

<TELESPAN Event Information>
<Confirmation Number: >
<Date and Time: 10/5/06 1PM EDT>
<Customer Name: National Wildlife Federation DC>
<Moderator: >
<Conference Title: Global Warming and The American West>
<Length of Call: 31 min.>

OPERATOR: Good day, and welcome to today's National Wildlife Federation Conference Call entitled Global Warming and the American West. During the presentation all lines will be in a listen only mode. A question and answer session will follow the presentation and instructions for asking questions will be provided at that time. Thank you for your attention, I would now like to turn the conference over to your host, Dr. Doug Inkley.

DOUG: Good afternoon everyone, or I suppose good morning, for some of you that are west of the Mississippi. I am Dr. Doug Inkley, I am the Senior Science Advisor for the National Wildlife Federation. Welcome to this press conference, Global Warming and The American West, and I will be serving as your host and moderator throughout this teleconference today.

The purpose of this teleconference is to provide to you the latest science from wildfire and snow pack experts, and to release the National Wildlife Federation's new report, Fueling the Fire: Global Warming, Fossil Fuels, and the Fish and Wildlife of The American West.

I can tell you that we have just confirmed that the report is now available on our website. It is at [www.nwf](http://www.nwf.org/news) as in National Wildlife Federation, .org/news. Again that's www.nwf.org/news.

The way we're going to proceed today is to first start with 3 short presentations which will be followed by ample time to address any questions that you may have. The first speaker today will be Ms. Patty Glick and she is the author of the Fueling the Fire report. Ms. Glick is the National Wildlife Federation's global warming specialist and she's worked out of our western resource center in Seattle, Washington where she has authored numerous reports on global warming and the effects of global warming on fish and wildlife.

I am very pleased that we are honored today to also have 2 distinguished scientists. The first of these is Dr. Philip Mote. Dr. Mote is Washington's State Climatologist, he is also a research scientist and an affiliate professor at the University of Washington where he is part of their Climate Impacts group. He is a graduate of Harvard University and has published many studies, including those on the special interest on the effects of climate change on mountain snow packs and water availability throughout the west.

I can tell you that our 3rd and last speaker today will be Dr. Steven Running. Dr. Running is a professor of Ecology at the University of Montana in Missoula. He's authored more than 240 scientific articles and he's a team member of the NASA Earth Observing system. He specializes in forest ecology, and has extensively studied the incidents and cause of fires throughout the western United States.

So now I'm going to ask if Ms. Patty Glick would introduce the National Wildlife Federation's report, Fueling the Fire. Ms. Glick?

PATTY: Thank you. I would like to start by underscoring the message conveyed in our report, that it is critically important for people to make the connection between the nation's growing addiction to fossil fuels and the devastating consequences it is having for people and wildlife alike. The American West is truly on the front line, not just in terms of the increased pressures to dig and drill for fossil fuels in sensitive areas, most of all burning fossil fuels is the driving force behind global warming, which is dramatically altering the western landscape. And as Dr. Mote and Running will explain, the latest science is painting a bleak picture. One of the greatest concerns about global warming in the west is its impact on the regions water resources. Winter snow pack accounts for 75% of the water supply in the west, and it's the primary source of water in many areas during the dry summer months. With global warming, the region is already seeing a significant decline in average winter snow pack, and a shift toward earlier peak snow melt. And that trend is projected to continue.

Another serious consequence of global warming is the trend towards longer fire seasons, and more intense wildfires, which scientists have attributed directly to the hotter and drier conditions across the region. In fact, this year has gone down as the most extensive and expensive fire season on record for the United States, and it provides an eerie snapshot of what

life will be like in the American West if global warming continues unabated.

Not only have the record fire season, the continuing drought conditions, and major heat waves of 2006 been enormously stressful for people, but they have also had a significant impact on fish and wildlife. From Arizona where natural water resources have completely dried up in some areas and animals are forced to rely entirely on manmade water catching devices, to Nevada where officials recently had to call for a special hunt and relocation of hundreds of antelope because wildfire has ravaged their winter range, to Montana where many of the regions top blue-ribbon trout streams were closed to fishing this summer because higher than normal water temperatures were seriously stressing the fish.

