John Talbott Oral History Interview, June 29, 2015

Title
“Sun Grant, Making a Positive Impact on the World”

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Location
Valley Library, Oregon State University.

Summary
In the interview, Talbott discusses his upbringing in rural Wyoming, his early exposure to the state's energy industry, and his undergraduate years at the University of Wyoming. From there he outlines his years working for Wyoming Game and Fish, his private consulting business providing conflict mediation services, his experiences as a graduate student at Virginia Tech, and his activities as project manager at the Big Sky Carbon Sequestration Partnership. In recounting his tenure at Big Sky, Talbott provides a detailed overview of the practice, possibilities and hindrances governing underground carbon sequestration.

Next, Talbott reflects on his move to Oregon State University and his leadership of the Sun Grant Western Regional Center. He shares the history of Sun Grant at OSU in the years that preceded his arrival and details the specifics of several projects that Sun Grant has supported through its grant allocations. In particular, Talbott notes promising research on biofuels, life cycle analysis, and bioproduct conversion processes that have been conducted by OSU scientists, among others.

As the session nears its end, Talbott shares his perspective on the future direction of Sun Grant, making note of the program's participation in the Department of Energy's "Billion Ton Study" as well as its interest in boosting rural economies through biomass projects. He also speaks of his appointment as assistant director of the Oregon Agricultural Experiment Station, the work that he has conducted in this capacity, and the significant impact that Experiment Stations have made on the agricultural sector in Oregon. The interview concludes with notes on family and an expression of pride in the culture that Talbott sees as prevailing at OSU.

Interviewee
John Talbott

Interviewer
Mike Dicianna

Website
http://scarc.library.oregonstate.edu/oh150/talbott/

Transcript

Mike Dicianna: With this interview we have the opportunity to learn about the OSU Sun Grant with John Talbott, who is the director of the Western Sun Grant Regional Center here at OSU. Today is June 29, 2015. We are in the Valley Library here on the OSU campus. My name is Mike Dicianna and I'm an oral historian for the OSU Sesquicentennial Oral History Project.

Well, one of the things that we try to obtain is our subject's whole story. And so let's start with a brief biographical sketch, like where were you born, early childhood experiences, that kind of thing.

John Talbott: Sure. I was born in Powell, Wyoming, a long time ago. And my family moved from Powell to Meeteetse, Wyoming when I was a seventh grader. So I graduated from Meeteetse High School, a huge graduating class of fourteen. And from there I attended the University of Wyoming and got a bachelor's degree in wildlife ecology. And right after graduation, I actually worked for a large mining concern, permitting a 67,000 acre strip mine.

But then I took the biologist exam for the Wyoming Game and Fish Department, got hired, and so I went to work for Wyoming Game and Fish, and was stationed all over the state, held numerous positions. It culminated in, I was appointed director of the agency in 1995.

MD: Now as far as your upbringing, I would imagine it was quite rural. Are there any things that you take from that as far as your childhood experiences, growing up in the wilds of Wyoming?

JT: Sure. I think one of the things that's interesting - particularly now being part of the Sun Grant where you're talking about using biofuels or basically using plant biomass to create the same thing that's in a barrel of oil - is in my youth I worked on ranches, but my family was in the oil and gas business. So in high school and during the summers in college, I worked in the oil and gas fields in Wyoming. So it kind of gave me that interesting mix of knowing how you produce biomass on the one hand, and on the other hand, how do you produce oil and gas? And definitely, as a result of that rural upbringing, it certainly steered me towards wildlife; I was always fascinated by that, loved to fish.

And, of course, I think we were advantaged somewhat in Meeteetse - a very small school district, but with huge cash because of the oil and gas fields there. This was before equalization and all of that occurred in school districts. So we got a crackerjack education. It was very much kind of pre-college: four years of math, four years of science, four years of social studies, four years of English and English lit., four years of writing, all those kinds of things. It was a good education. And when I got to college I found it to be pretty easy because we'd been grilled pretty heavily before then. And my father was always on the school board and my father-in-law was a county commissioner, so I got interested in policy and politics and all those kinds of things. So later on in my career, when I got the chance to further my education, I chose the public policy program at Virginia Tech and that's ultimately where I went after I left the Game and Fish Department.

MD: So you were at the University of Wyoming, that's in Cody?

JT: Laramie.

MD: Laramie, ok. And during the late '70s, so that period of time, your field of study must have been fairly new.

JT: Actually, the field of wildlife management dates back to the '30s, pretty much with Aldo Leopold. I think OSU's Fisheries and Wildlife program started here in about 1938. But it was not coincidental, I guess, that one of the reasons why I chose that instead of petroleum engineering, or something like that, was there was that age cohort of people in the Forest Service, BLM, Fish and Wildlife agencies that were retiring, and I figured the timing was just about perfect for when I would get out of school that all these folks would be leaving. And it worked. Like I say, I did a short stint with a mining company and then got on with the state.

