CHAPTER 3: THE ENVIRONMENTAL MERITS AND TECHNICAL FEASIBILITY

Basic criteria that must be able to be satisfied before the proposal proceeds

3.1 Before the Lake Pedder proposal, with its uncertain and potentially far reaching consequences, could be considered seriously there needs to be widespread consensus on two fundamental issues, namely that the original lake is worth restoring and that it is technically feasible to do so.

Intrinsic value of the original Lake Pedder

3.2 In his evidence to the Committee in Hobart in February 1995 Dr Kevin Kiernan, a geomorphologist who prepared three reports for the Lake Pedder Study Group, said that the complex of landforms which constituted the original lake was 'very extraordinary' and that he believed it to be 'without parallel anywhere'. Based on his studies of glaciated areas of New Zealand and Patagonia, the only other places in the world where one would expect to find a parallel, he put forward the view that:

> There is nothing there that even remotely approaches Lake Pedder in terms of morphology and genesis... it is a very, very special feature on a world scale, and looking at any of the criteria that are normally adopted to assess geoconservation significance ... suggests to me that it would have to be of most extraordinary high priority. [1]

3.3 Dr Kiernan concluded in one of his reports, *The Geoconservation Significance of Lake Pedder and its Contribution to Geodiversity*, that 'Lake Pedder is a place of immense geoconservation significance that on the basis of its geomorphological values alone would seem easily to meet the criteria for inclusion on the list of the World's Natural and Cultural Heritage.' Dr Kiernan's evidence suggests that Lake Pedder has values that are worth restoring if it is feasible to do so.

3.4 The unique beauty of the former lake was commented on by many people who made submissions to the inquiry, some of whom made available to the Committee books, photographs and copies of artwork recording the scenic beauty. As Dr Mosley stated in *Why Lake Pedder Should Be Restored*:

> Some natural places are quickly recognised as special, not just to a few individuals, but to all who have had the good fortune to experience them. Undoubtedly, Lake Pedder was such a place, and in their minds and hearts the lake has not gone beyond recall.[2]

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1 Evidence p 31.

2 Mosley, G, *Why Lake Pedder Should Be Restored.*

3.5 Speaking for the Wilderness Society at the public hearing in Hobart in April 1995, Mr Chris Harris expressed the opinion that the value of the lake was appreciated by people who had never visited it:

> I believe all the evidence and statistics show that a large part of the population support the preservation of areas which they may have no intention of ever visiting because they recognise the importance to humans of doing that. I really do not think it is at all a relevant argument to be asking how many people are going to visit these areas.[3]

3.6 This view was reinforced by an anecdote in a submission to the inquiry by Professor David Shearman, Professor of Medicine in Adelaide, who remarked that the most common picture in the Royal Adelaide Hospital, where pictures are chosen democratically by staff to improve the working environment, is a 'stunning photograph of Lake Pedder before it was destroyed'. He said that:

> I find this an interesting choice for South Australians since the majority has not visited Tasmania and indeed very few have ever seen Lake Pedder. I enquired into the reasons for the choice. I can tell you that after 20 years our Hospital community is still grieving for Lake Pedder.[4]

3.7 Senator John Devereux, Senator for Tasmania, also gave evidence in Hobart in April and observed that he found it interesting that:

> '... almost everyone who is opposing the draining of the lake seems to preface their remarks by saying, 'If I had my time over again, I would not have supported the drowning of the original Lake Pedder.'[5]

3.8 Both the flooding of the lake and the proposal to drain it have raised considerable international comment. Ms Christine Milne, MHA, of the Tasmanian Greens commented at the April hearing that:

> Lake Pedder is really the birthplace of the green movement internationally - not just in Australia, but right around the world. The United Tasmania Group, which came out of the campaign to save Lake Pedder, was the world's first green party, pre-dating the German Greens and the other green parties around the world. ... In terms of a symbol to the world, it is the birthplace of the green political movement internationally... I would certainly like to see it restored as a symbol of hope to future generations that we have the capacity within ourselves to rectify the mistakes, where we can rectify them, and to take a lead in the global context in that way.[6]

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3 Evidence p 248.

4 Professor David Shearman, Submission p 1.

5 Evidence p 421.

6 Evidence p 270.

3.9 According to Dr Mosley in a recent management study for Pedder 2000, the value that was placed on Lake Pedder was demonstrated most effectively at the time it was threatened, with over 1000 people visiting the famous beach on one long weekend in March 1971, just before inundation began. He added that:

> ... a 10,000 signature petition for the saving of Lake Pedder produced within a month of the scheme being made public was said to be the largest ever presented to the Tasmanian Parliament. ... The decision of the Commonwealth Government of 1973 to conduct the Lake Pedder Enquiry provided people with another opportunity to attest to its values. Those making personal submissions included the landscape painters Max Angus, Patricia Giles and Elspeth Vaughan and the photographer Geoff Parr.[7]

3.10 Dr Mosley observed that a steady stream of books with a major emphasis on Lake Pedder was produced in the two decades after the flooding.

3.11 The launch of the Pedder 2000 campaign in 1994 attracted support from a number of internationally well-known individuals and organisations. A letter from the David Suzuki Foundation strongly supporting the proposal was read to the Committee by Ms Hilary Edward of Pedder 2000 who commented that it was typical of the many letters they had received.[8] It would appear to the Committee that there is little doubt that Lake Pedder was widely regarded as a special place that should not have been flooded. Whether the potential cost and complications make it now worth restoring, is a vexed question.

Feasibility of restoring the essential features

3.12 The other essential criterion which must be addressed is the feasibility of the proposal. Professor Peter Tyler and colleagues of the School of Aquatic Science and Natural Resources Management, Deakin University and the University of Tasmania considered this question for the Lake Pedder Study Group. In a forthcoming paper they state that:

> ... a cardinal requirement for the proposal to have credence is that the old lake survived inundation more or less intact and that, if the reservoir were drained, the physical features of the old lake would emerge for restoration. [9]

3.13 To provide a framework for his investigations Professor Tyler established four obligatory criteria for validation of restoration, namely:

. that the lake would be contained, ie the eastern dunes and other lake rims would be intact;

. that the original drainage patterns would re-establish, demonstrated by the integrity of original major channels such as Maria Creek and the Serpentine River;

. that the original lake morphometry (eastern beach, beach step and ripples) remained; and

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7 Mosley G, *Lake Pedder: A Report on the Future Management of the Area Proposed for Restoration*, a study commissioned by the Lake Pedder Study Group, March 1994 pp 19-20.

