



Snowy Hydro hopes to expand cloud seeding

Two winters into a \$40 million 6 year trial cloud seeding program in the Snowy Mountains there have been impressive results revealed by the monitoring system this year.

"The early indications are that it is certainly working and we are already confident we will be able to show the expenditure is not only justified, but that the program should be expanded to include a wider area," Snowy Hydro's managing director Terry Charlton told the Times.

"The signature to date shows increases in snow of up to 25%, and we're very comfortable with that," he said.

In what has not been a great year for natural snowfalls, one of the drop zones of the seeding activity, at Spencers Creek saw snow depth right on the median on August 24.

At Deep Creek, which is on the edge of, but outside the actual drop zone, the monitoring has show the snow pack to be halfway between the median and the minimum snow depth.

And at Three Mile Dam, well outside the drop zone, actual snow depth is on the minimum historical depth.

"These are very interesting results, showing where nature has been left to its own the snow pack is on the actual minimum historical depth; where there is some assistance it is halfway between the median and the

minimum, and in the actual zone it is right up to the median," said Mr Charlton.

"Despite the poor year, the results are much more stark in 2005 when you analyse what the result has been at Spencers Creek in relation to Three Mile."

"This is particularly encouraging given that we have carried out a lot less cloud seeding this winter - 80 hours, compared with the first season in 2004 when we seeded for 187 hours.

"Last year we seeded 12 cloud events; this year just five, basically a result of it just being too warm and the conditions not meeting the strict requirements under which we have to carry out the seeding.

"There are very conservative cessation criteria - it must be cold enough that we don't run the risk of producing precipitation as rain, but rather ensure there is super cool water in the droplets in the clouds so they fall as snow."

Mr Charlton said the cloud seeding is being carried out at 12 locations aimed at picking up the north west, west and south west weather movements.

"If it's from the south we do not seed, as that's heading into the Jagungal Wilderness area which is outside of the trial program," said the managing director.

In addition to expanding the scope of the program in the future, Mr Charlton is also



Minister for Natural Resources and Primary Industry ian Macdonald, pictured with Snowy Hydro managing director Terry Charlton.



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hopeful some of the stringent conditions set by Snowy Hydro on itself may be relaxed a little in terms of level of runoff and snow.

There are cessation rules to halt seeding when snow depth and reservoir levels are too high, when there is a chance of rain instead of snow, or during extreme weather conditions.

"However we are very conscious of ensuring we do not have any adverse impact on the snowfields," he said.

"Last year we were not so confident, as to how much impact the seeding was having but it is a different matter this year. We are firmly of the opinion that our program will only produce a positive environmental impact and there is a lot more area that could be seeded with a beneficial result."

Mr Charlton said the organisation held firm to its opinion that the country still had five or six years to run in a 15 year drought cycle.

"There is no doubt the Murray and Murrumbidgee system need all the water we can provide.

"Every year we endeavour make special arrangements for those rivers and irrigators to receive water when they most need it," he said.

He spoke of a facility enabling irrigators to effectively pay for a special timing of a release, which if not utilised could be carried over for several years.

"Flexibility in water delivery arrangements is definitely helping to overcome some of the insecurity as to what water they have access to at particular times," he said.

Mr Charlton said the monitoring and sampling system in place for the Snowy Mountains cloud seeding program was "state of the art".

"In this respect we are ahead of the situation in the United States and in Europe.

"We have spent more money on understanding how best to measure the correlation between the seeding and the yield in snow and water, whereas overseas they tend to take the approach that if it works, that's all that's needed to be known.

"In our case water is a raw material and the \$40 million investment we are making and any further investment down the track has to be justified."

He said environmental monitoring was a significant part of the experiment and involves aquatic systems, alpine vegetation, soils, erosion and sedimentation, and areas of high conservation value.

Natural Resources Minister Ian Macdonald has told the *Times* he is very excited over the latest preliminary results from the second year of the program.

"It is certainly very encouraging that the snow signature from cloud seeding appears to be up to 25 per cent," he said.

Mr Macdonald said he hopes the program proves successful in helping to offset the impact that global warming is having on the unique alpine environment of the Snowy Mountains.

"Snowfalls in the region have been decreasing an average of one per cent per year for the past fifty years," he said.

"This trend is having a very real impact on the Snowy region, especially the animal and plant species that depend on consistent snow cover for survival."

He said if at least 10 per cent more snow per season could be realised in the targeted areas this would send the equivalent of 70,000 Olympic sized swimming pools down the Murray River once the snow melted in the spring, and would also help improve local water storages which in recent years had been at critically low levels.

State Government approved the cloud seeding trial last year, after Snowy Hydro proposed testing up to 20 weather conditions annually over the six year, \$5 million per year program.

At the time Snowy Hydro said it hoped to generate 10 per cent more snowfall, which would typically increase the depth by about 15 cm and extend the season by three to four days, as well as providing another 70 gegalitres of water run-off for electricity generation and irrigation.

It indicated that this would also replenish its power generation capacity by around 3%.

Because of the science associated with the trial, only one in three suitable winter storm cloud events is subjected to cloud seeding so as to clearly identify just what happening downwind as a result of the seeding in terms of specific snowfall.

Equipment involved in the trials includes weather balloons and radar, used to help gauge the direction, speed and collective temperatures and moisture in clouds being targeted.

The project has been targeting a 1000 sq km area in the Kosciuszko National Park, above the 1400m elevation but excludes the Jagungal Wilderness area (which also cuts out the Tumut catchment to the north).

New legislation or a complete environment assessment will be required at the end of 2009 if cloud seeding activity is to continue after the current six year program, as Snowy Hydro now hopes given results have more than doubled initial predictions.