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MD: Well tell us a little bit about the U of W, the other U of W. How big a school is it? What's the campus like?

JT: It's the only four-year institution in the state of Wyoming, which makes it somewhat unique. I think when I was going to school there, there were about 9,000 students. I think today it's probably up around 12 or 13,000. Very well-funded; Wyoming is rich in uranium, oil, coal and gas, and so the school is well-funded. It's a pretty good school given its small size, and its location. It has its own law school. It doesn't have a medical school, but UC – University of Colorado at Boulder Medical School is only an hour and a half away. So, yeah, it was a great school. For those of us who were in wildlife, range management, forestry, all those kinds of things, because it was a relatively small school, we knew one another, took a lot of the same courses.

And it's funny now, I actually tutored students in biochemistry. I just had a knack for biochem. And so, as a consequence, a lot of those students went on to become doctors, because they were pre-med, and so I knew a lot of the doctors in Wyoming. Wyoming's a small state; our governor used to call it a small town with really long streets, and I think that's a very good description.

MD: So you graduated in '78 with honors, and it was also called wildlife conservation and management. So we got a little bit of an idea of what you decided to do with your degree. So when you started your career with Wyoming Game and Fish – they're Game and Fish versus, we're Fish and Game.

JT: Right, yeah.

MD: Now what was your initial position?

JT: I started out as a game warden trainee in Alcova, Wyoming. And me and another guy, we did reservoir and fisheries and forest stuff. We traveled all over the state, we had a camp trailer and a boat. And we went to all the major reservoirs in the state and made sure that everybody had their life jackets and fishing licenses and those kinds of things. And he and I remained friends through life; he recently passed away. But, yeah, it was like two crazy kids, you give them all the gasoline they want to buy and a boat and a place to camp, and we just ran all over the state for months. And from there I went to Glenrock, and from Glenrock to Sheridan, from Sheridan back to Glenrock. And then I got a station appointment in Lusk, Wyoming, I think in 1980. So I was only there about fifteen months and I moved to Kaycee, Wyoming. That's when I got involved with the co-op unit at the University of Wyoming, doing a lot of mountain lion research. And from there I went to Thermopolis and was in Thermopolis for, like, thirteen months. And then I became the regional supervisor in Lander. And once I became regional supervisor I became really involved in grizzly bear work, and I was the chairman of the Yellowstone Ecosystem Recovery Group and so on and so forth. From there I became assistant chief of the Wildlife Division, and from there deputy director, and from there director.

MD: So it was a kind of a progression into administration, but you had done your time in the trenches.

JT: Yeah.

MD: Now during the time that you were there in the '90s what were some of the big challenges that were facing wildlife management during that decade?

JT: Not unlike it is today, I think. You've got fragmentation of habitat, human development. Even in a place as wild and rural as Wyoming, they've just seen unprecedented oil and gas development, uranium, coal, coal-bed methane. And lots of people coming to Wyoming to fill those jobs and everybody wants their own twenty acres, so habitat fragmentation. And then compounded by more and more species becoming species of concern. And so you're seeing less and less effort directed towards traditional things – elk, deer, rainbow trout, cut throat trout – and more towards endangered species, threatened species.

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And then just a really rapidly changing political environment. The Oregon Department of Fish and Wildlife is going through the same thing right now – they need money, they had traditionally supported themselves with hunting and fishing license fees, and you just can't do that anymore. You and I are getting older, and we don't participate like we used to. We're not recruiting any younger folks. And legislatures have always tended to say, "you gotta pay your own way." So generate more revenue. And eventually you price yourself out in terms of, license fees get so high that rather than getting

people participating- And so that's, I think, pretty much across the country, that would describe the dilemma that every state wildlife is facing.

MD: So tell us about the Talbott Group.

JT: The Talbott Group. Well, when I left the state, I started my own consulting business, it was called the Talbott Group. And essentially my idea, at least initially, was that I was just going to go back to being a one man biologist. Go out and do ferret surveys. Well, the fact of the matter is that you can't survive on that, so I ended up doing a lot of environmental compliance work, not only with state and federal agencies but also with private companies; coal companies, oil and gas companies. And kind of got into doing a lot of facilitation work, primarily conflict resolution kinds of things. And then did a lot of work with training people on how to have collaborative conversations. And this was in the late '90s and it was really popular during that time, rather than settling all your disputes in court, was to go to a mediator. So I got certified as a mediator and then, through those mediations, it occurred to me that, particularly land owners and special interest groups and agency people did not know how to have a collaborative conversation.