8 Evidence p 300.

9 Peter A Tyler et al *Limnological and Geomorphological Considerations Underlying Pedder 2000 - The Campaign to Restore Lake Pedder*, submitted to "Archiv Fur Hydrobiologie", Stuttgart, 27 March 1995.

. that the lake bed was not buried beneath metres of 'silt' and that reoccupation of the basin was probable.

3.14 Other objectives of his survey, desirable criteria as opposed to essential criteria, included the finding of 'Pedder pennies' (ferromanganese concretions), evidence of the texture and integrity of surrounding peats and an assessment of the precision of his methods on a specially selected small creek influx.

3.15 The restoration proposal became a credible proposition and began to gain momentum when Professor Tyler's work found that the key geomorphological features were intact and would most likely re-emerge if the lake was drained. The prospects for the re-emergence of the significant geomorphological features were crucial to the feasibility of the proposal, but consideration also had to be given to the re-establishment of the vegetation and the fauna. The criteria for assessing the feasibility of biological restoration of the 24,000 hectares of inundated plains surrounding the former lake were not so easy to define. Opinions varied widely, both on the similarity a rehabilitated site would have to the original and on what constituted the original. Studies of flora and flora endemic to the Lake Pedder area showed that some irreversible changes to the biological communities have occurred with the probable extinction of several species including the fish *Galaxia parvus*, some crustaceans and insects.

3.16 Full restoration of the pre-flooding situation was therefore an unrealistic objective but was not a requirement for the proposal to be justifiable. Mr David Steane, a Tasmanian landcare specialist with experience in rehabilitation projects on damaged sites in the Strathgordon area, prepared a brief technical note for the HEC on the possibility of restoring the sand dunes at Lake Pedder. He also made a submission to the Committee and explained at a public hearing that the pattern and composition of the plant and animal communities of any area vary greatly with time and are very much a matter of accident:

> There was nothing magic or fixed about the pattern of vegetation of the now flooded area as it was in December 1971. The pattern of distribution of button grass, heath land, scrub and taller forest at that time is largely the result of the accidental occurrence of fires over the preceding decades or centuries, together with the accidental history of climatic or seasonal variations, especially of things such as severe climatic occurrences following severe fires.[10]

3.17 Mr Steane went on to propose that in discussing restoration it was preferable not to get caught up in the fine details of what may or may not have been the composition and condition of the vegetation immediately prior to flooding in 1971.[11] This view in some ways reflected the claim of Pedder 2000 that revegetation should follow naturally as the underlying geomorphological processes re-establish, and that there was no great urgency in re-establishing the plant communities nor any particular pattern of vegetation which should be reinstated. The principle of plant succession, mentioned by various expert witnesses, would appear to the proponents of the proposal at least, to be the acceptable and natural method of revegetation. This would include monitoring of progress, and intervention where required, to deal with problems that might arise, such as erosion and weed invasion.

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10 Evidence p 409.

11 Evidence p 410.

3.18 Throughout the inquiry comment on the biological implications of draining the lake and exposing a large area of drained terrain was characterised by a great deal of confusion about the difference between restoration and rehabilitation. The authors of a Feasibility Study for the HEC gave a useful definition and explanation of the difference between the two:

> In the context of this report, it is important to distinguish between the act of restoration and that of rehabilitation. Restoration is the act of restoring the disturbance or damage to the original condition. Rehabilitation is defined as the act of rehabilitating to a useful state, and not necessarily to the original land use.
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> In the profession of land rehabilitation which has developed over the last 30 or so years both within Australia and overseas, the term rehabilitation has been adopted as it is not seen as possible within a reasonable time frame to establish the original conditions, particularly in pristine environments.[12]

3.19 Given such a definition it may have been more accurate to describe the proposal as the restoration (or uncovering) of Lake Pedder and the rehabilitation of the surrounding terrain. To Pedder 2000, restoring the aesthetic and wilderness values of the area is not dependent on exact restoration of the original flora and fauna, and massive human intervention designed to attempt such an impossibility would be unjustified, expensive and unacceptably damaging to adjacent wilderness areas.

3.20 The polarity of professional opinion about the basic criteria to be determined in re-establishing a satisfactory vegetative cover serves to highlight the need for further site-based scientific investigation if the proposal were to proceed.

Geomorphological and biophysical considerations

3.21 The studies undertaken by Professor Tyler and his colleagues, and by Dr Kiernan, form the core of evidence about the status of the submerged landscape. Both studies were commissioned by the Lake Pedder Study Group in the knowledge that a firm scientific basis was required before the proposal to restore the lake could be considered seriously or raised publicly.

3.22 Professor Tyler explained to the Committee[13] that in addition to his recent work at Lake Pedder he and a team of other scientists had made some studies of the former lake in the months before inundation. Some of the scientific activity was recorded on film and biological samples were retrieved for later study. The results of Professor Tyler's 1993 survey were compared to the earlier data and the limited amount of other information available for Lake Pedder, the Lake Maria complex and their catchments before inundation. This revealed that the major geomorphological features of the original system escaped damage

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12 *The Restoration of Lake Pedder: A Preliminary Feasibility Study*, Land Management and Rehabilitation Services Pty Ltd, p2

13 Exhibit 18.

during the rapid filling of the Huon-Serpentine Impoundment. Professor Tyler's summary of findings included:

. the original principal drainage channels are largely intact, as are the bed, beaches and dune systems.

. sediment covering the original lake bed is no more than a few millimetres thick and 'Pedder pennies' are abundant in the northern part of the lake.

. decomposition of original vegetation covering the surrounding swamps and plains is incomplete and the underlying soil is bound by root systems.

3.23 Professor Tyler attributed the lack of damage partly to the rapidity of the flooding. He noted that wind-driven wave action has clearly scarred parts of the shore line of the present impoundment, but rapid submersion ensured that the vital features did not suffer much erosion damage during inundation.

