion about the future.
- How can we effectively reuse gray water for conservation success long-term. How do we mitigate increasing demand on decreasing supply. The Colorado powers a significant economy from agriculture to urban growth. The Colorado River Water Compact creates winners and losers. Is it possible to create a better balance of this agreement?
- We need to recognize that unintended consequences are a byproduct of decisions made. Unfortunately, political decision making is flawed as they are often made on a fear basis rather than a factual, rational decision platform. Prioritization of water resources is going to continue being a real challenge unless we can come to agreement on a hierarchy of needs.

- I am certainly encouraged with the cooperation that was brought forward during the movie – which is being done across Colorado. The ingenuity of water users related to the various water projects is a bit overwhelming and I am anxious to learn more.
- It's encouraging to see more projects being approved in the State (Windy Gap, Glade, etc...), however, it is discouraging to know that the projects that could increase capacity and usability are tied to the approvals of Federal and State agencies which makes them nearly impossible to accomplish (i.e. NISP) or too costly to pursue. Pushing on new, innovative water storage projects is something, I see, as vital to continue to the economic boom and unprecedented population growth we are facing.
- I'm encouraged by the progression of water policy over time. I like to see the cooperative policy making and the realization that water policy can be a win-win proposition. I'm also encouraged by the increased recognition that we can meet some of our water needs through conservation and that it needs to play an even more important role in the future. What I find discouraging and depressing is the intersection between how stressed Colorado's rivers currently are, the projected growth in our state population and climate change. Safeguarding our rivers for future generations will be a tall order.
- I was encouraged that more and more people in all industries and sectors are realizing the water problem that shadows Colorado and that everyone is looking towards viable solutions. I was discouraged by hearing the increasing population numbers by 2050. I love and encourage growth, but it needs to be smart growth. We need to realize what we can handle. We need to begin focusing more energy, policies, and funds on creating more water storage while still maintaining a healthy environment. We need to engage local communities all the way to the Colorado Senate and House to create policy that can help encourage growth in that sector. There was a bill passed just this year reclassifying hydroelectricity as renewable which is a great start.
- The nature of water rights are unbelievable complex, and the way to have a more successful water future is in litigation and compromise. Ugh... rock and a hard place!

What questions do you have based on what you learned in the film?

- How do we move forward with future storage projects and ones that are in the pipelines currently? They seem stalled out and in a state of perpetually being pushed down the line by moving goal posts.
- What is the balance to providing for growth and the environment? What happens if Colorado just says we're keeping our water? – probably civil war. How much do downstream states actually contribute to the water flow of the rivers that flow out of our state? Should the arid west be providing our nation with food? The use it or lose it on water rights seems counterintuitive to conservation – how can that be changed?
- What new trends, ideas, or practices are we seeing at the legislative level that might impact water law between now and 2050? How have the Ute Mountain and Southern Ute Tribes engaged in the issues of water rights and water conservation since the completion of the Dolores Project that was mentioned in the documentary? I'm curious to hear more about Alternative Water Transfer Methods and what potential impacts

that can have on agricultural water use in the future. How do these tie into the notion of 'beneficial use'? What does the first-ever official water shortage declaration in the Colorado River Basin mean for the Colorado River Compact?

- The film says that the Colorado population likely will increase from ~5 to 10 M by 2050. Given the reality of limited water resource, is/has the feasibility of a population limit (population control) ever been seriously raised and discussed by any entities? Should and how can the paradigm —- "we live in a culture and mindset of expansion" —- be altered and made more sustainable with respect to water demand and use? Or, is it assumed that the balance of supply and demand for water is eventually self-limiting because the cost (financial and social) will become too great? Throughout the film there are numerous examples of transfer and storage of the water where evaporation must be very significant. What is the estimated percentage of liquid water lost to evaporation? What conservation approaches to reduce evaporation have been seriously considered and(or) implemented, especially on a large scale? Of course, evaporated water is part of the natural water cycle so it's not lost forever, but it might not recycle directly to Colorado/NoCO if climatic effects are not evenly distributed and at steady state, which they never are. For NoCo (and Colorado at-large) what actions and activities could be implemented to directly couple enhanced and accelerated amelioration of global warming/climate change and water use and conservation? They are inextricably linked, but the film did not really address this concept or possible linkages.
- Where do we go from here? How do we make the population aware of the shortages, need for change, and how do we communicate those processes?
- How do we maintain the agricultural and water rights and implement water conservation efforts? Are we reaching a point where we will need to replace hydroelectric power with other sources of power?
- Colorado seems to do a vast amount of water conservation currently. I don't see a lot of water conservation happening in the other states that also use water from Colorado. When do you think we will start to see more states joining in to conserve this precious resource?What roles will the water courts play in future Colorado water projects? At some point water will limit Colorado's growth. How will that impact the economy and how will that change the face of Colorado?
- Should governments and other developers be allowed to purchase historical senior water rights only to use the water in different areas than where it originates? This practice seems to defeat the original intent behind the use of the water.
- What resources can the Colorado Water Center provide to help in education? Can "The Great Divide" be added to our library collection so people can view it for free? There was no discussion on grey water systems. I know Golden has passed some ordinances on this. I will need to investigate this more. https://www.cityofgolden.net/live/sustainability-initiative/water-conservation/graywater-reuse/
- Can we adequately predict the impact climate change will have on Colorado's water resources/what adaptation methods are necessary/possible to mitigate these impacts? Is a water allocation system created in the 1870s still the best way to satisfy the State's water needs? Is it realistic to think that we can satisfy all of the diverse water interests