So I started doing this training and it was really successful. I ended up traveling all over the West providing this training to different groups and helping them so that when they were in a situation - whether it was mediation or a facilitated group or some conflict resolution settlement - that they knew how to participate. Put your baggage off the table and down on the floor and let's talk. And also, as I always termed it, I called it the bulldog facilitation, which was, I always felt that we got more out of a group meeting by having conflict than everybody hiding what all their issues were. So I actually used to put a bag up on the table and would go around the room and have everybody discuss their baggage. You know, that they hate Michael or Michael hates John, or whatever. We deal with it and then we put it in the bag. And when it was all done then we set the bag on the floor. Okay, and now we can have a conversation. And it worked really well. [laughs]

MD: Well, you had a big change from the middle of the West to the other side of the United States. So you spent a bunch of time in Virginia, what circumstances took you clear across the continent?

JT: Well, it was interesting. When I was still with the state, I was fortunate enough, I got chosen by our governor in Wyoming to attend, it was called - it was at Duke University - Leadership for State Executives. It was a one week thing at the governor's center at Duke. And as it turned out, the representative from Virginia - who was a lady that I eventually then married, after she moved up to Wyoming. After she moved out, we just decided the timing was good to move back to Virginia. Her parents were elderly and in not very good health. So she got a position at Virginia Tech and then I got a really good graduate stipend, originally, to go back and get my masters and Ph.D.

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So we moved back to Virginia, and that kind of turned out strange. While I'm there, like I say, I'm an avid fisherman. I used to fish in Giles County all the time. And I ran into a bunch of people from Giles County, the Board of Supervisors, so, long story short, I wound up being the Giles County administrator while I'm a student at Virginia Tech. [laughs] So I did that for a couple years and then ended up taking over – we started up an institute at Virginia Tech called the Institute for Policy Outreach, myself and one faculty member. And I think by the time I left, we had almost sixty employees. We had fourteen graduate students and a number of faculty on board, and we dealt with policy issues primarily related to rural communities – issues they have with health care, issues of transportation, economic development and all those kinds of things. It was a lot of fun, it really was a lot of fun.

MD: So you ended up getting your masters of public policy and you were saying you were just in the process of finishing up your Ph.D., and this was all Virginia Tech. So you end up returning west, back again, to the Big Sky Sequestration Partnership, and this is at Montana State. Tell us about this; the whole idea of reclaiming the greenhouse gases is fascinating.

JT: Yeah, well my wife applied for a position at Montana State as the president of the Montana State Foundation. She got that job. And so as they were interviewing her, they wanted me to come out to talk about possibly a position with the partnership. And at that time they had what was called phase two; it was a kind of inventory. In other words, they were talking about capturing CO2 off of greenhouse gas sources - like power plants or cement kilns or any of those kinds of things - and then storing it deep underground. So when I got there, they were in phase two, which was, they were

completing an inventory of not only what were the sources but what were the potential sites where we can bury this stuff. So it was really interesting to me, and again it kind of goes back to my oil and gas background; I knew all about seismic and drilling wells and all that kind of stuff.

So I took that position and then we applied for what was phase three, which was a $121 million grant from DOE. And we were successful, we got that. And so we had eleven universities, four national laboratories, and we located a naturally occurring CO2 reservoir in north central Montana. And through some work we were able to determine that, even though it was a naturally occurring CO2 reservoir, there was only about, in terms of its capacity, it could hold another eight to nine billion tons of CO2. So the project was designed to – the problem with any carbon sequestration project, there were five partnerships at this time, was finding a source of CO2 that you could actually put underground. Because nobody had any capture methodology to capture it. So we produced the CO2 from Kevin Dome. And then we took it off the flank of the dome, that had never been exposed to CO2, reinjected it, and then we could see how the rocks, in this case reactive carbonates, responded to the CO2 infusion. And then we could actually test these dome structures, these geologic structures, as permanent sequestration sites. Because, you think, if they've been holding it for 150 million years they obviously haven't leaked, so what better place to put it than something like that? Pretty interesting stuff in terms of the chemistry, geochemistry, and the hydraulics and flows and all those kinds of things.

And at the same time, closer to home, we did a test up near Wallula, Washington, at the Boise-Cascade plant there. And we injected 3,000 tons of food grade CO2 - because that was the only CO2 we could get our hands on - into the mafic rocks, lava flows. And what's fascinating about that work, and you'll hear more about this in the future, is the CO2 reacts with those rocks in a way that it becomes a solid. So you never have to worry about it escaping – essentially it becomes limestone. Even on the East Coast, where they've always been concerned about what would you do with CO2, there weren't any good sites to take the CO2. Well, now they have a good site, because up in Maine, that country up there, there's lots of it. Off the coast of California, off the coast of Oregon, lots of places. And, of course, oceans provide another great seal because CO2, at low enough depth, just remains a liquid and sits there. So you could always do it that way.

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MD: So in essence, we're talking about storing greenhouse gases that are the big evil problem.

JT: Right. And one of our other things was, CO2 is a wonderful instrument for removing residual oil from old oil fields. So you can actually pump the CO2 into those old oil fields. And it's called the miscible flood where the CO2 mixes with that old heavy oil that's still in the reservoir; it's just like a soda pop. So it becomes more buoyant and lighter, so you can produce that oil that you would never otherwise be able to produce. So we did work on that and, of course, oil companies have been using CO2 for enhanced oil recovery for quite a while.

