Cultivating Research in BC
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Thank you, Minister Chong.

Premier Campbell, distinguished colleagues.

Thank you all for this opportunity to be with you again. It‘s an honour and a pleasure. While we’re celebrating excellence in BC research and innovation today, I want to talk about the business of cultivating that excellence. And one word keeps rattling around in my mind:

It’s “fertilizer.”

I don’t want to talk of “fertilizer” as simply a code word for money. And I certainly don’t want you to think of fertilizer as a polite word for stuff people spread around when they don’t care about the truth.

No, I want to talk about fertilizer because of a headline that I read in the Vancouver Sun last week. It read **“Fertilizers boost declining BC fish populations”**

The fertilizer in question is one that was developed out of research conducted at the University of British Columbia, and one that has been commercialized and is being sold worldwide by the Vancouver-based firm Ostara Nutrient Recovery Technologies.

The research that led to this fertilizer didn't come from marine biology or environmental science. It is the result of work by a civil engineer, Professor Dan Mavinic. Dr. Mavinic wasn't trying to develop a fertilizer for fish; he started out looking for a way to prevent sewer pipes from clogging up.

You see, phosphate from our household detergents and other sources creates a sludge that clogs up water treatment pipes and plants. Phosphate is not just a nuisance, of course, it contains phosphorus: an essential component of fertilizer. Together with nitrogen, phosphorus promotes plant growth.

When too much phosphorus leaves our pipes and enters the ocean, it can disrupt the marine food chain so much that oxygen-starved "dead zones" develop, such as a large one in the Gulf of Mexico where fish cannot live. However, when it stays in our pipes it wreaks havoc on our public sewer system and eventually becomes an expensive problem.

Dr. Mavinic's solution enables municipal water treatment plants to run more efficiently and pipes to flow more freely, not by flushing the phosphorus into the ocean, but by harvesting it and processing it into a remarkably pure and highly useful slow-release fertilizer. According to the Ministry of Natural Resource Operations, this slow-release fertilizer is proving to be the best method yet for turning endangered streams into "live zones" that help replenish our threatened salmon and steelhead populations.

Here is a single application of research that solves a costly civil engineering problem, helps prevent one serious environmental condition *and* offers remediation of another. That's quite the fertilizer.

How do you create the kind of conditions that foster discoveries like this, that enable unexpected connections, and that offer real economic, social and environmental benefits? Here again, the word "fertilizer" suggests itself. The remarkable 18th Century British playwright and politician Richard Brinsley Sheridan famously said "Fertilizer does no good in a heap, but a little spread around works miracles all over."

Research and innovation in British Columbia has been working miracles all over. I wish I had time to specifically celebrate all the research that is

coming out of UBC, UVic, Simon Fraser, UNBC and associated research facilities in our province. I suspect that Drs. Reynolds and Golnaraghi will be able to speak to some of them. There's a huge amount going on, and it hasn't happened by chance.

Mr. Premier, you and your government have been instrumental in tirelessly fostering the conditions that *allow* all this to happen. You have invested steadily in the research agenda in our province, and each and every day we are seeing and experiencing the positive return on that investment.

Rather than talk about the number of metaphorical "miracles" resulting from research across British Columbia, let me give you a sense of their combined magnitude and economic impact. Last year I commissioned a study to measure and understand UBC's contribution to the economy of our province. That research revealed that UBC's core activities are responsible for more than $10 billion dollars annually – which is about 5% of the provincial economy. Delving further, we learned that the largest portion, fully half of that total contribution, comes from "new knowledge and knowledge transfer." Translation: basic research and research applied to practical purposes. From just one of our four major

research-intensive universities, $5 billion dollars is added to the economy each year through research and innovation.

Now consider all four of our research-intensive public universities - The Research Universities' Council of British Columbia calculates the total economic contribution from all forms of research at UVic, SFU, UNBC and UBC is just over $ 7 billion dollars. I think it is more than fair to say that research is one of the most important drivers of our economy. One that abundantly rewards the investment put into it. But how can we further maximize this return on investment? This is the question and our challenge moving forward

I like to think of innovation as taking place within a *research ecosystem*. To explain, let's look again at Ostara's fertilizer.

In efforts to rebuild depleted salmon and steelhead populations, Ostara's slow release fertilizer is being applied at two particular times in the year, in some 15 watersheds and 28 rivers across BC. The fertilizer is not fed to the fish; it's fed to the streams, with the specific intent of promoting the growth of algae. Algae provide food and habitat for insects; and the insects in turn feed and nourish salmon hatchlings and

small fry. The larger those juvenile fish are before they leave for the sea, the better the chances they will survive and return to spawn.

The solution is a very elegant strategy for returning a stream to its natural state and helping the inhabitants of that stream to thrive. The ecosystem is highly interdependent, with each species sensitively linked to the others.

