

The Port Phillip Bay Study

The Port Phillip Bay Environmental Study was a \$12 million project that ran over 4 years. The Study, begun in 1992, investigated Port Phillip Bay's ecology, physical processes, and nutrient and toxicant levels. It identified the sources, concentrations and dispersal of pollutants in the Bay. Importantly, it identified the critical nutrient load which the Bay can tolerate.

Port Phillip Bay is one of Australia's most important bodies of water. It is the entrance to Australia's busiest port, and has over 3.2 million people living around its shores. CSIRO designed and managed the Study, which involved over 40 research tasks, investigating the complex and numerous factors involved in managing the Bay. Water quality was linked to inputs from land activities, such as nutrients from sewage and industrial plants, run-off from agricultural land, and surface run offs from cities. These inputs are then mixed or blown into the ocean, or may settle in bottom sediments. Understanding the interactions between these processes is crucial to managing the Bay.

The project saw CSIRO scientists undertake original research and push the boundaries of environmental modelling, to provide decision makers unprecedented predictive power over the impact of future development around the Bay.

Port Phillip Bay Environmental Study: strategic science enables planners to make environmental predictions

The Port Phillip Bay Environmental Study had to contend with a continually changing commercial environment, as its key business stakeholders were subjected to the turbulent vicissitudes of privatisation, outsourcing and corporate streamlining.

The Study set out to determine how best to manage the Bay in the long-term. In the end, CSIRO scientists presented the client, the Melbourne Water Corporation, with a fairly simple and very practical answer which the whole community could understand. However, finding this simple answer involved a lot of leading edge science, some complicated politics, and a degree of brinkmanship in managing contractual relationships with both client and sub-contractors.

The Study was completed under-budget and on-time. Its findings and recommendations have already been incorporated into Victorian environmental protection policies, while the computer models developed by the project are helping Melbourne Water plan for infrastructure developments. The models help predict the impact of changes on the Bay's ecology, such as the effects of an increase or decrease in the amount of sewage present.

The CSIRO team also had to contend with some concerns from commercial environmental consultants about a public sector agency moving into their market and undercutting them. But ultimately the Study confirmed a clear niche for CSIRO as an environmental consultant because it can deliver a strategic scientific capability that the private sector does not, and is unlikely ever, to supply. It does not have to compete with private consultants; instead, it works with them to provide an enhanced level of service or an enhanced product.

Project origins

In 1991, the then Metropolitan Melbourne Board of Works (MMBW) approached CSIRO for advice on the sustainable management of Port Phillip Bay, the entrance to Australia's busiest port, and which has over 3.2 million people living around its shores. The main concern was that, with the amount of human activity in and around the Bay, how could authorities maintain water quality and the health of the Bay's ecosystem?

According to Dr Graham Harris, Program Director of the Study and now Chief of the Division of Land and Water, CSIRO was approached for its reputation as an expert, unbiased and fearless arbiter of good environmental outcomes.

This didn't mean that CSIRO was the right organisation to actually manage the job. But as a team of CSIRO scientists, led by Dr Chris Crossland, who preceded Dr Harris as Director of the project, began to work through the issues, they saw the opportunity to do something really special. "Approached from a strategic scientific perspective, the Study could push out the boundaries of scientific modelling of a complex environment," explains Dr Harris. "So, CSIRO made a full bid to run the Study. And we promised to deliver what no commercial consultant could. We said that we would predict what was the critical nutrient load of the Bay, beyond which the Bay's ecosystem will fall over," said Dr Harris.

However, it was a risk making such a prediction. The CSIRO team, at the start of the project, did not precisely know how to do it.

"It was a calculated risk. We knew that delivering the outcome would take us to the cutting edge of environmental science, and CSIRO has always been comfortable with that. We knew that to arrive at such a prediction, we had to couple an ecosystem model to a physical model of the Bay. There were available models of the Bay's physical characteristics, including tides and winds, but developing a model of the ecosystem was the real challenge."

The team also took a risk unprecedented in CSIRO, when it accepted the job with an upper limit in the consultancy fee. Upper limits in fees make project proposals very attractive to clients as they limit the client's financial risk.

At the beginning of the Study, the price tag was set at \$12 million, a full commercial rate which did not undercut private consultants. Harris: "This was important as there was a great deal of suspicion from private consultants about CSIRO's motives. Many thought that we'd undercut the private sector by subsidising the job from our

appropriation funds and that, we were only doing this and other consultancies to meet our external earnings targets. Internally as well, some people who didn't understand the project queried why we'd take it on. So we had to have a strong case both scientifically and financially.”