The problem that we encountered is that it's simple enough to do. Capture can be kind of difficult and expensive. So therefore, people who generate the CO2 want to be able to sell the CO2 to an oil company for enhanced oil and gas. The oil companies see the CO2 as a waste product from a power plant and they don't think they should have to buy it all, you ought to just send it over here. And of course, as Kemper Southern Company is finding out – they're building a new IGCC plant down in Louisiana – is that taking a plant that's designed to generate electrons, and then turning it into a chemical plant that captures CO2, has a host of problems. It's expensive and then the CO2, when you're done, in order for it to be cost-neutral, you need to be able to sell it for about 45 or 50 dollars a ton. And currently there just aren't any buyers out there that are willing to pay that amount. So, like I say, there are a lot of naturally occurring CO2 reservoirs across the country, and oil companies that use CO2 for enhanced oil recovery, that's where they're getting their CO2. So they can produce it naturally much cheaper than they can purchase it from a power plant.

MD: And that's one of the parts of the whole picture of climate change that doesn't have a lot of press.

JT: No, no it doesn't.

MD: And it seems like such a simple, great idea.

JT: Well it's simple and I think there's some reluctance on the part of utilities especially. Once it's proven that it works, there's some concern about what kind of investment you're gonna have to make. Basically rate payers are going to have to swallow-

MD: Right, it all boils down to money.

JT: Yeah, and then there's some real concern by the environmental community about the long-term safety of storage. And one of the things that, I think, continues to hurt the science and the notion of it, is that everybody wants – well, if you look at the new classes of well designations, which would be CO2 injection wells – you have to remain basically responsible for that CO2 for fifty years after you finish injecting. The problem with that is, as we all know, is that most companies – I mean, you look at the Fortune 500 today, none of those companies was here fifty years ago. So who's going to assume that liability? Assuming there is, based on our experience with the tests we were doing, there was virtually, not zero liability or probability of leakage, it could happen. So that's another bit of a policy bottleneck. There's been attempts – some states who saw this as a real advantage, particularly that have a lot of coal-fired power – the states basically agreed to indemnify and hold harmless people who injected CO2 for storage. But that is not ubiquitous by any sense across the country. I can think of three states that have done that so far.

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MD: Yeah, it's not like you're storing nuclear waste, it's CO2.

JT: Yeah, well we used to tell people – obviously jokingly – that if leaks into a shallow-water aquifer, where people are getting their drinking water, basically you get free seltzer water. [laughs]

MD: Well in 2011 the Sun Grant here at OSU brought you on as their director, and that's for the western region. And I understand there's five regions under Sun Grant. So how did your path lead you to this directorship?

JT: Yeah, well, like I say, once the carbon sequestration project was underway, it was funded – basically you went from the hypothetical to just doing the science – it wasn't that intellectually interesting anymore. It really wasn't. And I had kind of gotten interested in biofuels and bioproducts and had done a lot of reading on it, and I just thought it was a great opportunity. Because the neat thing about the Sun Grant is that, it's not just about converting biomass into pharmaceuticals or biofuels or whatever it happens to be, it's about stimulating rural economies. And you look at eastern Oregon as a classic example, where there's this huge disparity between economic well-being and output on the west side of the Cascades versus the east side. And so I saw it as a great opportunity to - with my policy interests, here was a way that you could stimulate local economies, put people back to work, do it in an environmentally sustainable way, reduce greenhouse gas emissions. It was just a nice fit. So I applied and was fortunate enough to get selected for the job.

MD: Now the Sun Grant, did it start in 2011? Or has it been around for a while?

JT: No, it's been around for a while. It was conceived by our College of Agriculture's former dean, Thayne Dutson, and Kevin Kephart, who's the vice president for research at South Dakota State University, and some other folks. But essentially they looked at the Sea Grant, they looked at the Space Grant, and here we are Land Grant, and said, "why aren't we doing something with biomass?" So it took them several years, starting in 2004, but by 2008 the Sun Grant was authorized under the Farm Bill. It had a funding authorization of $75 million – Congress being who they are, they gave $2.5 million – but also there was a clause in the Transportation Bill that directed the Department of Transportation to provide funding to the Sun Grant for the development of biofuels. That has since expired; we no longer receive DOT money.

So for all intents and purposes, at least initially, it was viewed as an earmark. So once earmarks became a dirty word, the five centers had to recompete – basically funding was removed. We recompeted and were successful, and we're now in the new Farm Bill, still receiving $2.5 million a year from the USDA. But we receive a lot of DOE funding as well. As you might expect, DOE is less on the upstream side, producing the biomass, and much more on the conversion side – how do you convert it to these different chemicals? But with the USDA funding and the DOE funding, we've been able to put together a pretty good program. And our program, again, it's important to remember that we're kind of a pass-through. We take those federal dollars – we do a solicitation annually, where we solicit all of the Land Grant institutions in our

region, nine western states plus the Pacific territories. And so we hold a competition, and we change the theme every year, depending on what the science dictates is of most importance at that point in time. We have a peer-reviewed panel and an advisory committee, and then we select projects that we fund.