3.24 The drainage patterns of the Serpentine Valley appear to have been kept open by denser, cold water, particularly melting snow, running into the impoundment along original creek beds. The acidic waters of the impoundment have retarded the rate of decomposition of plant material with the result that trees and shrubs are still standing on the dunes and immediately recognisable remains of original flora lie on the bed of the impoundment.

3.25 Dr Kiernan concluded in volume 3 of his reports to the Lake Pedder Study Group that although the investigations of Professor Tyler and his colleagues were not exhaustive, their results were entirely consistent with what could be predicted on the basis of first principles, the landforms types involved, the materials present, the processes in action, observations made as the dams filled, and evidence gathered from around the impoundment margins since that time.

3.26 Dr Kiernan also informed the Committee[14] that a distinction had to be made between two sets of landforms now submerged, the fossil landforms caused by glacial action which cannot be repeated and which can not regenerate if damaged, and contemporary landforms which are formed by ongoing processes and which can regenerate. Very little damage has occurred to fossil landforms at Lake Pedder and most important contemporary landforms such as the beach, the megaripples and the river and creek channels are undamaged and would in any case be regenerated by natural processes.

3.27 The implications of these findings for the restoration proposal were critical since without evidence that the landforms were intact and would function again as a dynamic and integrated landscape there was little point in investigating further. In an inquiry characterised by widely differing and often unsubstantiated claims, the scientific studies which led to Professor Tyler's claim that the lake and associated landforms remained intact and recoverable were not seriously disputed.

3.28 While accepting that the major land forms are probably intact the HEC referred to evidence that showed that the dunes of Lake Pedder and Lake Maria suffered considerable damage during the flooding process. The HEC suggested that the dunes could be expected to suffer further severe problems during dewatering due to either slumping or wave damage,

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14 Evidence p 32.

depending on whether the water level were lowered rapidly or slowly. The HEC's consulting marine engineer, Mr Michael Hunn, recommended that further work be undertaken to determine the properties of the beach and dune sands, that model testing be undertaken to determine the stability of the sand in a saturated condition and the effects of dewatering, as well as measurement of existing dune profiles.[15]

3.29 A rather different view of the fate of the dunes during the dewatering process was suggested by Dr Kiernan, who witnessed the slumping in 1972, photographs of which the HEC provided in its feasibility study. His recent observations led him to conclude that the Lake Pedder lunette was not an ancient feature, but was one of the contemporary geological processes that would re-establish. Under natural conditions it was being constantly eroded on its windward western margin by lake water in the winter, and it appears to have been migrating eastward. Pre-flooding photographs consistently showed evidence of windward-slope erosion and the collapse of vegetation from the dune onto the beach. Dr Kiernan claimed that the presence of the peat cover over the dunes would help to retain the form of the dunes during draining as well as serve as a growth medium for revegetation of the area. The same aeolian processes that originally produced the dune would restore the form of its slightly eroded western face over one or two summers of exposure.[16]

Biological implications

3.30 The general consensus among those who have investigated the plant and animal communities of the original Lake Pedder is that the original biology of the lake and its surroundings would not be fully recoverable. This opinion was expressed at a symposium on the natural history and restoration of Lake Pedder in Hobart in April 1995 and included in a summary of the symposium proceedings sent to the Committee by the convenor, Dr Chris Sharples.[17] The summary noted that:

. it is possible that it would take a considerable period for the botanical successional process to return the vegetation communities to something like those which were present before the flooding, and that initial plant colonisation would be by species able to adapt to the bare substrate; and

. some species have disappeared from the area and may be extinct or severely threatened by competition from introduced species in the new impoundment. Exotic species may not be removable.

3.31 Before any restoration regime for the 24 000 hectares surrounding the former lake could be developed and assessed, agreement would have to be reached on what was considered to be the 'natural' condition of the vegetation and what would constitute an acceptable composition of species. Consideration would also have to be given to what constituted 'restoration' and what was 'rehabilitation', and a decision then made on which

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15 *The Restoration of Lake Pedder: A Preliminary Feasibility Study*, Land Management and Rehabilitation Services Pty Ltd, Appendix B, p 3.

16 Kevin Kiernan *Restoring Lake Pedder: a geomorphological perspective of recovery prospects and likely timetables* August 1994 p 7.

17 Exhibit 21.

option would be most appropriate given factors such as world heritage values, the location, climate and enormous size of the area, the probable cost and many other factors.

3.32 The absence of definition on these issues gave rise to some of the conflicting opinions and estimates which characterised the inquiry. The HEC, in its first submission, gave an estimate of $375 million - $500 million for an intensive program of revegetation around the lake. A consultant to the HEC, Dr Michael Sobczak, vice-president of Malcolm Pirnie Incorporated, a US environmental engineering organisation, appeared at the public hearing in Hobart on 6 April, and quoted figures of $1.2 - $2.5 billion for restoration to a mature, successional stage.[18] The contrast between such estimates and the claims of some proponents that revegetation could just be left to nature accentuated the need for a decision on how closely any restoration should replicate the original and for further research into the requirements of a successful revegetation process.

3.33 The difficulty in defining exactly what it is that should be restored appears less problematical if the view of Mr Steane is taken into account. Mr Steane emphasised to the Committee at the public hearing in April the fact that the development of any ecology is dependent on accidents such as fires, floods and disease, and hence is always changing.

3.34 Mr Steane also commented that as an objective, restoring the pattern of vegetation to its pre-flooding condition was neither practicable, important, nor meaningful other than as an interesting academic exercise.[19] Professor Tyler commented at the scientific symposium that a native-looking vegetation would probably be acceptable to most people.[20] The subject of plant species and their composition, apart from the requirements for successful colonisation and succession, is clearly a matter of aesthetics which should be exposed for public comment.

Vegetation

3.35 At the April public hearing in Hobart, Mr Tim Duckett, a rehabilitation scientist who prepared the feasibility study for the HEC, identified rapid revegetation to stabilise the soil and prevent erosion as the major technical issue in biological restoration. He considered that natural unassisted revegetation would be too slow to avoid the peat soils drying out, breaking up and eroding, which would result in downstream siltation as well as complicate the revegetation process. His opinion was that the most likely colonising species would not in all cases be those which were present originally, and that without intervention, successional processes might only return the species composition closer to the original over a very long period, measured in centuries. However he was convinced that, because the peat mat is largely intact, synthetic or assisted rehabilitation methods could be used to ensure rapid revegetation and soil stabilisation.