The region is also facing the expansion of invasive species, pest, and disease outbreaks. The loss of vast areas of important sagebrush habitat and alpine tundra, and a significant decline in wetlands that support the majority of North America's breeding waterfowl. If these trends continue as projected, it does not bode well for the natural heritage and the outdoor traditions that are such an essential part of the Western economy, its culture, and its values.

But as important as it is for people to understand the problems, it is even more important for us to recognize that there are solutions. We have a real opportunity to change course and reduce our dependence on fossil fuels, stop global warming, and build a brighter economic future around clean energy sources. But the timing is critical and we desperately need our elected officials to lead the way by enacting a meaningful federal global warming policy. Delaying action will only make the impacts of global warming worse. For example, every new coal plant on the line that gets built will be there for the next 30/40/50 years all the while adding tons of heat trapping carbon dioxide into the atmosphere. Quite simply, more pollution only means more global warming and the greater likelihood of facing the worst case scenarios in terms of the impact.

Really, the bottom line is that there is no substitute for the annual snow pack, that's the single most important source of water for much of the west, nor can we ever replace the regions great native sagebrush habitat, or its cold, clear rivers, its forests, its grasslands, and the fish and wildlife that they support. But we do have substitutes for fossil fuels. Effective and affordable technologies are available today that

can significantly improve the energy efficiency of buildings, appliances, cars and trucks, and altogether reduce the need to build new coal fired power plants and drill for oil wells.

In addition, clean, renewable sources like the sun and wind are becoming increasingly affordable and have tremendous potential to diversify the regions and the nation's energy portfolio. We also have a chance to be proactive and insure that all new energy development and global warming mitigation projects are managed in a way that prevents or minimizes the harmful impacts on wildlife and habitat.

To conclude, really, by acting now to reduce our dependence on fossil fuels, and build a cleaner, safer, more sustainable energy future, America will be taking the single most important conservation action of the 21st Century. And if you're interested in more details about the impacts of global warming on fish and wildlife in the west, as well as a comprehensive look at our recommended solutions, as Doug mentioned, the full report is available at nwf.org/news.

DOUG: Thank you Ms. Glick, and what I would like to do now, this is Doug Inkley, is to introduce Dr. Philip Mote from the University of Washington Climate Impacts group. Dr. Mote.

Dr. Mote are you there?

DR. MOTE: Yes.

DOUG: Would you please proceed?

DR. MOTE: Sorry, I thought I had my line muted and I muted it when I thought I was un-muting it.

I wanted to provide just a little bit of backdrop of the science that's in the report that Patty Glick put together and just described. I'm not going to make any comment on the policy, connections or recommendations in the report. Really just focusing on the hydrologic cycle piece of it.

As was first pointed out in a paper by Dan Cann and colleagues in 2001, the timing of spring as measured either by the date of peak snow melt runoff, or by the first bloom of lilac and honeysuckle's in the west, has fluctuated from year to year very closely associated with spring temperatures. And also has trended earlier just as spring temperatures have increased in the last 50 years. They documented a trend toward about 2 or 3

weeks earlier arrival of spring in 50 years, and although they were reluctant to ascribe this solely to global warming, subsequent research has strongly suggested that in fact the natural fluctuations in climate that we know about cannot explain all of this temperature trend.

More recently, a couple of papers I was involved with as well as 2 other papers, all came out in 2005, these 4 papers collectively underscored the picture painted by Cayen and colleagues that snow pack has been declining, spring snow pack in most of the west. In fact roughly 75% of locations monitored over the last 40 to 60 years have shown declines, only about 25% have shown increases and those have exclusively occurred where there's been a large increase in precipitation.