Privatisation: people changed but project plan and goals didn't

CSIRO was awarded the Study, but soon afterwards massive changes hit the Victorian public sector following the election of the Kennett Government. The Study was conducted amid the backdrop of the privatisation of Victoria's water services and the streamlining of the State's public sector. During the four-year Study, the Metropolitan Melbourne Board of Works (MMBW), the main sponsor, was privatised and became the Melbourne Water Corporation.

The other agencies involved were Melbourne Parks and Waterways, who also contributed to the funding of the Study, the EPA, the Department of Conservation and Natural Resources, and the Port of Melbourne Authority. These bodies either merged or changed briefs, so that the representatives to the Management Committee overseeing the Study were constantly changing.

Dr Harris adopted a two-pronged strategy to deal with the disruptions. The first was goal-alignment – to foster a clear understanding of the Study's aims and get a clear agreement on the expected outcomes, no matter who were sitting on the Committee.

“If we wanted to achieve the project aims, we had to make sure that everyone in the Management Committee agreed with the goals and that they understood what needed to be done to achieve those goals. We got this agreement at the start of the project and everyone in the Committee gave all-out support to the Study,” he said.

But the constantly changing roles of the agencies involved, and the changes in the composition of the Management Committee, meant that this alignment had to be constantly re-established. The team did this by giving thorough briefings to the new members, and occasionally refreshing the awareness of the goals with longer serving members. Dr Harris and Mr Brian Newell, the Melbourne-based Project Manager, gave briefings whenever a new Committee member came in, and spent a lot of time ensuring that everyone was on-side with the project.

For example, when Dr Harris heard murmurings that the newly privatised Melbourne Water Corporation was having doubts about the project's funding, he immediately approached John Morgan, Melbourne Water's first Chief Executive Officer.

Dr Harris: “I understood that the funding would no longer come from taxpayers' money; Melbourne Water now had to raise it from commercial sources. It understandably had to be more circumspect in funding projects such as this. So I walked into his office one day and said: ‘I'm the one spending the money you're paying, I think you should know what you're spending for and what it can do for your bottom line.’ Our conversation persuaded him of the commercial merit of the Study, and that led to a series of briefings for other key staff of Melbourne Water.”

The lynchpin that held Dr Harris' two-pronged strategy together was the comprehensive plan drawn before the Study began. The 'blue document,' as it was known, was prepared by Dr Crossland and a multi-disciplinary CSIRO Technical Group. The plan was the result of extensive consultations with the client. "Crossland and the Technical Group talked with the client to tease out what it wanted and needed, analysed the results of those talks, and came up with a very well-defined study plan. They did an absolutely good job. During the course of the Study, we didn't need to change the plan in any major way. We did some fine-tuning and re-directing when major new scientific findings emerged, but the scope, timelines and budget stayed essentially intact."

The technical group: continuity and integration amid change

The Technical Group was critical to co-ordinating CSIRO's oversight of the project. It brought together the expertise of a number of Divisions spanning expertise as diverse as physical oceanography and through to marine biology, microbial ecology and toxicology. The interaction of its members created the 'big picture' of the Bay environment.

Importantly, the Technical Group served as a central control group, which synthesised the more than 40 research tasks into an integrated Study. But CSIRO didn't try to do all the work itself. "We focused on the areas where we could add unique value – where we were pushing the boundaries of science, such as in determining a critical nutrient load," said Dr Harris. We sub-contracted most of the work to consultants and contractors. This was important because we were sensitive about charges of taking work from the private sector in fields that really didn't use CSIRO's strategic capabilities. And after all, that's not what CSIRO's here for, even if we do have a 30% external target to meet," he said.

The Group was responsible for writing consultants' briefs, tendering and managing contracts, and ensuring that all consultants delivered the contracted work on time. Members regularly sat down with the scientists from each consultant to review progressive findings.

Dr Harris, who also chaired the Technical Group, said the members met every 6-8 weeks, each time for three days. The first two days were spent with contractors to determine the status of the scientific tasks. On the third day, the Group analysed the results of these consultations, and synthesised all findings into an overall view of the Study. Timelines budgets and project milestones were also reviewed on the third day. This overview was then taken by Dr Harris to the quarterly meetings of the Management Committee.

