

## GEER 07 30 2008

Collins: Thank you Len. It's always tough following uh two distinguished speakers like Amy and uh Dan but uh I'll give it a try here. Uh, before I begin, I wanna warn all of you, I'm not a scientist or a researcher or a academia so uh, uh bear with me here on uh this presentation because I'd like to do a little bit of a different approach and it's to pose some thought provoking questions after I cover a brief history of climate. Uh, but ask you some thought provoking questions uh because it's important for all of us to start thinking in these terms and Dan really hit it, hit on it in his presentation regarding some of the laws and their uh, uh mission and what they're supposed to do.

Climate Change. Are we ready? No. Uh, let's cover the past uh climate uh very briefly here. From 2000 to 1400, uh 14,000 before present, uh that was the last Ice Age. Uh, we're now in the uh Holocene epic. But even during the last Ice Age, there were variations in temperature. Glacial retreat, would retreat and they would expand. And now during the Holocene epic, there's been a lot of different climate variations also. From, and I'm gonna read here a little bit because I don't have the brain power to met uh to remember all this. From 10,000 to 8500 B.C., a cooling trend occurred. Scientists speculate this cooling may have been caused by the release of fresh water trapped behind ice uh on North America into the Atlantic Ocean. Uh warming resumed from 8500 B.C., by 8500 B.C. By 5000 to 3000 B.C., average global temperature reached their maximum level during the Holocene and were 1 to 2° since uh Celsius warmer than they are today. Uh, climatologists called this period the Climatic Optimum. From 3000 B.C. to 2000 B.C., a cooling trend occurred. The cooling caused large drops in sea level and the emergence of many islands such as the Bahamas and coastal areas we have today emerged. From 2000 to 1500 B.C., another warming trend occurred. From 1500 B.C. to 750 B.C., a cooling trend saw temperatures drop with the renewed gloath (sic) growth of glaciers and sea level drop. The period from 750 B.C. to 150 B.C. saw warming again. During the time of the Roman Empire, 150 B.C. to 300 A.D., a cooling began that lasted until about 900 A.D. The cooling caused the Nile River and the Black Sea to freeze during that period at certain times. The period from 900 to 1200 A.D. has been called the Little Climatic Optimum. Temperatures were warmer, even warmer than today. During this period, the Vikings established settlements in Greenland and Iceland. From 1550 A...A.D. to 1850 A.D., global temperatures were at their coldest since the beginning of the Holocene. Scientist called this period the Little Ice Age.

So, as you can see, climate has varied in the past. Now I started approaching this in an investigate type way and there're factors that affect climate, extraterrestrial factors such as solar output cause the uh sun has

variations in a solar output every 11, 90 and 180 years. Uh, the earth-sun geometry uh which deals with the circular to elliptical orbit that the earth uh periodically changes as it uh rotates around the sun. The uh tilt on the ax...on its axis and the wobble on its axis. All these affect uh climate change. Then if we look at the, the terrestrial or earth features, volcanic emi...emissions, mountain building, continental drift, atmospheric ocean heat exchange such as with uh the Gulf Stream, surface reflect, reflectivity such as uh polar ice cover, atmospheric reflectivity such as cloud cover, and atmospheric chemistry. And that's what we've uh and the IPC has re...IPCC has really focused on, the atmospheric chemistry. Um, because frankly, that's the only thing we can do anything about. I know they've touched on this before but this is how dramatic the level of CO<sub>2</sub> rise has been in the past 150 years or so. Very dramatic and much of it is due to us, humankind. Now to really delve into it a little bit more, what percentage of the atmosphere is CO<sub>2</sub>? It's .036%. And we have contributed to about a 3<sup>rd</sup> of that rise over the past 150 years. About 1/100<sup>th</sup> of a percent. Out of that 1/100<sup>th</sup> of a percent, uh it's not all totally our anthropogenic gases in the atmosphere. Some of it as we, as a planet is warmed, the Tundra has released a lot of CO<sub>2</sub> into the atmosphere. And the point is not to disagree with IPCC. I am a strong believer in that. Folks, I have the religion. I've got a Prius. I've changed all my light bulbs at home. I've uh heck even my watch is self-winding without a battery. Uh, the point is that climate has changed and what can we do about it? Even if the United States and, and the rest of the world stopped putting CO<sub>2</sub> in the atmosphere, there's a residual amount that's going to continue. And the point of this whole presentation is that climate has changed. It will continue to change no matter what we do about it so it's time to get prepared.

Now, I'm not gonna go through all the predicted physical changes. Amy and Dan have talked about that. I'm sure scores of uh of other folks have talked about it. Uh, it's complicated. There's a lot of uncertainty. Uh, and uh as the uh astronomer once said about the universe, you could probably apply it to climate. It's not only queerer than we imagined. It's queerer than we can imagine. Very complex. Here are the issues I'd like to focus on and I'd like to pose some questions and Dan again, Dan was really starting to hit on, on some of those issues in his presentation. The philosophical, the legal, the ethical, and the policy issues. And how it affects our mission in terms of fish and wildlife resources.

