Can we adapt our water consumption?
Study evaluates how climate change will affect aquifer

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SEGUIN – Water planners base the water budget off the 1950s drought of record. If climate change brings a new drought of record, should we be worried?

“Absolutely,” research scientist George Ward told the Edwards Aquifer Recovery Implementation Program group on Thursday.

The group called on researchers to evaluate how climate change would affect the Edwards Aquifer, as the state legislature advised members to look into anything that would affect an already uncertain task of establishing a plan to maintain the aquifer.

The aquifer provides spring flows that make up about 65 percent of the Guadalupe River flow now.

Climate models call for at least a two-degree temperature increase and a 5 percent reduction in precipitation in the South Central United States, Ward, associate director for the Center for Research in Water Resources at the University of Texas at Austin said.

Runoff from precipitation flows into our rivers and increasing temperatures means more evaporation.

“Water planners really care about runoff” he said. “That drives everything.”

Because Texas receives most of its rainfall from thunderstorms, water planners took advantage of catching water with reservoirs and storage facilities, Ward said.

But what if the water doesn’t get to the ground or what if it evaporates before running into the river or seeps into the ground?

Models show that a rainfall decline of 18 percent yearly would mean a runoff decrease of 35 percent, Ward said. The nature of the watershed would amplify any change in temperature or precipitation.

But Ward advises many problems exist with trying to surmise regional climate effects from global climate data. Obviously, more research is needed, he added.

Charles Jackson, researcher with the Jackson Institute for Geophysics at UT, emphasized the uncertainties in the data. The models say the earth is warming, but disagree on how much.

“Many models can all look believeable but give many predictions about what the future holds,” he said. “It’s difficult to know what’s going to happen.”

The earth has seen many climate changes throughout its history, Jackson continued. The last thousand years have seen droughts way worse than the drought of record. The historical information comes from sedimentary data like coral, rock, cave deposits, tree rings and ice cores, he said.

Jackson suggested identifying the sources of uncertainty that affect predictions in Texas climate and not giving all models equal weight.

The one thing the data can tell water planners is if the drought of the 1950s wasn't as severe as others in the last thousand years, no reason exists for thinking what happened before can't start again, Jackson said.

Higher temperatures and less rainfall would make it more difficult to plan for future water needs, said Todd Votteler, representative for the Guadalupe-Blanco River Authority for the RIP program.

"It doesn't make it impossible. It makes it more of a challenge," Votteler said. "This reinforces that in the future, we're going to be using less water per person."

Larry Hoffman, a civil engineer from San Antonio who attends all the meetings, disagrees with the models from the Intergovernmental Panel on Climate Change.

The member of the Regional Clean Air and Water Economy doesn't believe humans can affect climate so much with their emissions of carbon dioxide.

"The climate changes. It's natural," Hoffman said. "If you can get a signal that the climate is changing, you have to adapt to it."

Possible effects of climate change on Texas

20 to 30 percent reduction in recharge to the Edwards Aquifer

Comal spring flows could reduce by 15 percent by 2030; to maintain this flow, would need to reduce use by 50,000 acre-feet per year by 2030

Diminished water quality, flooded facilities on coast

Greater water demand from plants, crops

Decrease in surface and groundwater

Increased carbon dioxide and warmer temperatures would help crops in the nation overall, but Texas is not in the place to benefit.

Source: Bruce McCarl, regents professor for the Department of Agricultural Economics at Texas A&M University who participated in part of the intergovernmenetal panel of climate change