I won't go into the technical details, but we collectively were able to show very clearly the role of temperature in driving these declines in spring snow pack and shifts in stream flow from summer runoff to more early spring and even late winter runoff as the snow reservoir has been depleted by warming. And it's now possible to more clearly relate the warming trends to the buildup of greenhouse gasses and to successively eliminate different factors of natural variability in contributing to the warming trend. So I think over the last 5 years what science has been able to show with increasing clarity is that there is indeed a connection between the buildup of greenhouse gasses and the hydrologic changes that we're observing. These have consequences not just for anything that has a reliance on summer stream flow, for instance fish and wildlife, agriculture, but it also shifts the balance of the timing of peak soil moisture and advances the summer drying that sets in. And that has a very important role in determining the behavior and extent of wildfire as Professor Running will explain shortly.

So the other thing that's really emerged is where as we've typically tended to think of drought as simply not enough precipitation, in fact there is a clear role for temperature in droughts both by shifting summer runoff earlier and by enhancing summer evaporation so that you can really shift the moisture balance simply by having a warm winter or spring. We saw that here in Washington State very clearly in the winter of 2004/2005 where the Cascades received something like 70% or 80% of normal winter precipitation but accumulated only about 20% of normal winter snow pack simply because the storms we had were all very warm storms. That provided a vivid illustration of what its like to cope with much less of our natural storage and the government of Washington had to declare a drought.

So in conclusion I just want to underscore that the temperature in the west is clearly rising under the influence of human activity, chiefly the burning of fossil fuels, and that is already playing a role in shifting the snow melt driven hydrology.

DOUG: This is your moderator again, Doug Inkley, thank you Dr. Mote for that explanation. Our last speaker today is Dr. Steven Running, he is the Professor of Ecology at the University of Montana. Dr. Running?

DR. RUNNING: Yes, what I'd like to do is pick up on the train of thinking that Dr. Mote has started us with, and have our listeners think through how the seasonality progresses in western ecosystems. Because as we've already heard, these ecosystems rely primarily on snow pack for their water supply for the growing season. And as a general rule of thumb, about one meter of snow will saturate about one meter of soil, and that soil water then is what those ecosystems primarily live on for their spring growing season. Once that soil water has been depleted by evaporation, evapotranspiration and growth of those ecosystems, and those soils are dried, then the ecosystem goes into water deficit or water stress phase. And for my students I like to have them think about their gardens if they forget to water their gardens and you come out after a weekend being gone and the zucchini and tomato leaves are all drooping down and wilted. An ecosystem doesn't visibly wilt, but the plants in that ecosystem become water stressed, have less water content in the plants, and of course this is then the precursor to the wildfire season. Because once that ecosystem is desiccated the plants are more combustible and then it really is just a probability of when a lightning strike or another ignition event will start a fire off in that ecosystem.

So, from this conceptual picture of the spring and summer drying of our western ecosystems, now we can start looking at some specific numbers. And these particularly I'm drawing on a paper in Science Magazine on August 18th, lead authored by Tony Westerling, where they found since 1970 that the length to the active wildfire season has increased by 78 days. That's two and a half months. So remember how I've explained how an ecosystem first uses the summer, the winter snow pack as its source of water supply. Once that snow pack water supply is gone then these ecosystems are vulnerable to burning. And in fact, we're finding the fire season that's now 78 days longer than in 1970. What the Westerling paper also reported was that the duration of

burning of the large wildfires has increased from 7 days to 37 days. So when a fire gets going in these more desiccated landscapes they're much more difficult to control and they burn for a longer period of time.

And so what we are seeing now in the new research findings is that the initiation of spring snow melt coming 2 to 4 weeks earlier in much of the west is now rippling through this, our entire summer season and causing a longer wildfire season, its also causing the forests to become desiccated up in higher elevations than we've seen in the past. It used to be customary that our summer snow pack would stay slowly melting up to 6/7/8 thousand feet until July. And of course snow doesn't burn, so as long as there was snow on the ground there really would not be high elevation fires. What we're now seeing is those higher elevations are desiccating. The Westerling paper found that the elevation around 2100 meters was where the greatest increase in wildfires has occurred. So we're actually having a larger fraction of the landscape now being vulnerable to wildfire over a longer season with higher temperatures.

