

Tape Transcription

Interview with Randall Cerveny, Tempe, AZ, 12 May 2008, Interviewer is Adam Luke

AL: Adam Luke

RC: Randall Cerveny

Randall Cerveny is the president's professor in geography at Arizona State University. This interview pertains to the climate in the Tempe area, including the urban heat island affect and other issues pertaining to desert climate. This interview is for the Tempe Historical Museum's upcoming renovation. The interview is approximately 17 minutes long. Words and pauses such as um, uh, you know, and similar were not included in this transcription.

AL: All right. Well I'm here with Randall Cerveny?

RC: Cerveny (CER-ven-ee), Randy Cerveny.

AL: Cerveny. Okay. Get it right. And it's May 12, 2008 and we're going to talk about some stuff for the Tempe Historical Museum. Get some of his knowledge on some issues here in Tempe. Um, but just want to start out, just to ask about kind of the climate in the Tempe area. You know, what ways has it changed, if it's changed at all in the last – since people have started moving and inhabiting this area?

RC: **[0:39]** Well the biggest change that we've seen with the climate in Tempe is the growth of something that's called the urban heat island. We're part of a large metropolitan area that has a dramatic impact on climate that the use of concrete, asphalt, building materials that absorb heat during the course of the day, allow for the evening hours to become much warmer than they would otherwise be. That the city of Tempe probably averages on the order of about 5-7 degrees warmer than it did, say, 80 or 90 years ago, simply because of the growth of people.

AL: Interesting. Um, so does that primarily change kind of the temperature at night or is it also affect during the day, how hot it is?

RC: **[1:29]** Um, it might have a slight impact on the daytime average temperature, maybe a degree or two, but the primary idea is in the evening because concrete and asphalt hold on to the heat that they get during the day and then slowly release it. So that heat, which would normally just be dissipated really, really quickly in a desert environment sticks around the city during the night, so that our minimum temperatures in the morning are the ones that we see the most dramatic impact. And as I said, that's usually on the order of about anywhere from 5-7 degrees warmer than the natural desert terrain that we had 80 years ago.

AL: Yeah, all right. So this all kind of a part of growth, I guess is what you'd say, growth of an urban buildup. But what are some ways that people in Tempe or the surrounding area have tried to adapt to living in the desert?

RC: **[2:23]** And that's a good point because a lot of people tend to think of the changes as all bad.

AL: Mmhmm.

RC: And it's not necessarily bad. I mean, for example, here in Tempe now, we hardly ever have a hard freeze, that, we may get one once ever two or three years because the warmth of the city keeps our wintertime temperatures warmer, so that we don't have those freezes. When we do, occasionally it can be bad because we have a lot of tender crops, but, or plants. But in general, the idea is adaptation that we have to make modifications in the way that we do things in order to have an effect that we consider desirable. **[3:03]** So some people have switched to natural, xeriscaping type of landscaping. There are some problems with that actually – you want to have a little bit of strip of vegetation right by your house in order to hold the moisture in that is associated with the area right around your house and it keeps your house a little bit cooler. **[3:25]** But the other thing would be changing the type of materials that we use to build with or changing in some cases even the road systems. We use now a different kind of asphalt than what we used 40 or 50 years ago – a rubberized asphalt, and that has different characteristics, some of which we haven't quite figured out all the implications of, but we do adapt things, and that changes the local climate.

AL: All right. Um, so you talk about adapting. What are some ways to reduce the impact of people on the environment. I mean you kind of mentioned some of them but I don't know if you know of ways that could try to reduce the impact of how they live.

RC: **[4:07]** Well, again, reduce maybe might not be the best of all words. We are changing the environment. One of the biggest that we have in Tempe is the creation of Tempe Town Lake. That is a reservoir of water that doesn't, wouldn't normally exist there naturally of that size. What that does to the surrounding area is changed in terms of humidity. That for a fairly narrow strip of land right around that lake, conditions are much more mild in terms of the temperatures because the humidity holds in the heat – prevents it from getting to hot, but also prevents in from getting too cold, kind of like a San Diego effect if you will – and makes it a much more moderate climate than when it was simply a dry lakebed and temperatures could go up to 120 or down to the 30s, depending on the time of year.