Let's look at change first. It's always inherently viewed as bad. It's human nature. I don't wanna change. A lot of other people don't want to and it affects the environment, things we study, things we've cherished, certain species. But, I was just recently in Alaska and I was cruising down a fjord and the park ranger on board uh was explaining that uh back in the 1700s, I would of been under a 1000 foot of ice. The sea ice extended 30 miles

through this fiord and it was just a giant glacier. I happen to glance over on the shore and I saw a forest where ice would have been. I saw bears. I saw birds. I looked in the water and there were dolphins or porpoise I guess up there. Killer whales, uh certain types of seals so it was amazing the amount of life that was there. So that brings up the philosophical issues, should change always be in uh viewed as bad? Probably to us in our built environment that's for sure. Uh but mother nature doesn't make value judgments. Only we do.

Species, some species will become extirpated during climate change or extinct while others will increase under changing conditions. Do we attempt to save all species or should we make judgments and put our resources towards species that will have the best chance of adapting? Tough question. What's the first thing we learn in Biology 101? Extinction is normal. I'm not advocating extinction. I'm with everyone else. I love the critters. I love the species. The reason I took the job 20 years ago was to save em and make a difference. But it causes you to think when you start looking at climate change and the way things are progressing. What will the public want and what are the potential conflicts that will present be presented to fish and wildlife management? A lot. How should we conduct land acquisition, anticipated future conditions or based on present conditions? And how will we define restoration? I guess that really relates to a lot of us here. Time and place or are we doing something for biodiversity or both? It's uh, these are tough questions, especially if we go through a period of rapid climate change. And I like the python stand. What will this mean to invasive species management? It's, it's a tough one there.

Some other issues. For the most part, our current laws tend to be based on the status quo or static view of climate. They were never meant to be, for the most part, there's no absolutes here, but I don't feel they were meant uh to be used in a dynamic changing environment and it's something we're gonna have to look at. The Organic Act, uh the Endangered Species Act, Clean Water Act, Clean Air Act, all these tend to be more status quo. And will these laws now ultimately be an impediment to the successful management of fish and wildlife? Will the courts be more and more involved in the management decisions and are they qualified? And if you, even if you discard the other theories of well, why climate change occurs and focus only on the anthropogenic...uh anthropological greenhouse gas emissions and we were effectively able to curtail ours and the rest of the world, what about the residual CO<sub>2</sub> and will it continue to affect climate?

Let's look at the Endangered Species Act and the polar bear. I know a lot of you are familiar with that. Uh, and everybody wants to protect the polar bear. It was recently reclassified as threatened through the Endangered

Species Act. What are the implications of this ruling? They're looking at the future and the melting of the polar ice cap. When you start looking at things this way, is there, does it bring into play other things? Have anybody, has anybody seen the Florida 20/60 Report and the potential uh effect that Florida's growth is gonna have on the species throughout Florida? What's that gonna mean based on a ruling like this? Could that be applied? I don't know. I'm not a lawyer either so. Thank god. Uh, the, and, and there's nothing wrong with these acts. They're made and they've done a great job but will they be applicable here in the future? Um and will we be allowed to change them and should we change em? There's the, they're very interesting uh questions, legal questions, ethical questions, philosophical questions. And as species migrate, how will they affect regional and local laws? Will native species now become exotics or the other way around. It's, it, it, when you start thinking about this and these terms that you better have some Tylenol ready cause it can give you a headache.

Now let's look at some ethical issues. Should we intervene to save a species when because of a new climate the species should go extinct? I guess maybe if you look at it that we're the cause of the new climate, that's, that's correct. But these are very thought provoking. What will we be mandated or allowed to do? And what about if a species could be saved simply by moving it to a cooler climate? But it's not able to do so on its own. Should we play god and move it? These are tough questions and we need to be thinking about them now for the future.

And economic factors, what does this mean to in terms of directing our limited resources? We're all struggling and always trying to get money to save the resources. It's gonna be tough. And what are the implica...uh implications to the states and other states' economies?

So those are some questions I just wanted to get, run by you to get you thinking about em. And I know a lot of you are very bright people and you've probably thought of em before. And I missed any other, this is my first day here so if someone else had covered this uh please forgive me.

Uh, now I'd like to put in a word for our upcoming climate summit. It's gonna be next month on the 20<sup>th</sup>, 21<sup>st</sup> and 22<sup>nd</sup> in Orlando. Staying at a Green Lodge. Our goal is to identify key research needs, improve awareness of impacts on wildlife and develop ideas to optimize species conservation for integration into the Florida Fish and Wildlife uh Conservation Commission's Comprehensive Climate's Change Strategy.

I'm, I'm also on a, a member of the think tank uh for AFWA. And everybody is really struggling with how to get our arms around the 600 pound gorilla. We sort of realized we can't do it by ourselves. We need

your and the public and other people's help uh to help us develop our long range strategy so I would invite everyone to participate in our upcoming conference and here is a link to it. So if you're interested, please visit the link and I hope to see you all there. Thank you.