To cultivate the fish you have to look at the whole stream. With research it's the same (although when we extend the analogy, we generally don't refer to our research results as "spawning," ourselves as "small fry" and the fruit of our research "algae").

To flourish, our research ecosystem must be capable of attracting and supporting the very best minds on the planet. We need to provide them with the resources and conditions to *keep them here* and to enable them to mature and do their best work. Further still, we need to provide ways to incubate discoveries – grow them into practical ideas, products and enterprises that truly change the game and change the world for the better.

Certainly, to do this, we need to attract the "big fish." After all, top talent is a finite resource in a competitive global marketplace. However, to truly succeed we need to carefully tend to the entire *system*. Talent needs a habitat rich with complementary talent. Our star researchers need brilliant graduate students, accomplished post-docs and superb junior faculty.

At the University of Northern British Columbia, Dr. Laurie Chan became, in 2006, the BC Leadership Chair in Aboriginal Environmental Health, with a $4.5 million dollar endowment through LEEF BC. Dr. Chan came here via Hong Kong and London. He's a big fish. He currently supervises 2 post-doctoral fellows and 7 graduate students. Those associates of his are essential to his work, and the inspiration and support they receive working with him gives them the opportunity to mature and grow. The value and impact of their combined research has the potential to expand exponentially over many generations to benefit BC and all of Canada.

The big fish need the right habitat if we are to retain them and if they are to thrive. They need great facilities that enable great minds to do great work. TRIUMF, Neptune, The Pacific Institute for Climate Solutions, The Centre for Addictions Research, The Pacific Center for

Advanced Materials and Microstructures, the Brain Research Centre.…these and many other important facilities receive significant support from the Province and allow our researchers to focus on their work, not on their surroundings.

It is vitally important that all of these essential research facilities not only exist, but that the entire infrastructure of research receives long term, stable operating funds. Dependable and reliable support allows risk-taking and creativity. This kind of funding isn't flashy, but it is absolutely essential. Think of it as the slow-release fertilizer that enables the entire ecosystem of research to prosper. Mr. Premier, you get it. You have always thought in the long term, not just in short-term political calculations.

We also need to guarantee an atmosphere of creativity and inquiry. This is the air of academic freedom that research-intensive universities uniquely provide. More often than not the next important discovery comes from somewhere we couldn't predict – like a clogged, balky municipal water line, as in the case of Ostara. Businesses might find it hard to afford open-ended freedom in research, but working together with universities and government, we can ensure that critical type of research takes place.

In an ecosystem of discovery, we need to harvest innovations. Here again government, business and academia need to work together in order to bridge the gap between the breakthrough idea and its commercial implementation.

In British Columbia, the Centre for Drug Research and Development is a wonderful example of how these kinds of collaboration can succeed. The province invested $25 million dollars to help launch the CDRD. It is independent, non-profit organization with a network of affiliations to eight research institutions across British Columbia including UBC, UVic, SFU and UNBC. CDRD's technical and commercial drug-development expertise and facilities are improving the odds of turning scientific discoveries into marketable treatments for diseases such as bladder cancer, colorectal cancer, Huntington's disease and diabetes.

The CDRD is skillfully fertilizing a healthy pharmaceutical sector in BC. Just think of the other sectors that could benefit from this kind of care and cultivation.

Before I close, let me add one more element to our research ecosystem. As we pursue research at a level equal to or better than anywhere else on earth, we also need to ensure that our children are

able to participate in and benefit from this pursuit. We need to enrich students' natural curiosity and transform it into a genuine passion for inquiry, helping them develop both the rigor and imagination that characterize great researchers.

Premier Campbell, your government's proclamation of the Year of Science for this 2010-2011 school year is a wonderful step in encouraging curiosity and interest in science. If we as a province are to fully benefit from our research, we need not only to attract top talent, we also need to grow it right here. This is a responsibility that I feel acutely as a university President, but we know that the job doesn't start with secondary education. It starts with pre-school.

This is a critical time for us, and there is real opportunity for BC to broaden our reach internationally. Both the US and British public higher education systems are struggling with budget challenges, which means some top-level talent in those markets might be ready for the catch. But at the same time, others are also angling for the big fish, including our own, home-grown ones. We are experiencing competition for talent like never before, from the rapidly developing education system in China and a robust cluster of well-established private universities in the US.

There's an old saying, paraphrased from Pliny: "the farmer's eye is the best fertilizer." As we celebrate the health and harvest of our research ecosystem here in British Columbia, let us keep our eyes on the whole *and* on its many interdependent parts. Let us also continue working together to attend to the *whole* ecosystem. More than anything, let us be ever watchful for new opportunities, so that we may further fertilize and cultivate, in British Columbia, the world's most attractive, most robust environment for research and the innovations that flow freely from it.

Thank you.