AL: So it sounds like a lot of these have really localized effect, kind of like Tempe Town Lake...

RC: **[5:08]** Right. And in fact that's one of the interesting things that, in some ways, we are a natural laboratory. That because so little research has been done on what a desert landscape is like, we're doing these things and actually finding out the effects of

them as we're doing them. One of the interesting things that people might not be aware of is that on the western dam of Tempe Town Lake we have a very elaborate weather station. And we had that up there with the idea of being able to figure out exactly what kind of an impact Tempe Town Lake was going to have on the local environment. So we're kind of using Tempe as a natural laboratory to understand what kind of changes are taking place in a desert environment.

AL: Interesting. And speaking of water, you mentioned Tempe Town Lake, what are some ways, maybe water conservation tips or ideas of ways that people try to conserve water here, ways they could conserve water?

RC: **[6:07]** Well one of the biggest things I think that people aren't aware of is that you don't have to water it everyday. That plants, the kind of grasses that we have out here, don't require a large amount of rain, a large amount of water each and every day. Instead, if you water a little bit heavier, say, twice a week, that's probably a fairly good regime to try to get into. There are some places that still use flood irrigation. A lot of the parks, for example, they will still turn on the water and run it out covering the park for a depth of a certain amount of inches, but they'll only do that once every few weeks in order to provide a natural irrigation, or a natural source of water for the plants here. So depending on the character of the local vegetation that you have in your particular area, there are different schemes that are using. **[7:02]** Some are more viable than others, but they all, the purpose should be that we try to conserve water because water is a precious commodity in the desert. Especially when we go through drought cycles such as we're in right now. Maintaining a consistent supply of water into the future is something that we should all be concerned with.

AL: Um, let's see. You've really touched on this quite a bit, but again I'll ask you.

RC: Sure.

AL: Can the Tempe area continue to sustain growth?

RC: **[7:35]** Well, it's, one of the interesting things is that we have this idea of climate as being something that's stable, that doesn't change except what we do to it. And one of the things that we've discovered in our climate research for Tempe and the surrounding area is that this particular area seems to go through periodic droughts. Now even though we're in a desert, there are times when we get a little bit more rainfall, a little bit less. We average in Tempe, roughly about 8-9 inches of water a year. For the last 10 years or so we've been below that amount. We have found that there appears to be some cycles that are associated with that. That in the 80s and 90s, for example, we had above normal precipitation. This decade so far has been below normal. And what we charted out when we look at long-term records of Tempe for the last hundred years or so, we find there appears to be a 20-year wet cycle followed by a 20-year drought cycle. **[8:37]** And when we're doing planning, when we're trying to figure out how many people can live in a given area, maybe the best thing isn't to look at simply what's happened in the last year or two, but look at the long term cycles and the long term

changes that we see in water usage and try to plan for the lowest situations so that we can survive them and use the water that we get during the plus situations to our advantage.

AL: So has the research that you've done, or have you worked with maybe, developers or city planners or whatever, to discuss how to take into account these years of cycles and such?

RC: **[9:18]** Actually, I haven't, but one of my former students, Nancy Selover, who's the state climatologist of Arizona, has been in contact, particularly again with things like Tempe Town Lake. That Tempe Town Lake is a landlocked lake that doesn't naturally get replenished so that during drought years the level would go down unless it was replenished artificially through changes with water import from the Central Arizona Project or from SRP or something like that. And in order to maintain Tempe Town Lake so it doesn't dry up, planners have looked at those kind of situations as to how often they're going to need to add water to the lake, how much are they going to have to do, how often are they going to have to lower the dam in order to allow the water to run through, those kind of concerns. And so yes, we have had here at ASU, and particularly with the office of the state climatologist, a lot of contact with Tempe about managing water resources here.