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And it's fascinating. We've done some neat work on everything from – we don't do corn ethanol, that's the thing to remember, we do not do corn ethanol. We're all about cellulosic ethanol which, forced in ag residues – torrefaction, pyrolysis, gasification. Lignin, which is the huge waste material you get after you convert biomass into fuels or intermediate chemicals. Now we're working on using that lignin as a source of hydrogen so you can upgrade the fuels, so you can make jet fuel, diesel, any of those kinds of things. Had a lot of success with that so far. So, fascinating stuff. It's really interesting.

MD: Well that's one of the things that interested me was this whole idea of making jet fuel – bio-jet fuel – because traditionally it's kerosene, and with the new high-tech airliners, it must be a cost savings.

JT: Well, right now it's not really a cost savings, but the airlines have come to the realization that jet fuel volatility so heavily impacts their business – 93% of their operational cost is fuel. So they figure, everything's cheap right now, so if they're paying $3.50 a gallon for J4, J6 or J8 - most of them are going to be using J4, which is like kerosene - that they can pay a little more for a long-term contract. In other words, if I have a bio-refinery, much like the one that's going in down at Lakeview, Oregon, Red Rocks LLC; they already have an off-take agreement with Southwest Airlines. And it's because Southwest Airlines is willing to pay a little bit more for a guaranteed amount of fuel, every year, year after year. Same price, set price.

MD: That makes a difference.

JT: Yeah. Alaska Airlines now has signed some agreements with a group down in California that is converting camolina, which is a mustard, to a jet fuel. And you're starting to see a lot of the airlines – I think the immediate future for biofuels is definitely going to be aviation fuel. And the Navy, of course, and the Air Force, they've tested every one of their aircraft, from the turbo props, sub-chasers, to F-18 Hornets, the F-22 Raptor. They've tested them all on biofuels. And what's fascinating is they've performed just as well. And more importantly, if you reduce the temperature of your exhaust gas by burning biomass-based fuels, it extends the engine life of those engines considerably, because it's lower temperature. And then you have the reduced emissions, obviously.

MD: Yeah, as an aviation historian, I find this just fascinating. Now what direct projects and research is being done here at Oregon State, and in which departments?

JT: Well we've had, over the years at Oregon State, we have several projects on-going now and I'll touch on some of those. And we've had some in the past, and we're getting ready to issue a new solicitation so we'll probably have some more. But, for example, we had over in the College of Forestry, Steve Strauss, was looking at – you're familiar with all the hybrid poplar that grows, particularly over in Boardman? And, of course, a lot of the hybrid poplar, the intent of the company that's growing all that poplar, was they were going to work with Zeachem, who has a pilot facility in Boardman, to convert that to basically – not so much fuels, because fuels are the least profitable – but they were going to build a bunch of chemicals; acetate and acetone, which is a pre-cursor for jet fuel. They can make fuel, it's just that you can get more money for the intermediates. So what Steve was looking at was, could you genetically modify what was already a hybrid – it's not a naturally occurring species – to produce the basic elements for plastics? So Sun Grant funded that. So, in other words, you go out and harvest the trees after the leaves have fallen, and Steve's idea was to go out there and sweep up those leaves at the same time, because they produce this chemical that is extremely valuable. And the trees are good at doing it; it doesn't affect the tree whatsoever. So that was one project that we funded.

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We've funded a lot of work in Biological and Ecological Engineering on life cycle analysis. And for those unfamiliar with life cycle analysis, it's kind of the, soup to nuts, what are your emissions? How are you degrading the environment - in any manner, whether it's water use, use of fertilizers - for any given biofuel bio-product? So that you can compare it, apples

to apples, when you're comparing it to fossil fuels. Obviously you're still using fossil fuels to harvest, whether it's giant cane or whatever it happens to be. You're still putting fertilizer on it, which typically comes from petroleum. So there are emissions associated with that, but what are they? And how does that compare to a gallon of gasoline? So they've done a lot of work.

Christine Kelly did a lot of work looking at different algae that, if you're familiar, algae – we've been able to show that you can breed algae, basically engineer algae, to produce fuel directly. Diesel, gasoline, jet fuel, what have you. She did a lot of very early work on that. And then we also had some folks looking – one of the problems with algae, because it uses brackish water, so it's great stuff, it'll actually clean up the water. But it's separating the material that you're producing without destroying the algae, ok? So that's still a mechanical engineering problem that's being worked on.

