

Crucial FEWSION Episode 5 – Transcript

Narrator: Does it matter what you eat? When you enjoy a juicy burger or a steak – are there any environmental consequences of your meal? Well, visualize how much water you use when you take a shower. Imagine collecting all that water from your showers every day, for a month. Its typically around 475 gallons – or 1800 litres. Imagine what that many bottles of water look like on a supermarket shelf. That’s how much water it takes, on average, to produce a 1lb packet of ground beef. Depending where you live, your beef eating habits may be directly threatening the health and long-term survival of rivers in the region. But what if your choice to eat less beef could positively influence the health of a river? Without having a negative effect on farmers.

FEWSION project researcher Brian Richter, at the University of Virginia, discusses these issues and their solutions - with project director Ben Ruddell at Northern Arizona University in Flagstaff. Hear them explain why and where your burger may be killing a river, in this Episode of ..

Crucial FEWSION...

Ben Ruddell : This is Ben Ruddell. I’m director of the FEWSION project at NAU. FEWSION is a project that’s mapping food-energy-water supply chains and their dependencies for the United States.

Today I’m speaking with Brian Richter. Brian’s been a global leader in freshwater ecosystem conservation & policy for decades. And he’s authored some of the classic books & papers that define that field.

Most recently he served as the chief scientist for the global water program of the Nature Conservancy. But today he consults privately with ‘Sustainable Waters’ and teaches at the University of Virginia. In 2016 Brian joined the FEWSION project. He’s has been looking into potential solutions to water problems in the United States. Welcome to Crucial FEWSION Brian, are you there?

Brian Richter: Yes Ben, hello. Yeah, the Colorado River’s a prime example of an emerging water crisis in the Western United States. Essentially the situation there is that over the last 20 years the river flows have been below normal on average, about 20% less than normal. Yet at the same time we have been taking as much water as we always have out of the river system. And the only way that you can make that work is by dipping into your ‘savings accounts’. That would be the big reservoirs that are along the Colorado river system. So the rivers have become very depleted across the Colorado River basin, across the Western US in the last couple for decades because we’ve been removing so much water from these rivers.

So, we really wanted to understand, what some of the opportunities were for trying to help the water users that are dependant upon that water in the Colorado River system – there are about 40 million people – along with an awful lot of really important farm land.

Ben: When you joined the FEWSION project Brian, we have a national database with information on food, energy and water supply chains and it gives you this national picture, but it also tells you about which human activities in which specific counties and locations and cities ae key in contributing to the depletion of water – right?

Brian: Yes, exactly. This research really started because of the availability of this very talented team of researchers that are organized under the FEWSION project. They were able to look at the contribution of using the water for individual crops and seeing what the impact of irrigating that individual crop would have on the river flow.

One of the really fascinating things that came out of our research was that within the Western US fully one third of all the water used is going to the irrigation of cattle feed crops. Primarily the alfalfa and grass hay. And what we found is that if you take that collection of crops, they clearly emerged as the most dominant driver behind the drying of these rivers and streams. And then ultimately also the primary driver behind the water scarcity and the water shortage crisis that we're facing.

Ben: What are the ecological impacts associated with this drying of streams and rivers?

Brian: There's a lot of different forms of damage that's resulting from the drying up of these river ecosystems. But one of the things we looked at specifically was the native fish species that live in these streams, across the Western US. We found that there are more than 60 species that are becoming highly vulnerable to extinction because of this depletion of the river flows, their habitats that they rely upon. And when we looked only at this group of cattle feed crops we found that more than 50 of those 60 species, would be in trouble just from using water strictly for that purpose – for irrigating cattle feed crops. And so again it really turned our attention to focus on some way that would work out for both the producers of those crops, as well as those who consume beef, hamburgers and steaks, as well as those folks who rely upon dairy products. And therefore, lead to a plausible solution for the overall water crisis.

Ben: What are the basins water managers doing, in response to this water crisis?

Brian: Well there's been a lot of hot debate over the past couple of years, but finally the seven states that share the C R 's water have agreed to what they call a drought contingency plan – how they will share the pain of not having enough water to meet everybody's needs. Which implies of course that they're going to have to use less water, going forward.