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18 Evidence p 358.

19 Evidence p 409.

20 Exhibit 21.

3.36 Dr Kiernan who told the Committee at its February hearing that he had considerable experience in walking and observing in areas where peat that had been inundated for long periods was exposed, said that he had seen little evidence that peat was eroded as a result of drawdown.[21] He explained that as the surface hardens it cracks open in a polygonal form and the seeds which get trapped in the cracks between the polygons serve as a focus of growth. His personal observation that exposed peat survives very well combined with Professor Tyler's revelation that the peat mat is intact across the floor of the new Lake Pedder indicates the likelihood that one of the essential requirements for revegetation exists. What cannot be determined without further investigation is how long the peat would remain intact if revegetation was very slow. Dr Kiernan's observations would also require further scientific evaluations before they could be accepted.

3.37 Mr Michael Eades, an environmental scientist who outlined in his submission a scenario for a staged release of water from the impoundment, suggested that migration of indigenous native seed into the new landscape would happen naturally due to wind and the activities of native fauna, particularly birds.[22] This view was in contrast with others, such as the HEC consultants, who believe that intervention such as seeding and fertilising would be essential. Mr Eades also observed at the public hearing on 7 April that several characteristics of the impoundment would be very helpful in regenerating the plains:

> The other thing which quite encouraged me when I was having a look down there is that the perimeter is very convoluted, so there is a very high perimeter line of undisturbed native ecosystems in close proximity to most of it... it is a very linear lake, with a very high perimeter ratio... There are also islands dotted around it. ...All those still retain pristine original ecosystems which will be very helpful to regenerate the plains once that bottom section is drained. I think it will happen quite rapidly.[23]

3.38 Mr Eades believed that the gaps in present knowledge, while important, are not crucial to the work, and that restoration, if carefully monitored, could proceed and problems could be dealt with as they arose.

3.39 While acknowledging that the formation of an algal/moss mat over a newly exposed peat surface could be expected to reduce surface erosion and increase the speed of colonisation, the HEC commissioned feasibility study took a negative view towards the prospect of a successful restoration without massive and expensive intervention. Apparently based on limited examples of research into plant community restoration over several decades and on practical experience gained by the HEC in rehabilitating construction sites, it predicted that natural site recovery would take centuries, if not thousands of years, without assistance. Cost estimates for assisted revegetation were based on a very high standard of rehabilitation, with original plant densities replicated within 10 years and a considerable contingency for assumed disturbances and problems. Many of the predictions appear to be based on a worst case scenario, for instance assuming that much of the peat mat would erode exposing the inhospitable quartzite which made the rehabilitation of road edges and quarry sites associated with the Gordon Scheme such a difficult task.

3.40 This view is in contrast with that of experts within the Tasmanian Parks and Wildlife Service. The Service's views were outlined in documents obtained under Freedom of

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21 Evidence p 34.

22 Mr Michael Eades, submission p 9.

23 Evidence p 393.

Information (FOI) provisions and passed onto the Committee by Pedder 2000. The Service stated in a memo about the environmental consequences of draining Lake Pedder that:

> . If dead vegetation and roots are still intact, which appears to be so in places, the organic soils will be supported by a dense root mat which together with the undulating topography should help minimise erosion.
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> . An assessment of the physical and chemical condition of the organic soil would be required before drainage was considered. Viable seed may still exist in the old soil profile.
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> . Revegetation rates are difficult to predict without trials on growth rates in submerged and unsubmerged samples. Subjective assessments from other areas suggest regrowth will occur in ex-submerged organic soils. Detailed monitoring has been carried out on reclaimed peatland mining sites that have been subject to inundation in the northern hemisphere. There have been considerable success with rehabilitation of disturbed peatland and buttongrass moorland in other parts of western Tasmania.
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> . An assessment of revegetation and recovery rates at the Gordon impoundment would give strong indications on the rate of stabilisation and likely succession.[24]

3.41 The re-establishment of the button grass, which covered a high percentage of the terrain now submerged, attracted attention during the inquiry. Mr Tom Walduck, a Tasmanian forester and seed supplier, commented in his submission that any attempt to resow the lake bed would have to proceed without the plant which covered 90 per cent of the area.[25] He based his assumption on his knowledge of the difficulties of regenerating button grass artificially by sowing its seed on sites disturbed by mining and road construction. Mr Walduck conceded that button grass regenerates naturally, but he did not believe that any seed would be able to germinate after several decades of immersion and appeared to discount the probability that button grass seed would be carried back into the newly exposed area.

3.42 This prediction contrasted markedly with that of Mr Eades who believed that wind and fauna assisted dispersal of seed from mature adjacent ecosystems would fairly rapidly re-establish button grass, as demonstrated on the banks of Lake Gordon. When asked at a public hearing whether the situation would be different at Lake Pedder due to the huge area to be exposed, he explained that as most of the newly exposed terrain was close to slopes which support a heath community containing button grass, recolonisation would be 'dotted all over the place'.[26] This view was complementary to Dr Kiernan's view that cracks in the peat mat become focus points for new growth.

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24 Tasmanian Parks and Wildlife Service, memo from Peter Bosworth , Assistant Director, Resources and Planning to Tony Dell, Secretariat, August 1994.

25 Mr T G Walduck, submission p 2.

26 Evidence p 393.

3.43 The subject of the viability of seed that has been submerged for more than twenty years was raised by Pedder 2000 at the February public hearing in Hobart as a likely subject for scientific investigation during the next few months. Dr Sharples' summary of issues raised at the symposium in April noted the suggestion that: [27]

> Perhaps the most important immediate focus for research is testing the viability of seed stored in the drowned peats, and obtaining samples of the peat for revegetation trials with a variety of treatments using both the natural seed store and artificial seeding or planting.