in Colorado with this dwindling resource? How do we discourage buy-and-dry and still honor a farmer's right to sell his water to the highest bidder? Can we count on future trans-mountain diversions to help meet future water needs in Northern Colorado?

- I want to know how each end of the Big Thompson project, as they were tunneling through, when they came together in the middle, could only be off the width of a coin? It is amazing to me the engineering they had way back then, and even to bring water from Dillon down to Denver. It really is incredible what has gone into the history of water in Colorado.
- My questions are as follows: Where can I find other sources to read more in depth about the many projects that have occurred in Colorado related to water? Example would be the Colorado Big Thompson Project. How do the water board and water court operate? Details such as water rights transfers, etc. What are single use rights? The Aurora Project that was highlighted discussed multiple use and treatment of water. Why are other communities not doing this? How do we project when the water resource runs out? For example, determining that the state can support more growth or growth ends. Enforcement and education. I am wondering about what other communities are doing to educate developers and residents, what changes have they made that have been successful and how do they enforce policy. Is it an honor system or is there true enforcement?
- Recreation and environmental benefits have the last rights to water. With the existence of the aspect of use it or potentially lose your right to it, is it possible to more effectively balance these needs and priorities from time to time without compromising an areas economy or community? How are we more effectively planning our water resources for the future growth of the State of Colorado and the Western U.S.?
- I'm looking forward to the course as I'm certain it will raise and resolve unasked questions. I'm baffled by the resistance in Northern Colorado to develop water storage reservoirs . 20+ years for Chimney Hollow. NISP is still in limbo. How do we effectively deal with this issue where building a storage facility literally is impossible to accomplish in a reasonable manner.
- Water diversion was brought up a lot – are there maps that show how/where that happens? The state-wide water supply initiative was conducted in 2003 – I have not seen the information but am wondering if there is or will be an update? I am wondering how far in the future the 2003 information was estimated and if we are on track with the water supply that was projected. What is being done to protect the water habitat in diverted water? This was mentioned by Kirk Klanke I believe. Last, but not least, did anyone else have a panic attack when they saw the little boy driving the huge tractor at the end???
- I've always heard (I know it was referred to in the video) that we have a huge deficit for water vs. the growing population. I'd like to see those studies and compare them with current water projects that are in the pipeline (no pun intended) and how they match up with one another.
- I'd be interested to learn more about the interface between Colorado and other states concerning water management and our obligation to deliver water to other western states. I'd also be interested to learn more about what is working well in other watersheds around the world and how we in Colorado can learn from them.

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- Do we need to have more of a separate water basin groups and solutions rather than just one single group surrounding Colorado? Each basin is unique and has different practices, we could branch out into separate sectors and try different things then regroup and see which worked best. Have the basins work separate but learn from each other. What will happen in the future if we have houses that can't have water? Which part of the economy will fall victim first? Can this inhibit job growth by not allowing as much industry to grow as needed?
- What does the future of water look like for the entire American west - woah? How do we keep enough water in the rivers to maintain the quality of life Coloradoans and those down stream have come to expect? What changes NEED to be made? How do we educate water users in Colorado and downstream to help make needed changes to make this precious resource go further? How do we quickly make energy adjustments so that we are not using water to produce energy and it can be used for more valuable needs for citizens, agriculture, and recreation? What is the most important crop in Colorado today? How much more efficient can agriculture become? What about the effects of pesticides, etc. on our downstream water systems? Is agriculture really 80% of the water use... feels like we are pulling a LOT more out for municipal use within and outside the state of Colorado?