Ben: And what are you proposing, based on your research?

Brian: One of the strategies for lowering use that we looked at in our research, is the possibility of not irrigating some of the agricultural crops that are being produced with the Colorado River's water. If we could find some way of fallowing – meaning not growing the cattle feed crops, on about 20% of the farmland that's been producing those crops, we would be able to make a big dent in this water crisis in the upper part of the Colorado River basin. That's primarily in the upper part of the basin. As you get into the lower part of the basin it becomes more challenging. There the numbers are in excess of 40% of those crops would have to be fallowed. Now when I'm talking about fallowing Ben, its really important to be clear. What this means is that some of the farmers would agree to – voluntarily – not grow a crop on that land for a short period of time – for a year or a couple of years. And then after they're done fallowing it would rotate to either other parts of their own farmland or to other farmers within the area. We really see these farmers as being the potential heroes in this water crisis, but we have to reward these heroes for doing this kind of a fallowing activity. And so the way that this would work is that we would financially compensate these farmers, we would actually pay them, a price each year for not growing a crop – that would in most cases be more than they could make by actually trying to grow the crop. And so, it becomes an attractive option, it becomes a real motivator, a real incentive for these farmers to raise their hand and voluntarily do this.

Ben: How much of an impact would that fallowing have on the national food supply chain, Brian?

Brian: We were comforted to find that the totality of the cattle feed crops being produced in the Colorado River basin, is only about 5% of the production of those crops in the United States. So yes, obviously it would disrupt some of the local relationships, the local contracts, the farmers are selling

to dairies and to feed lots. But in terms of the overall food security for the nation, I think that we can overcome some of those challenges and make this work.

Ben: So, we care about rivers being drained of water and overuse of water in the West, because it's threatening some fish species and aquatic ecosystems that we depend on - and enjoy. Is this putting our water supplies at risk? Which are some of the cities that are most at risk? Or in other words, which are some of the cities that could help the most?

Brian: There are a number of cities that are located within the Colorado River basin that are dependent on the flow of water there – so Las Vegas, for example. Grand Junction, Colorado. But then there's other cities that actually lie outside of that river basin, that draw water from the river and they transport it, they pipe it and pump it – to some great distance in some cases. Denver, Aurora, Colorado Springs – those cities are dependent on the Colorado River's water to a large extent. And then cities over on the western coast of the United States – Los Angeles, San Diego, they're all using the Colorado River's water to some extent.

And so, one of the questions that we explored with this work, with help from the FEWSION team, was how much water are those cities using. And how much beef consumption is going on in those cities. The level of detail that we were able to get to with this data in this analysis was actually quite remarkable.

So, for example – we were able to identify that Los Angeles is the single largest consumer of water from the Colorado river to grow cattle feed crops that get fed to the cows, that end up as beef that's being consumed in Los Angeles. Well it turns out if you take the cumulative consumption of beef products in Los Angeles, it's about half as much as the water that they take directly out of the river for their municipal water supply system. So that's quite striking – that's quite a lot of water. So, that means that their impact, their footprint on the Colorado River is not just the water that they're using directly. But it's also compounded by the fact that they're consuming goods that are reliant upon water for irrigation out of the Colorado River.

If you take a look at California in general, it's even more striking. So, if you sum up what California cities are consuming - of beef products, its equal to the total amount of water they're taking out of the Colorado River. So, it's a big impact.

Ben: Brian - can we estimate how much less beef we need to eat domestically – and also send to the export market? What kind of reduction would make a significant difference to our water supply? Would it be cutting your beef consumption in half? Eating it just one day a week? What sort of a reduction is going to help us with Western rivers?

Brian: Well it very much depends Ben, upon which river that you're concerned about. There are some rivers that would benefit from not producing 10% of the cattle feed crops that are presently being grown there. There's others that the numbers gets up quite a bit higher - maybe even in the range of 30 to 50%.

In the upper part of the Colorado River system, you could largely stabilize and avert the water crisis by fallowing about 20% of the irrigated cattle feed crops. But when you get down into the lower part of the Colorado River basin – California, Arizona, Nevada - there you would need to reduce the growing of those crops by something on the order of more than 40%. Any strategy like this you have to be careful about putting out a blanket universal answer, and instead what really will work best and be very strategic. You want to be sufficient in getting rid of the water crisis but at the same time you don't want to incur any more hardship or economic consequences than absolutely necessary.