Fauna

3.44 Restoration of the aquatic fauna of Lake Pedder did not raise the emotion and controversy that the vast revegetation project has prompted. The subject attracted few submissions, but one of these, a submission by Dr Sam Lake, contained considerable information based on long term scientific surveys. Dr Lake, a freshwater ecologist and limnologist, and a small team of freshwater biologists conducted a survey of the Lake Pedder area just prior to the flooding and also carried out regular sampling of the littoral fauna at twelve sites at the new impoundment between 1975 and 1989, which enabled them to monitor the major changes that occurred in the shore-dwelling fauna.

3.45 Dr Lake submitted that irreversible changes to the biological communities had occurred in that endemic species originally found in the area inundated by the impoundment have either become extinct or have been greatly reduced in abundance. Dr Lake reported that *Galaxia parvus* has not been found in the impoundment since 1978, and *Galaxia pedderensis*, another native fish relatively common in the former lake, and now regarded as being on the brink of extinction, is the subject of captive breeding trials. Other endemic fauna such as crustaceans and insects probably did not survive the flooding. However, Dr Lake has found that some of the animals of the distinctive *psammon* community which lived in the shallow waters over the fine white quartzitic sand of the original beach have survived, the beach also remains and is still a suitable habitat for some of its original inhabitants.

3.46 In his submission Dr Lake concluded that it would be perfectly feasible to restore Lake Pedder and its surrounds, provided that the task is undertaken with a long-term perspective. He commented that it would be difficult to re-establish the fauna of the lake, due to the large scale of the operation that would be required, combined with a lack of information and expertise in Australia and elsewhere in the restoration of large aquatic environments. He suggested that to allow the re-establishment and recovery of populations of the original animals that dwelt in Lake Pedder, it might be necessary to have a specific program to greatly reduce the numbers of trout and possibly even of the climbing galaxias whose populations would become increasingly concentrated and hence have an increased impact on their prey populations. Dr Lake believed that attention should also be given to the question of whether trout would survive and breed in the shallow restored Lake Pedder.

3.47 One aspect of the biological restoration of the lake that did attract considerable public attention during the inquiry, was the subject of the platypus population of the new lake. Professor Nigel Forteath of the University of Tasmania, who appeared as a delegate of the

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27 Exhibit 21.

Huon Valley Council, told the Committee in Hobart on 21 February that draining the lake would present risks to a possibly significant platypus population:

> In one bay alone, I have counted probably 70 different animals. That is a very large population of what I consider one of the wonders of the world... So my estimate of 2000 plus platypuses is probably very conservative indeed. [28]

3.48 Professor Forteath did not claim to have reached his estimates on the basis of a properly conducted scientific survey, but his opinions on matters such as the diet and habits of platypus were reported in the press. Dr Tom Grant, a recognised Australian expert in the biology and ecology of the platypus and author of a report to the Australian National Parks and Wildlife Service, *Distribution of the Platypus in Australia with Guidelines for Management*, made a submission to the Committee in which he gave examples of the lack of knowledge of the biology of the species which had been reported in press statements attributed to Professor Forteath.

3.49 Dr Grant pointed out that even in mark-release-recapture studies there are great difficulties in estimating platypus populations. He suggested that the numbers estimated by Professor Forteath on the basis of incidental observation could not possibly be substantiated:

> Because platypuses can forage over considerable distances, it is impossible to distinguish between unmarked individuals, so that such an estimate would almost certainly have involved the double-counting of many individuals.[29]

3.50 Dr Grant also stated that it was important for scientific work to be carried out on the Lake Pedder populations of platypuses before useful conclusions could be drawn on the possible impact of the proposed draining on the species'. He emphasised the need for a full environmental impact assessment before the lake was drained. The Committee considers that Professor Forteath's methodology was not sufficiently rigorous to provide a reliable estimate of the platypus population but recognises also that no scientific study has been conducted for making an accurate estimates. Nevertheless, Professor Forteath's observations highlight the possibility that populations of some fauna species would be adversely affected if the lake were drained.

Rehabilitation prospects

3.51 Although restoration of the flora and fauna is problematical it was not regarded by proponents of the proposal to be as significant as restoration of the lake's unique physical features. Provided revegetation could be achieved successfully and adequate reservation of species is achieved elsewhere in protected areas, biological restoration of the exposed terrain should be viewed in terms of a carefully managed, aesthetically acceptable rehabilitation.

3.52 There appeared little doubt amongst those qualified to assess the botanical prospects of the restoration proposal that the drained area would gradually revegetate from the outer edge, as occurred around the adjacent Lake Gordon on areas that were exposed when the level dropped after years of inundation. However, opinions professional and otherwise about the length of time that this would take, the degree of intervention that would be required to avoid problems such as erosion and weed invasion and the cost of any essential intervention,

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28 Evidence p 96.

29 Dr T R Grant, submission p 1.

vary considerably. The level of tolerance towards the unsightliness of the early stages after draining would also vary. The belief that further research work would be essential before the project could begin was virtually unanimous.

Rehabilitation options

3.53 Opinions varied considerably about the level of intervention that would be required to bring about a satisfactory revegetation of the area which would be exposed if the lake were drained. It was difficult for the Committee to form an opinion when the views of its expert witnesses appeared to be irreconcilable and there were no precedents to draw upon. Analyses of the proposal were not based on the same premise about the likelihood of natural revegetation succeeding without intervention. The lack of information from studies of relevant revegetation projects meant there was no clearly stated objective about this aspect of the restoration proposal, which, in addition to other factors, contributed to an apparent conflict of views about the need for intervention and hence the amount of time, effort and cost that it would involve. A close examination of the evidence revealed more common ground than was immediately apparent.

3.54 There was general acceptance, based on Professor Tyler's work, that the peat mat, essential for ready revegetation, is still intact across the entire area, that it is bound together by the root systems of dead plants and still contains a great deal of undecomposed woody material. There was also considerable agreement on intervention strategies that might be required. These included techniques such as seeding, fertilising and the use of short term, sterile cover crops, but views differ widely on the likelihood and extent to which intervention might be needed. Fundamental to such viewpoints was the perception of the peat mat's capacity to remain intact until recolonisation occurs. The Committee was presented with conflicting evidence on this subject. The predictions of those who submitted revegetation scenarios depended heavily on their interpretation of the long term robustness of the exposed peat. Only further studies would reveal this information conclusively, and even then many management decisions would need to be made throughout the rehabilitation period to accommodate the unpredictable. The element of risk which would remain could have serious financial implications for governments since once the lake was drained and rehabilitation underway, the commitment would be irrevocable.