So you add all these factors together and what we're seeing is really a remarkable increase in wildfire activity in the west. And to just quote some statistics for this wildfire season alone, it's now reported that we've had 9.1 million acres of wildfire in the summer of 2006. The 10 year average is 5 million acres. So we've almost doubled this year the wildfire activity over the 10 year average. And that costs have also just yesterday been reported as 1.5 billion dollars for wildfire control, which is the highest in history. So I think we can see from these multiple strains of evidence and through a look at the seasonality of how summer, seasonal summer drought develops in the west that the warming trend that we're under now is clearly accelerating and expanding the wildfire activity, and there's no reason that we see that this is going to, trend is going to reverse in the near future. It's going to do nothing but get longer season with greater wildfires. I think that's enough to say for now.

DOUG: Thank you Dr. Running, and thank you to each of our speakers.

In my view it's very clear that the National Wildlife Federation's report is already, makes it clear that the changes in the west are already having a very significant impact. I'd like to point out that global warming has more or less been considered by most people to be an issue about the melting of

ice in the arctic or the intensity of hurricanes in the south. And now we're seeing that it is actually an issue that's having an impact here in the American west, in our own backyards. Climate change is decreasing mountain snow packs, which are critical to our western water supplies, and climate change is also increasing the incidents, intensity, and scope of western wildfires.

The National Wildlife Federation's view on this is that it's imperative that we as a nation and as a society step forward and address the issue of global warming by reducing carbon emissions. Ms. Glick has demonstrated that there are feasible solutions to the global warming crisis.

Okay, for those of you who may have joined us late, the National Wildlife Federation's report is available right now on our website at www.nwf.org/news. And what I would like to do now is turn this teleconference over to you folks, the audience, so that you have an opportunity to ask questions. As a reminder, please do state your name and affiliation and you may also wish to direct your questions specifically to one of our speakers; Ms. Glick, Dr. Running, or Dr. Mote. Thank you.

OPERATOR: Thank you. At this time we will begin the question and answer session. To ask a question please press zero followed by a one on your touchtone phone. To retract a question please press zero followed by a two. Questions will be answered in the order that they are received. If you have a question please press zero followed by a one, now. Please hold for a moment while our system compiles your responses, thank you for your attention.

Our first question comes from Mr. Jim Casey of the Pincela Daily News. Please go ahead.

JIM: Thank you. This is primarily for Dr. Mote and also for Dr. Running. How have these conditions that you've described affected particularly the Olympic Mountains on the Olympic Peninsula in Washington State where we're kind of out here on our own? Including Blue Place.

DOUG: Dr. Running would you care to address that?

DR. RUNNING: I think Dr. Mote being in Seattle is much closer to the Olympic Peninsula, so I'm hoping he will give a first answer. He probably has more direct information.

DR. MOTE: Hello, can you hear me?

DOUG: Yes.

DR. MOTE: There are a few, well 2 snow courses on the Olympic Peninsula, one at Hurricane and one at I think Deer Park and they do show very large declines in snow pack. And as you noted the Blue Glacier has retreated substantially. Other than that we really don't have good measurements. I've looked at a few stream flow records from the eastern side of the Olympic Peninsula, but its pretty hard to come up with long term records other than the ones I mentioned to document the changes. And the ones, the Hurricane and Deer Park show much larger declines than we would have expected from climate alone. I know that the Hurricane snow course has had significant incursion of vegetation which is always a concern, it tends to reduce the accumulation on the ground, so I think that's probably played some role. But yeah, other than that I don't know how these changes have played out on Olympic Peninsula.

DOUG: Thank you Dr. Mote, Jim, does that answer your question?

JIM: Yes it does, thank you.