Ben: Brian, is this gonna mean that we'll need to pay more for our beef products and dairy products?

Brian: I do think that that's a possibility. But it's not a certainty, Ben. There's some degree of water savings that could occur by simply not using water in some wasteful ways. There are different ways of applying that water. There are improved sprinkler systems. There's even drip irrigation that we can go to in some cases, that would enable us to grow the same amount of crop using substantially less water. BUT - when you get to a certain level of water savings, then you start to get into really taking some agricultural production out of the picture.

When that happens of course the markets gonna function and would likely start to see a tick up in the prices of beef products and in dairy products. I think that more and more Ben, what we're gonna start to see is that people are gonna appreciate that eating meat is something of a luxury. It's going to cost a little bit more and we're going have to come to grips with some of the environmental damage, some of the environmental consequences associated with eating meat. And paying a higher price is gonna be one of those consequences.

Ben: But Brian, if we follow a significant fraction of feed production in the Western US and produce *less* beef –who else will need to adapt? Which cities in the US, which American consumers will be most affected? In other words, which consumers can have the most effects, by changing their beef eating habits?

Brian: Particularly large western cities are most directly dependent upon cattle feed crops that are being produced in these western areas that we looked at. So, for example, Los Angeles stands out as number one. But there's other big cities in the west. Portland, Oregon, Denver Colorado, the San Francisco Bay Area, Seattle Washington. Those cities are all consuming beef and dairy products that are being produced using irrigated cattle feed crops. And so, they are directly connected to the drying of these rivers and the water crises – the water shortage vulnerability that we're experiencing in many parts of the West.

Ben: Ok – but what about eastern US cities – they also eat a lot of beef right? But that's corn-fed beef, isn't it?

Brian: Yeah, so, the eastern cities are reliant either on consuming beef that's produced in mid-western feedlots – for the most part – and those feedlots are being supplied primarily with corn being grown in the mid-western part of the United States. But there are also parts of the eastern US where you're able to produce cattle on grass – on grass that grows from rainfall. So, it's easier to produce grass fed beef in the eastern US than it is certainly within the western US.

Ben: And what about overseas consumers?

Brian: When we look overseas and we look at where are these cattle feed crops going other than to US-based feedlots and dairies, we find that some of our close neighbors, Canada and Mexico, are big importers of those feed crops and also some of the beef products produced here in the United States. And then also a number of some of the Asian countries, Japan is a big importer – and China particularly within the last five years China has become one of the largest importers of these cattle feed crops.

Ben: So, growing less cattle feed crops and producing less beef will affect our domestic economy and also the export economy Brian? How does the amount of water that's used in the western US to produce cattle feed compare with its economic contribution?

Brian: Yes, well, when you look at the economic value of producing these irrigated cattle feed crops, it's a pretty tiny fraction of our overall economy – it's something on the order of only 1 or 2 % of the GDP – whether we look at from the scale of the US or the region of the West, or any of these individual states, it never really amounts to much.

Ben: But we should mention the likely effect of fallowing on the local relationships between farmers and dairies and feedlots in the economy of the Colorado River basin, right Brian? Although sales of cattle feed crops might only amount to a percent or two of national GDP, the farmers are also buying seeds, fertilizer and farm equipment, so farming has a multiplier effect in local economies. So, some local associated businesses *will* get hurt when you take cattle feed crops out of production. *But* studies of the economic impacts of the fallowing so far, have found that fallowing payments to farmers more than offset their loss of crop revenue on fallowed ground. But we need to dispel the myth that fallowing economics devastates farm towns, don't we?

Brian: Yes exactly, but in terms of water consumed it's using a disproportionate share of the available water supplies. In the US as a total, the irrigation of cattle feed crops – which takes place mostly in the West – is about **a fourth of all of the consumption of water within the United States**. If you look at it strictly within the western US it's a third of all the water that gets consumed. If you look at just within the Colorado River basin **its more than half of all the water being consumed inside that river basin**. So, it's a disproportionately large amount of water being utilized for the economic return that's being realized from that water.