AL: All right. And maybe a little more about Tempe Town Lake, but I mean, maybe this is a question for someone else, but how have they been replenishing? I mean could you describe that a little more detail? I don't know if that's ...

RC: **[10:27]** Well actually, the interesting thing is they had the thought when they originally planned it, that they would need to replenish it a lot more than what they have had to do. There are a couple reasons for that: one, we've had rains coming at the right times. Even though we're in a drought cycle, we've tended to have big, heavy rains that have imported water into the system at a regular enough frequency that we can actually use that to our advantage. But the second thing, and probably the more important thing, is it turns out that the bottom of that lakebed is a fairly good container for the water of the lake. That it didn't percolate through as much as we had originally anticipated. Consequently, the primary source that we're losing water from Tempe Town Lake is evaporation, and not so much leaking down through the bottom of the river valley. So, the situation actually has turned out for Tempe to be a lot better than what we had planned for when the lake was originally put in.

AL: How much is lost through evaporation?

RC: I don't have those exact numbers. The person that would is Nancy Selover.

AL: Okay.

RC: **[11:36]** And she's the state climatologist. I can, and she's here at ASU, she's a faculty member here at ASU.

AL: Okay.

RC: And if you want I can give you here phone number.

AL: Sure.

RC: Her email is simply her last name: selover@asu.edu.

AL: Oh okay. Nice.

RC: And her number is 965-0580. (Laughs)

AL: All right. Well these are just some kind of general questions to get some general response, but is there anything you'd like to add on the same topic that you'd like to add that I didn't ask about?

RC: **[12:20]** Well, um, I've noticed that Tempe does seem to be making some strides, particularly as we get into the light rail situation, with handling the odd desert climate, that we're making our bus stops and such a little bit more friendlier for people to be able to sit through so that the sun isn't beating down in them. And in some cases, I think they're even having some misting systems, maybe that are going to be put into some of these transit stations, I don't know if that's Tempe or Phoenix or both or whatever. But they are making some decisions based off of the actual climate of the system. And they're also even doing studies right now on ridership projections based on climate -- do people tend to take the train more if it's a hot day or not a hot day -- those kind of situations, so that we can get a better idea of planning for such things as the light rail with taking climate weather into account.

AL: And the whole issue of climate change is something that's really been coming into the public conscious I guess with all the talk -- Al Gore and all that good stuff -- but how has the, I mean, the whole public perception played into some of your research, some of the popular perception of how this all plays in? I don't know if this makes sense but, uh ...

RC: **[13:45]** Well I think people are paying more attention to climate. I think here, maybe not so much in terms of the global character as it is impacting Tempe, but the local character. That the fact that we do live in this big urban heat island environment and that we are in a desert situation where we have limited resources of water. Those are two factors that seem to be playing a bigger and bigger role in people's everyday lives. And I think that's important that everybody do keep those two points in mind. That we should value water as one of our most important resources that we have, that it is limited in a desert environment. And that we ourselves, because we are living in a city, are having a dramatic impact on our own weather. And that's something that we're going to be finding out more and more about into the future.

AL: It's very interesting, it's not just weather affecting us, but our impact on –

RC: **[14:40]** Our impact on weather. And we've known for a long time that people do which we're doing it. That the city environment quite definitely is artificial, that man has modified the weather that is happening in the urban areas. We've even discovered that it happens on a regional scale, that the eastern seaboard for example has a very odd regime where it's rainier on weekends than it is on weekdays, and that's due to the pollution that the cities put out. So we know that we do have an impact. The amount of impact that we're having globally, that's somewhat of a more speculative type of thing. But we do have an impact. **[15:29]** And particularly here in the desert because a lot of the other factors that other places have to worry about, things like humidity changes and so on, are less important. We can see that our impact is maybe even more pronounced here in the desert region than in other parts of the world.

AL: Yeah, I think that's all the questions I have.

RC: Cool.

AL: All your information is very helpful.

RC: Cool. Great, good. This is going to go into some kind of display, is that what you were saying?

AL: Yeah, it's for the ... (tape ends)