

# Global warming to squeeze western mountains dry by 2050

**G**LOBAL warming will diminish the amount of water stored as snow in the Western United States by up to 70 percent in the coastal mountains over the next 50 years, according to a new climate change model released here today.

The reduction in Western mountain snow cover, from the Sierra Nevada range that feeds California in the south to the snowcapped volcanic peaks of the Cascades in the Pacific Northwest, will lead to increased fall and winter flooding, severe spring and summer drought that will play havoc with the West's agriculture, fisheries and hydropower industry.

"And this is a best case scenario," said the forecast's chief mod-

eler, L Ruby Leung, a staff scientist at the Department of Energy's Pacific Northwest National Laboratory in Richland, Wash. Leung delivered the sobering report at the American Association for the Advancement of Science annual meeting, and the full results of her study will appear soon in the journal *Climatic Change*, now in press.

Leung emphasized the estimate's conservativeness, noting that the climate projections of warming devised by DOE and the National Center for Atmospheric Research are on the low end compared to most other models. Leung's clumping of the models is part of the DOE's Accelerated Climate Prediction Initiative, or ACPI.

ACPI assumes a 1 percent annual increase in the rate of greenhouse gas concentrations through the year 2100, for little change in precipitation and an average temperature increase of 1.5 to 2 degrees centigrade at least through the middle of 21st century. The result: more winter precipitation falling as rain instead of snow, two-tenths of an inch to more than half an inch a day, pushing the snow line in the mountains up from 3,000 feet to higher than 4,000 feet.

Where we now have snow in the mountains into April, "at mid-century snow will melt off much earlier than that," Leung said, noting research that shows in the past 50 years coastal mountain ranges have already lost 60 percent of

their snowpack.

"The change in the timing of the water flow is not welcome," Leung said. "The rules we have now for managing dams and reservoirs and irrigation schedules cannot mitigate for the negative effects of climate change."

If this picture isn't bleak enough, Leung noted that the model does not even address the possibility of population growth and increased demand on water resources. Mountain streams supply power and drinking water to Seattle, Portland and the San Francisco Bay Area and points south in densely populated Northern California, and they feed the booming agricultural industries in the

Columbia and Willamette valleys of Washington and Oregon and the San Joaquin Valley in California.

If there is any good news, it can be found farther east, in the Rockies. There, the winters are so much colder that small temperature increases have will have less effect on the snowpack, Leung said.

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