Now cities are very concerned about their ability to continue to grow and to have sufficient water resources to grow. And the value per unit of water used in an urban area used, its much, much greater than the value of that same volume of water being used out in irrigated agriculture. It's on the order of ten-fold more economic value coming out of using water in a city – within our service industries, within our manufacturing, within energy production. The amount of economic return coming from those activities that are also reliant upon water use is much, much higher than it is out in irrigated agriculture.

Ben: And there are big benefits to raising less beef and have it become more of a luxury commodity, right Brian? What did your research reveal about when municipalities and farmers collaborate on fallowing schemes? Is that effectively having the farmers grow water, as it were, instead of growing crops, for some of those western cities?

Brian: Yes Ben, what we found in our research we took a pretty close look at a couple of large irrigation districts in California that have been running these kinds of fallowing programs, for more than 10 years now. The Imperial Irrigation District and the Palo Verde Irrigation District both in California. They have partnered with municipal water users, primarily Los Angeles and San Diego. And over the course of the last 10 years they have fallowed anywhere between 4% and 20% of the irrigated farmland within each of those districts. That has saved an awful lot of water. In fact, it's saved so much water that about 40% of San Diego's water supply now comes from these farming districts.

The municipal utilities have been willing to pay the farmers an amount of money that makes this kind of a program attractive. And so, what we've found is that the farmers were making about a 35% profit by participating in this fallowing program. Now, that may not sound like a lot - but for most

farmers being able to be assured that you're gonna get a 35% profit in a year, by taking a break from your farming is a very attractive option, because you're not running the risk of having a bad year, not having enough rain, or having other climatic events that might destroy your crop, having insect infestations, there's all kinds of risks of course that farmers take every year they're trying to produce a crop. And if they can be paid a certain payment each year for voluntarily fallowing, that's a pretty attractive option to them.

And so, that was an interesting finding. And so, we said 'what if more irrigation districts, more farmers were to engage in similar programs. And we were quite impressed and even inspired by the potential. We think that there's a lot of potential to do this in a voluntary way that could compensate the farmers for doing this and get to a level of water savings that could really help to alleviate the water crisis in the Colorado River basin.

But very importantly, an additional benefit of this is that it can leave a lot more water in the rivers and the rivers have been so heavily dried up by our overuse of the river water, that we really need to resuscitate them. We really need to leave more water in the rivers for the benefit of fish and turtles and frogs and everything else that lives in those river systems. And these fallowing programs can be very effective in reviving that river flow, at the same time.

Ben: So, can we really use this data to pinpoint and give advice to consumers? And, also to producers like farmers – data on how everyone can work together in that system and be a part of the solution?

Brian: Yes, absolutely. I think there's a combination of things that will really help to resolve this water crisis in the western United States. One is that we need to work in a very cooperative, collaborative way with farmers. That's a very, very big part of this solution. But the solution also falls on the shoulders of all of the rest of. It has to do with our consumption of the products that require a lot of water to grow them. And it also has to do with our willingness to provide the funding to compensate those farmers if we're going to ask them to change what they're growing, or if we're going to ask them fallow some portion of their land - we have to provide the funding.

Fortunately, the cities typically have the spending power, the financial capabilities of doing this – so this is a very practical, very feasible solution. And we just need to do a whole lot more of it. And we need to do it really soon. Because we are really facing an imminent water crisis.

Ben: Okay. Brian thank you so much for talking to us today.

Brian: I enjoyed it Ben. Thank you!

Narrator: So, if you live somewhere like Los Angeles, Portland, Denver, the San Francisco Bay area, or Seattle – and eat beef or dairy products, you very likely are contributing to river decline. But the great news is that as residents of these cities, we CAN make a difference. By cutting back on our beef and maybe our dairy consumption, we really can save a river, without damaging the farming economy. Its potentially a win-win-win situation – for us consumers, for famers and for the entire river ecosystem.

Thanks again to Brian Richter for participating in this episode of Crucial FEWSION. The music was by Arthur Vincent and podcast production was by me, Diane Hope, for NAU's FEWSION project. Funded by the National Science Foundation.