As long as we're talking about algae, we've got a Ph.D. student doing some fascinating work on using dairy effluent to grow algae. Then as the algae are growing in the effluent, it's cleaning up the effluent, so that it can go back into the stream, or whatever. But then you harvest the algae, which in the process of cleaning up all the water has harvested all of the nitrogen and phosphorous out it. And it makes this fabulous potting medium that you can use in lieu of peat, so that we're not destroying peat bogs and creating methane emissions, and all those kinds of things. That's working great.

We have a bunch of folks in Food Science and Technology working on - if you think about it, original wheat varieties, when you see those old pictures of the draft horses cutting wheat, the wheat is over their shoulders. But, of course, over the years we've started breeding shorter and shorter wheat, because the straw isn't worth anything. Or wasn't. Well it is now, because you can convert straw to biofuels. So we're breeding new varieties, actually the old varieties, that have the same yield as the new varieties but have the taller stalk so that there's enough residue left over that you have another product that the farmer can sell for making biofuels, ok?

I'll tell you another quick one. We've been working a lot with Portland General Electric, here in Oregon. They have a 650-megawatt power plant over in Boardman that burns coal. By 2020 they're gonna shut that plant down. They don't want to lose that asset – it's about a billion and a half dollar asset. So we've been doing a bunch of tests with growing giant cane, Arundo donax, we've done a bunch of trials and what have you. You can produce about thirty tons per acre with it. It looks kind of like bamboo, similar. And the material is torrefied – torrefied is just, you're making charcoal, is what you're doing. And so we've done a bunch of tests, us and a bunch of folks from WSU, Washington State University, to see how this torrefied cane, is it gonna screw up the plant? Obviously this plant is designed around burning coal. And what we've discovered is that it actually works better than coal. It pulverizes better than coal, it has higher BTU content than coal, there's no NOCs, no SOCs, no mercury, no arsenic. You can store it outside, once it's been torrefied, it repels water, it acts just like coal. And because coal comes from the Powder River Basin, it's about 35% moisture, the torrefied Arundo is only about 9%. So you can get a better price for it. And it's a good rotation crop for farmers over there that are growing corn and alfalfa and potatoes and all those kinds of things. So we're seeing a lot of promise in that.

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And PGE has also funded a couple of our students who are looking at western juniper, the invasive species, and can we harvest that, torrefy it and burn it in a plant in a way that not only restores western rangelands – and you get all kinds of ecological services from harvesting it – but then you burn it in the plant. And that's looking really promising, we think that has a really good future.

MD: So that's going to cut the whole idea of these coal trains coming through.

JT: Exactly. You'll have trains, instead of coming from the Power River Basin, you'll have trains coming from central Oregon to Boardman with torrefied juniper on board.

MD: So that's a plus. Well, on the same idea as the controversy over these coal trains, how about the oil and natural gas, especially the plant that they're talking about doing down in the Coos Bay area? Is Sun Grant research affecting that?

JT: Well, I think to a certain extent. And I'm going back to, part of our sustainability mission is to look at – and, of course, they're talking LNG down there, liquefied natural gas, which they're going to be moving from Wyoming and other places. And it's condensed – frozen, basically – and then liquefied so that you can ship it off shore. And the question is,

again, under life cycle analysis, knowing what we know now about methane leakages during production of gas, natural gas' selling point remains to this day that it's 50% less polluting than coal. Well, but a molecule of methane is twenty-three times more potent as a greenhouse gas than one molecule of CO2. So if you're leaking all this methane – and remember, they're flaring a lot of it.

MD: Yeah, there are flames going-

JT: Yeah, so what is the actual impact of natural gas methane compared to other forms of energy? In this case, biofuels, torrefied juniper. And so, while not being directly involved, we certainly weigh in, when we're asked, about what are the potential impacts? An export market to Asia of U.S. natural gas obviously benefits producers of natural gas, but in the end does it benefit anybody else?

MD: It's a hot button. So where does Sun Grant go from here? What are the goals, say, over the next decade?

JT: Well, we just completed a study for DOE that was called "The Billion Ton Study." And in essence, what DOE asked us was, if you were gonna replace 30% of the country's transportation fuels with biofuels, is there sufficient forest residue/ purposely grown energy crops/ag residues to accomplish that? And that was about a six year project. We did lots of trials with different species, woody species – poplar, willow, switchgrass, giant miscanthus. We looked at energy cane, napier grass; basically looked at all the potential feedstocks. And our answer to that question was yeah, there's even more than enough to do it. So for rural America that, wow, if you think about it, producing 30% of the country's transportation fuels, that's pretty significant.

So the next question that we hope to address is, ok, now we've got to figure out the logistics. If you think about it, that takes a billion tons. Well, if you think about all the coal we burn in this country right now, we burn about 900 million tons. So how are we going to move a billion tons of biomass, which has a much lower bulk density – it's not as heavy as coal. Most of it is harvested on little crummy rural roads with crappy little bridges, so you can't drive great big trucks over it. So how do we address that issue? How are you going to get it to the refinery?