3.55 Pedder 2000 made it clear at the launch of the restoration proposal that it did not expect the plant and animal communities to be restored to their original numbers and composition. It emphasised that it was the unique geomorphology, combined with the wilderness values of the original lake such as aesthetic naturalness and remoteness from settlement, that made it so valuable. The guiding principle of restoration was deemed to be reinstatement of world heritage qualities and it was predicted that most of the necessary restoration would happen by natural processes.

3.56 A completely different view of the rehabilitation process was taken by Dr Sobczak, at the public hearing on 6 April. He commented that the magnitude of the project was unprecedented in the world and would require major intervention, physical reconstruction, chemical adjustment and biological manipulation over a long period of time.[30] He gave the figure of $2000 per hectare for reseeding, fertilising and stabilising erosion which he regarded as essential for rehabilitation. Restoration of vegetation to a mature successional stage would, in the United States, cost $50 000 to $100 000 per hectare which, for a project involving 24 000 hectares, would be a prohibitive expense. The degree of intervention on which Dr Sobczak based his estimates is obviously vastly different from that thought probable by other witnesses such as Dr Kiernan and Mr Eades, and still an order of magnitude away from the Australian consultants who advised the HEC.

3.57 In his written submission to the inquiry Mr Eades predicted that without rapid stabilisation of the landscape there could be serious sheet, rill and gully erosion. This would be caused, he thought, by the impact of run-off flowing into unvegetated channels below the present top water line. He provided a scenario for revegetation which incorporated strategies to prevent this. Mr Eades gave evidence after he had examined exposed areas around Lake Gordon and revised the position taken in his written submission. He said he believed that with slow drainage, careful monitoring and limited intervention, erosion would not be much of a problem.[31] He agreed to a suggestion that it would be very valuable if the HEC would agree to hold the level of the current Lake Pedder at its lowest level 1.5 metres down from the top so that detailed observations could be made over a period of several years. However he said that he believed that the positive evidence of successful revegetation that he had observed around Lake Gordon was a good indication of how regeneration would take place around a resurrected Lake Pedder.[32]

3.58 In his written submission to the inquiry Mr Steane commented that the proposal, if left to natural processes, would take a very long time and incur the risk of weed invasion and erosion. Based on the objective of achieving a 'near natural restoration in a reasonable time', he believed it would be a costly exercise. He thought the project 'would be fraught with environmental risks and would be an exciting challenge for the environmental managers.'

3.59 At the April public hearing in Hobart Mr Steane told the Committee that instead of trying to revegetate the whole area hurriedly by artificial means, at great cost, it might be better to concentrate on selected areas such as steeper slopes, dunes, creek banks, knolls and a series of nucleus clumps or lines which would serve as seed sources for the surrounding land.[33] This approach of selective intervention, combined with monitoring, was not incompatible with the views of Pedder 2000 and others who did not view the rehabilitation process as necessarily expensive and fraught with risk.

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30 Evidence p 356.

31 Evidence p 396.

32 Evidence p 403.

33 Evidence p 411.

3.60 Mr Duckett told the Committee at the same public hearing[34] that his examination of exposed sites on the banks of Lake Gordon demonstrated the importance of mats of moss and algae which bind the peat surface and provide excellent erosion control. In his preliminary feasibility study for the HEC he illustrated the way in which moss and lichen will colonise the remaining base of plants killed by inundation, an observation which when considered with Professor Tyler's findings of undecomposed remains of vegetation, may auger well for plant recolonisation. He voiced his concern that if this binding mat did not form, the devegetated area would be at risk of erosion and siltation from the increased velocity of runoff from the huge catchment area. He stated that to avoid erosion, artificial intervention and stabilisation would be required at the perimeter of the impoundment where the protective peat is broken by wave action.[35]

3.61 In one of the documents obtained under the FOI provisions and sent to the Committee, the Parks and Wildlife Service, which is responsible for the management of the area, suggested that rehabilitation of the exposed lake bed may not require seed spreading over the entire 272 sq km.

> If the peat layer is present in a physical and chemical state to support vegetation growth this could be a positive start because most rehabilitation problems require top soil spreading. It would therefore be more of a revegetation problem ...
>
> Revegetation cost would need further assessment but aerial seeding and, if deemed necessary, fertilising could be considered. ...
>
> Subjective assessment from other areas suggest regrowth will occur in ex-submerged organic soils ... There have been considerable success with rehabilitation of disturbed peatland and buttongrass moorland in other parts of western Tasmania ...
>
> A best guess estimate is that within 20-30 years (of the date of the last pool of water drying up on the exposed lake bed) considerable progress should be evident in revegetation.

3.62 A major consideration in the effort and cost of visually restoring the exposed terrain would be the very obvious wave erosion that has occurred at the new water line over the last 23 years. Dr Kiernan's observation based on field inspections coupled with air and ground photo interpretation is that this erosion would resemble discontinuous stretches of roadway.[36] This he likened to a fossil shoreline which is a feature of many large lakes, due to the fact that lake levels decline over time. As the depth of incision is limited it would not present serious problems. He asserted that:

> ... from an aesthetic perspective the terrain visible from Pedder Beach contains relatively limited areas of severe scarring. Many of the classic photographic images of Lake Pedder, focussed as they are on the beach environment, will probably be achievable again almost immediately upon draining of the dams.[37]

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34 Evidence p 359.

35 Evidence p 360.

36 Kiernan K, *Restoring Lake Pedder: A Geomorphological Perspective on Recovery Prospects and Likely Time Scales*, August 1994.

37 Kiernan K, *Restoring Lake Pedder: A Geomorphological Perspective on Recovery Prospects and Likely Time Scales*, August 1994.