Having been involved in drawing up the blueprint for the Study, the Technical Group also played a critical role in providing continuity amid the changes. Unlike the Management Committee, it stayed reasonably constant and this provided much needed stability and continuity given the disruptions going on in the clients' organisations. But they weren't immune from change: CSIRO itself went through a major re-structuring during the Study period. The organisation was streamlined,

resulting in several mergers between Divisions. The members remained in the Group, even if they had changed Divisions, or in one case, even retired!

Dr Harris: “The Group got to know each other extremely well and there were no major falling outs despite some very trying times. The cohesion and camaraderie allowed us to maintain a sense of humour during some difficult problems with relationships with both client and consultants.”

The Group’s crucial role in keeping the Study together and in delivering excellent scientific results has been recognised when it was awarded the 1996 CSIRO Chairman’s Medal. It now also serves as a core team which CSIRO can use to put bids together quickly, whenever private companies approach the organisation about environmental consulting work.

One person that also helped provide continuity was Professor Nancy Millis, now Emeritus Professor at the Melbourne University. She was a board member of the old MMBW and continued in the position when it became the Melbourne Water. During the Study, she chaired the Scientific Review Committee, which advised the Management Committee on the research aspects of the project. She also sat at meetings of the Technical Group, providing a critical link between the commercial and the scientific aspects of the Study.

Managing client and contractor relationships

The Technical Group became the main vehicle for managing the relationship with both client and contractors, but before becoming so, the members went through some fundamental changes in their view of research partnerships.

Dr Harris: “Since the Study was on total external funding, the Group, including myself, went through a major cultural change, in terms of commercial responsiveness and being able to work in a more commercial environment. That meant listening to the clients’ needs, delivering what they want and when they want it, and paying contractors on time. We learned all facets of commercial dealings, from defining tender briefs, letting contracts, legal agreements, and even dispute resolution on legal agreements.”

“Managing contractors and consultants was especially challenging. The importance of a clear tender brief with adequately articulated performance measures and expected deliverables cannot be overstated. And you need to work closely with your contractor or consultant. That way you can see difficulties coming up and start to take corrective action,” he said.

Among the key lessons learned was how to prepare management reports, complete with GANT charts, to indicate whether the project was within, over- or under-budget. During the early stages of the Study, the Management Committee wanted a fairly hands-on role in the direction of the research tasks. And as in most research partnerships, there were some early differences between CSIRO and the Committee on how some tasks were to be done.

“However, as we learned how to produce detailed management reports, we gradually gained the Committee’s confidence. The partnership and collaboration grew stronger over time, and the client became quite happy to leave us in complete charge,” Dr Harris said.

Preparing management reports dovetailed perfectly with the Technical Group’s role in providing a scientific overview of the project. By presenting both management and scientific reports, everyone involved in the Study was up-to-speed and had the same level of understanding of the project.

Its role in integrating the numerous parts of the Study also helped the Technical Group identify weaknesses in the work of some contractors. And because the Group is backed by CSIRO’s own research capability, it was also able to fill those gaps and weaknesses.

Cutting-edge science pays off

A major outcome which the Study has delivered is an ecosystem model now considered one of the world’s best. The information from the Study has been placed in a permanent data base to assist authorities responsible for managing the Bay. Computer models have also been developed which authorities can use for ‘what if’ analyses, allowing scientists to predict outcomes of different environmental inputs and factors.

This will play a key role in future planning of development around the Bay, to ensure that one of Australia’s most important bodies of water continues to meet the economic, environmental, leisure and lifestyle needs of the people who live close to its shores.

Dr Harris also credits the leading edge science that emerged for delivering the Study under-budget by \$500,000. Compared to the benefits that will accrue from the Study, the \$500,000 saving isn’t that significant. But for the client, keeping within budget is absolutely essential.

Dr Harris sees a continuing role for CSIRO in such consultancies. “People see us as the third agent in the nexus between a private company and the regulator. We work with a commercial entity such as Melbourne Water who wants to optimise the return on its expenditure on environmental protection measures. At the same time, we deal with regulators like the Environmental Protection Authority, who sometimes may have expectations way above what can be delivered by available technology. CSIRO has such a reputation that it can wade into the debate and tell a client company it’s not tackling a problem the right way, while at the same time discuss state-of-the-art technology with the regulators, and what can be reasonably expected from it.”