The next issue is, what are the economics? In other words, this isn't a giant oil company that can lease the ground and produce the oil. If I'm a bio-refinery, I have to convince all these folks in the immediate area to grow this stuff for me, to harvest their excess straw or excess corn stover, and to grow pennycress as a winter cover crop for their corn and soybeans. So it's an unusual situation in terms of the amount of work, the transaction cost, the opportunity cost for the grower. All these people – to have everybody on the same page in terms of making that commitment to be able to sustain one of these bio-refineries and making them economically viable. That all has to be figured out. We need to bring the economists in, we need to bring the logisticians in, and look at it really hard. There's a lot of work going on now surrounding that, but we want to see it become much more of a national effort.

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And then the third thing would be just - let's use eastern Oregon as an example. Right now its wheat fallow, most of it, the non-irrigated portion. What happens to that landscape in terms of how it operates - ecologically and hydrologically and everything else - if we go from a wheat fallow to wheat mustard seed? So instead of fallowing every year you're growing camelina, carinata, something. It's going to change the dynamics. And plus you're going to have different harvesting methods, different traffic, so there's some social consequences, some economic consequences. So when we look at landscapes, regardless of where we look at the U.S., and we incorporate this new method of producing fuel, what happens as a result of that? We want to make sure that it's sustainable and, number two, that we don't just create another problem.

MD: So your job is basically keeping all these balls in the air and herding cats at the same time.

JT: Exactly, yeah.

MD: Because you have to deal with economists and scientists, and never the twain shall meet sometimes. So that's where the public policy degree comes in.

JT: Right. Yeah, it does. I've had the best time. You're talking to people that are so brilliant. And yet, the fun part is, you get a plant genomist who starts talking to a soil scientist and a GIS person, and they realize that their modeling efforts

can produce a new variety of, whatever it happens to be – willow or whatever – just based on looking at, where does stuff grow now? Which variety grows there? What are the genomic building blocks that make this plant work better in this type of soil, this type of temperature regime, this type of moisture regime? And when we put it all together – we have a project doing this right now – can I, instead of doing ten years of trials to see what goes best, I can actually model and tell you exactly: I need to breed this plant to this plant, let's plant it over there and it's going to do great.

MD: So it's consolidating all this study – just fascinating. To change gears a little bit, in 2013 you also became the assistant director of the Agricultural Experiment Station here at OSU. Now, the Agricultural Experiment Station has been here since 1889. So in 2013, being the new assistant director, do you have a sense of this history? Where we started with the Hatch Act of 1887?

JT: The Morrell Act-

MD: -and where we are today?

JT: Yeah, it's fascinating not only because, if you go back to that history – I think Corvallis College was started before we became Oregon Agricultural College and then Oregon State College and Oregon State University. And during all that period, even when Corvallis College was basically a Methodist private school, agriculture was always a big focus. And for obvious reasons. But then as we began to transition, and the federal government steps in and starts to provide $15,000 to each state for their ag experiment station under the Hatch Act. And $15,000 now is nothing, but back then it was huge. And then, of course, the states had to match that amount.

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So, if you look at it, what it's evolved into since then is we're very fortunate here in Oregon that the state legislature goes way beyond matching what the feds provide. We're up to about $4.7 million per year that we get from USDA and the state graciously provides us with way more than that; in the neighborhood of $50-60 million. But that money supports not only the experiment station, writ large, around campus, but we have eleven branch experiment stations in fifteen locations, and we do everything from seafood to cherries to pears to wine grapes. Specialty crops, seed crops. And so you've got all these faculty and Extension folks - you've got the research faculty out there doing the research, the research is then translated by the Extension folks to the producer. And the end result is that, I always say, you've got a farm gate value in Oregon of $5.5 billion of product that leaves this state every year. $5.5 billion. That's huge. And in terms of return on investment, for what the feds and what the state gives us, you're getting a pretty good bang for your buck.

It's a great job, because I get to deal with everybody now; not just folks in biofuels or bio-products. We have our research function and our Extension function, and my office now, we help all our faculty with writing research proposals, getting those into the system, basically monitoring the research contracts after we get them, doing the reporting, all that. And then we also have the function of making sure that our safety and compliance are being met, whether that's IACUC dealing with animals. Of course, we handle a lot of pesticides, we do labeling testing for a lot of the herbicides and pesticides. So it's great. We do lots of plant breeding; I sit on the varietals committee, so when we get a new variety, you get to sit and talk about, "why is this white potato so much better than this white potato?" [laughs] Purple tomatoes. So it's a lot of fun.

MD: Yeah, it actually carries over from the Sun Grant, because there's partial Experiment Station stuff for the Sun Grant, but we're talking about the whole bailiwick when it comes to OSU and agriculture in Oregon.