3.63 Dr Kiernan told the Committee in February[38] that the scarring around the perimeter is not deep erosion, apart from a few places around the Scotts Peak Dam, but that it is a break in the peat cover which exposes the white rock and should not require engineering works. The Tasmanian Parks and Wildlife Service expressed a similar opinion:

> Most obvious erosion occurs around the shoreline exposed to wave action. From limited visual observation erosion is not extensive or severe.[39]

3.64 Views varied considerably on the likelihood of weed invading the newly exposed area, with Mr Walduck expressing the opinion that the presence of weeds growing in small cleared areas at places frequently visited by people in the Lake Pedder region is proof of the threat which weeds would pose to the vast area of bare soil exposed after draining the lake. Mr Duckett said at the public hearing in April that weed invasion would be a threat to the rehabilitation process and would initially be a problem in areas adjacent to access roads and sites available to the general public. He stated:

> A weed management plan would be a component of any rehabilitation program, should be concentrated in these areas, and should involve control and monitoring. Any public access into the area being re-established with native vegetation will require stringent hygiene requirements, to the point where access should be limited.[40]

3.65 On the subject of weeds, Dr Brown suggested to the Committee:

> ...if ever there is anywhere in the world that has got a head start, this is it. It is a wilderness with its western boundary on the west coast of Tasmania. It does not have the developed areas, farmlands or weed infestations upwind of the area which make such problems for most other wild areas in the world.[41]

3.66 Mr Eades expressed a similar opinion in his written submission to the inquiry:

> The threat from weed invasion may not be serious since the impoundment is extensively surrounded by natural lands, and sources of entry for weed seeds are few. Some weeds may enter but be out-competed later as native plants return.[42]

3.67 It appears to the Committee from the balance of the evidence that weeds could cause some problems in some areas but it is possible that widespread weed invasion might not present a serious risk. This cannot be taken for granted and there would be a need for appropriate monitoring and a weed management strategy if the proposal were to proceed.

3.68 The summary of the scientific symposium noted that research on restoration techniques should be encouraged, not only for Lake Pedder proposal, but because the knowledge may be needed for the draining of lakes elsewhere. A similar point was made in a submission focussing

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38 Evidence p 37.

39 Tasmanian Parks and Wildlife Service, memo from Peter Bosworth , Assistant Director, Resources and Planning to Tony Dell, Secretariat, August 1994.

40 Evidence p 362.

41 Evidence p 315.

42 Mr Michael Eades, Submission p 7.

on the implications of the eventual decommissioning of the Gordon River Power Development by Dr Robert Walker who pointed out that:

> As sections of the scheme are eventually decommissioned for any of a number of reasons, the future of either of the impoundments becomes a matter of public concern. Tasmania must have to hand well researched and up to date contingency plans for such events.
>
> Provision has to be made for the eventual retirement of the scheme. Partial or complete de-watering will be a future project for reasons quite separate from the purpose of geo-heritage conservation which is the purpose of the current debate.[43]

What questions need to be answered before commencing any restoration?

3.69 Evidence from many parts of the world after various types of disasters show that nature has an amazing capacity for regeneration.[44] It would therefore be surprising that if drained, the area now covered by the new Lake Pedder did not at least gradually recover without any intervention and, that if assisted, the recovery would be faster and more complete. However, many aspects of that process would have to be studied if the proposal ever proceeds.

3.70 An environmental restoration project such as the draining of Lake Pedder which was acknowledged to be of a scale unprecedented in the world was bound to raise a great many questions. While acknowledging the work which was done by Professor Tyler, Dr Kiernan and other scientists to establish the state of the drowned landscape, the Committee is aware that there are enormous gaps in other areas of essential knowledge.

3.71 There are too many uncertainties about the revegetation process to justify an in-principle decision to proceed with the proposal, unless the government is prepared to accept the risk that revegetation may not become established successfully and that extensive intervention might be needed to prevent serious erosion. However, the Committee is aware that further scientific investigations are already proposed by the Lake Pedder Study Group, the priorities for which are evolving as debate about the proposal raises further questions.

3.72 The evidence about environmental aspects of the restoration proposal was characterised by enormous diversity of opinion and not a great deal of established fact. At best, discussion about the prospects for a successful restoration was based on predictions which in turn were based on extrapolations from similar studies and the wisdom of experience. While this discussion was valuable in stimulating debate about the potential benefits as well as risks and costs involved with the proposal, it also served to highlight the lack of directly relevant studies. In effect, the Committee's inquiry appears to have raised a great many more questions than it answered.

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43 Dr R Walker, Submission p 1.

44 Wilson E O, *Naturalist*, Ireland Press 1994.

The questions for further consideration

3.73 If at any time in the future serious consideration were to be given to a proposal to drain Lake Pedder, there would be questions that would need to be considered. Some of the questions, such as whether viable seed existed in the submerged peat, should be fairly easy to answer. Other questions may be answerable only after the area is exposed and the unpredictable forces of nature begin to work. Given the potential risks to such a valuable world heritage area, there must be a high degree of confidence about the outcome, or a financial commitment to rectify any mistakes. Opinions varied enormously on what could be expected in the revegetation process and what would be acceptable. Fundamental questions which should be answered before any future proposal could progresses include:

. Should the aim of the proposal be restoration or rehabilitation and what degree of intervention, if any, would be involved?

. What was the original vegetation and was this in a natural or a manipulated state?

. How closely should restoration try to replicate the vegetation pattern of the pre-flooding period?

. What would be required to maintain the vegetation pattern that is re-established?

3.74 Many questions were raised about the peat mat which has been established as a basic essential for plant rehabilitation, for instance:

. How long would the peat mat stay intact once it was exposed?

. Is there viable seed in the peat mat?

. Is the establishment of a moss and algae cover essential to bind the peat until larger plants become established and if so, would this require intervention? Would the presence of the lower order vegetation cause any problems?

. Is there a role for intervention strategies such as aerial seeding and fertilising, cultivation and sowing of a temporary cover crop?

. What is the risk of weeds becoming established?

3.75 Once answers have been found for questions of such a fundamental nature, it should be easier to deal with the many others which depend on them, such as:

. Would the button grass regenerate naturally, what assistance might it need, would it be likely to re-establish in the proportions that existed before flooding, and if the proportion is different, is this a cause for concern?

. Would other species regenerate on the scale required? Would a seed collecting project be necessary to facilitate regeneration and if so, what implications would this have for adjacent areas?

. Would there be significant erosion and what strategies would be needed to eliminate this and repair any damage?

. Would the dunes slump during drawdown and what extent of intervention might be necessary to repair any damage incurred both during and after drawdown?