OPERATOR: To ask a question please press zero followed by a one now on your touchtone phone.

And Dr. Inkley it appears that we have no further questions from the audience.

DOUG: Okay, I will give it just another 10 seconds here and then we will close the teleconference.

OPERATOR: Okay, our next question comes from Ms. Mary Manning of the Las Vegas Sun Newspaper. Please go ahead Ms. Manning.

MARY: This is for either Drs. Running or Mote, but would you, can you specifically address the ongoing drought in the lower Colorado River Basin?

DR. MOTE: Well this is Mote. I am, I think scientists have been struggling to understand the causes of multi-year droughts like the one that has dogged most of the west off and on since about 1998. With the instrumental record it's clear that this drought is probably the worst, the driest 5 year period average over the west since records began in the 19th Century. Late 19th Century. From tree ring reconstructions it's a little harder to

put it in the longer term context, but it does seem to be pretty unusual. As to what causes it, there has been some speculation that certain temperature patterns in the Indian Ocean create what Marty Hurling at the Climate Diagnostic Center called the Perfect Ocean for drought. That may have played a role in sort of setting up the conditions, but we do also see the additional role of temperature in enhancing evaporation as I mentioned earlier. But I think the scientific community is still kind of struggling for answers on that very important question.

DR. RUNNING: Yeah, and I would add that what makes the Colorado Basin analysis particularly difficult is the expansion of agricultural irrigation. And so when you look at things like the Lake Powell water level we've got a combination of factors weighing in. Not only with earlier snow melt and higher summer evaporation, but also greater water use and water withdrawals from the river. And I think those are all contributing to what my hydrologist friends in the southwest say is just an absolute crisis on the verge of happening in water management.

DOUG: That was obviously Dr. Running, does that answer your question?

MARY: Yes it does, thank you very much.

DOUG: Thank you. Are there any additional questions at this time?

OPERATOR: Yes, Dr. Inkley, the next question comes from Mr. Jim Casey.

JIM: Just a follow up. Dr. Mote you indicated that the Blue Glacier has retreated substantially and that, my question, there are 2 questions here. One is, can you quantify that in terms of cubics, whatever. I've come across one web source that correlated it to ice cubes, which I thought was rather clever. And secondly, is there anyplace that can provide our newspaper with photo comparisons of either the snow pack or the Blue Glacier?

DR. MOTE: Thanks for your question Jim, this is Phil Mote. There's a glaciology group here at the University of Washington that has done extensive field work on the Blue Glacier dating back decades, and I'm sure they can provide photo pairs. They put together a nice little one page sheet on glacier responses to climate change and on that they mention that the Blue Glacier retreated about a kilometer in the last hundred years. They

attribute the bulk of the retreat actually to increased winter temperatures, so it's more that it's not accumulating as much because the area where it can accumulate has shrunk, rather than simply summer warming making it melt farther in the summer. But off-line or right now I can give you additional links and so on to the glacier folks.

JIM: Very good.

DOUG: Thank you. You're all set then Mr. Casey?

JIM: Yes, thank you.

DOUG: Thank you.

OPERATOR: Thank you. To ask a question please press zero followed by a one on your touchtone phone now.

And Dr. Inkley it appears that there are no further questions from the audience.

DOUG: Okay, I will proceed to close with a few items of business, however if there are any additional questions that come up please do let me know.

First of all, for those folks that are listening, a reminder that the report is now available at www.nwf.org/news. Also, we have available if you would like them, photos of both Drs. Running and Dr. Mote, and to get those please contact Mr. Aileo Weinmann, A-I-L-E-O, Mr. Aileo Weinmann, W-E-I-N-M-A-N-N, he is available directly at 202-797-6801. Or at weinmann@nwf.org, W-E-I-N-M-A-N-N-A @ nwf.org. Again those are 202-797-6801 and weinmanna@nwf.org. Thank you for joining us today, this concludes our conference.

OPERATOR: This concludes today's conference, all participants may now disconnect.

(End of recording).