JT: Right. For example, now I'm working with the governor's drought task force, and we're trying to gauge, not only what are the potential impacts – you're talking about a five and a half billion dollar industry – but what are the impacts to salmon, to commercial fisheries, to seafood. Ocean acidification impacts our seafood industry with oysters. And what are we doing, what is OSU doing, in terms of aiding the producer with new irrigation techniques and moisture monitoring and water management in general? Using produced water, recycled water for irrigation. And, of course, we're heavily involved in that already. So we've become, I think, a really important resource to the governor's office to say, "no you don't need any new research on this, we've already done it. Here's how you can go forward."

MD: And every year is different. Now we're dealing with this drought, so it's up to OSU-

JT: Right, to step up to the plate.

MD: -and be there for the state, just like it has for 150 years. That's one of things that I have kind of an idea is how the Experiment Stations serve the agricultural community since 1887, but also how it's adapted. And now we're in this whole era of the world is changing with climate change, and we're leaders in that.

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JT: Right, well you think about it, if it weren't for things like Dr. Schellenbacher and some of the other breeders here, hazelnuts would have disappeared. And yet, now we've conquered that problem. And we'll conquer yellow spot virus. And we're learning a lot, our Fisheries and Wildlife folks, about the genetics of salmon and this on-going dilemma about hatchery-reared salmon versus wild salmon, and when they mix in the wild, the hatchery-raised fish and the wild fish, are we diluting the genetics? And all those kinds of things are being addressed. And as those proposals come across my desk every day, it's like, "what are these guys gonna think of next?"

MD: One of the things that we always like to do is get a little bit about the person's family life – children...?

JT: Well, I've got two daughters. And one lives in Wichita, Kansas. She's the assistant director of human resources for Wichita State University. Her husband is the associate vice president for development at Wichita State University. That's my older daughter. She went to UW and she got undergrad and graduate degrees in political theory; I think I had some influence over that. And I have two grandchildren from that marriage – Sarah and Shannon. I have a grandson who is gonna be 7 and I have a granddaughter who's gonna be 10.

Then I have another daughter who lives in Fort Collins, Colorado. She's the supervisor of foster care services for Larimer County. And her husband is the director of IT for Larimer County. And they have one son, my grandson Aiden, he's gonna be 13 in July, and he's coming out to go salmon fishing with his grandpa here.

I've been married twice and now I'm single again.

MD: Enjoying being a grandpa.

JT: Enjoying being a grandpa and, like I say, with my grandkids, it's a good thing they like to fish, because that's what I like to do.

MD: You live here in town?

JT: I live in Lebanon.

MD: Oh, okay.

JT: Yeah. Lebanon is way cheaper than living in Corvallis in terms of housing prices, and it's just kind of a neat little community. It's blue collar, little different set of values, a little more conservative than Corvallis. I get in trouble a lot, because I'm a little too liberal for Lebanon. But it's an interesting little town, and now that Samaritan has the medical school campus there, it's really starting to boom.

MD: Oh yeah, it's changed a lot. Now, other than fishing, what do you do with your free time?

JT: Uh, fish. [laughs] I have an ocean-going boat and I'm a diehard fly fisherman. So, if it's possible to be fishing, I'm fishing. And I love photography; I'm an amateur – that's probably an overstatement to say I'm an amateur – but I love digital photography especially. And I do a lot of reading, obviously; I love to read. I've got a springer spaniel and we'll bird hunt a lot. And bird hunting in Oregon has been kind of disappointing to say the least, compared to-

MD: Well, yeah, compared to what you're used to.

JT: Yeah, but we get by.

MD: Well, this has been fascinating. One of the things – you're a transplanted Beaver now – but I always like to have our interviewees give us a chance to give you one more shot at what you want to say to the Beaver Nation, because that's who's going to be-

JT: -watching. Yeah.

I've worked now at four different universities. And I would have to say that Oregon State – and I'm not doing this for the camera – this is a great institution. Very forward-looking, very progressive. Great faculty. I've been fortunate enough to teach while I've been here, and just been impressed with the students, in terms of their abilities for writing and their fervor about their topics of interest.

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It's the most collegial university I've ever been at, in terms of how people work across colleges and across departments. I like to tell everybody that what I like most about Oregon State is that you never meet a stranger at Oregon State. Whether you're in Kerr, you're in Strand Hall, you're in the Union – everybody's just, they're Beaver Nation. And they act like it. Like I say, I've worked at some places where it was pretty cut throat. And Oregon State is not that way. If you ask someone, "would you be interested in participating in this project?" "Sure, sign me up." And other places I've been, it's like, "well, how much are you going to pay me?" And Oregon State's not that way.

MD: Well John, it's been a pleasure and I've learned so much about the Sun Grant, which is an important part of where we're going for this world. And so we thank you for your participation in the OH 150 project and we wish you all the best in your endeavors of making the world a better place.

JT: Well thank you very much. I've enjoyed it as well.

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