. What rate of drawdown would be best to protect the dunes, maximise opportunities for natural revegetation and avoid unnecessary further wave erosion around the perimeter?

. What would happen to endangered species and what would be involved in returning endemic species to the area?

. Is there a large population of platypus to consider, what would happen to them after the area is drained, should their preservation be a factor in the rate of drawdown and is there a case for offering this species special protection?

. What impact would trout have on fauna in a restored Lake Pedder? Should there be a program to eliminate them from this lake and would such a program be possible without adversely affecting other, endemic species?

. Would there be serious erosion and increased run off and what implications would this have for downstream communities?

. What restrictions would need to be placed on access to the area during the draining and rehabilitation process?

. The feasibility of the large scale seed collection that would be necessary?

. How should the region be zoned and what would be the implications of different zoning categories on future visitor access?

The need for a research program

3.76 The existence of all these questions raises the need for a coordinated research program. Further investigation would probably identify even more questions which warrant scientific study before any future proposal to drain Lake Pedder proceeds. This would particularly be the case if a decision on the future of the proposal was dependant largely on answers to these questions. However, the extent to which such studies should be embraced is very much a matter of priorities. Apart from the academic value of such research, a major push for research to answer many of the questions which were raised would only be warranted if the proposal has any real prospect of being implemented. The question of priorities and the need to allocate resources to further study are discussed in chapter 5.

The possible draining process

3.77 The way the impoundment is drained would affect the extent of damage that may be caused to landscape features such as the dunes and would also influence the re-establishment of the vegetation. There are two basic alternatives. The lake could be drained as quickly as possible to minimise erosion around the changing shore line, or it could be drawn down slowly to allow a process of natural regeneration to follow the receding water level. Retaining water in the impoundment for a longer period would also allow access to the shore line for erosion control work.

3.78 The draining options that could be considered would depend on what is technically feasible. The current impoundment has flooded parts of two catchments - the Serpentine River basin and the upper reaches of the Huon River catchment. The most important consideration would be to draw down the water level in the Serpentine part of the impoundment, where the original Lake Pedder is located. This would expose the original Lake Pedder.

3.79 There are two outlets in the dams impounding Lake Pedder. There is a serviceable diversion tunnel at the site of the Serpentine dam and there is a small outlet valve in the Edgar dam to provide riparian flow in the upper Huon River. There is also a canal to divert water from Lake Pedder into Lake Gordon. A diversion tunnel was built into the Scotts Peak Dam when it was being constructed, but it was permanently blocked when the dam was completed.

3.80 The HEC simulated the draining process and calculated how long it would take to drain the impoundment using the current outlets. With a July start the Serpentine impoundment had a 50 per cent chance of draining down to the level of the Serpentine Dam outlet by March of the following year (ie about nine months). With average conditions the level would then begin to rise again. With a January start, there is a 50 per cent chance of Serpentine water levels dropping down to level of the outlet in twelve months. The level would then remain close to this level until April when it would begin to rise.

3.81 Draining the impoundment would require more than simply opening the outlets on the dams. If the Scotts Peak Dam is not breached the following process could be followed:

. the McPartlan Pass Canal would be used to drain as much of Lake Pedder as possible into Lake Gordon to recover the energy value of the water - this would draw the lake down to a level of 306.0 metres above sea level;

. the Edgar Dam riparian outlet and the Serpentine Dam outlet could be used to drain the lake down to 303.3 metres;

. the Edgar Dam outlet would not operate once the water level dropped below 303.3 metres and only the Serpentine outlet would draw the water down any further, with water in the Huon part of the impoundment spilling into the Serpentine Basin;

. the water level would continue to drop to the level of the saddle separating the valleys of the Serpentine and the Huon Rivers at which point no more water from the Huon part of the impoundment would drain through the Serpentine outlet; and then

. the Serpentine outlet would continue to drain the Serpentine part of the lake until a level of 282.4 metres was reached - the original Lake Pedder would then be exposed because it had a level some ten metres above the level of the Serpentine outlet.

3.82 The HEC reported that with this scenario, depending on the pattern of future catchment flows, the level of water that would be retained behind the Serpentine Dam would vary from the level of the outlet valve up to about the level of old Lake Pedder. In wet years the level would completely flood the original lake. If the Scotts Peak Dam were not breached there would be a pondage behind the Scotts Peak Dam and Edgar Dam inundating about 47 square kilometres of the upper Huon catchment.[45] The water in this pondage would periodically spill over into the Serpentine catchment because the outlet on the Edgar Dam is higher than the level of the saddle between the two catchments.

3.83 If the Scotts Peak Dam was breached and no water from the Huon part of the impoundment spilled back over the dividing saddle into the Serpentine catchment then the maximum level behind the Serpentine Dam would reach only 288 metres and would not re-inundate the original Lake Pedder. The HEC cautioned however that any inflow from Lake Gordon, increased runoff, or blockage of the Serpentine outlet would result in higher water levels. It was also pointed out that at best there would still be routine flooding of the Serpentine Valley behind the Serpentine dam for a distance of up to 10 kilometres and this would maintain a large area of mud flat.

3.84 This outcome would appear not to be acceptable to Pedder 2000 because Dr Brown, in rejecting a partial draining option that would leave part of the Serpentine flooded, expressed the hope that the Serpentine Basin would be fully rehabilitated:

> We also aspire to see the Serpentine Valley, in particular, return to its essential naturalness, albeit with the dam left across bridging the lower part of it, and a pondage proposal which is a halfway house would not allow for that.[46]

3.85 Mr Ted Pritchard, Chief Operations Officer of the HEC explained the likely flooding of the Serpentine Valley that was predicted by the HEC's modelling of the catchment. This predicted what would have happened over a 70 year period from 1924 with historic rainfall and streamflow data if the dams were in place with the outlets:

> ... you would flood right back to Lake Pedder quite regularly. ... there are 12 times when you would get pretty close in that period. ... there are three times when you get above it but clearly you get pretty close on a lot of occasions. You would end up with quite a big lake behind Serpentine. If you breach Scotts Peak then there is a lesser amount but even at that there are a lot of occasions when it will flood some 10 kilometres back into the existing impoundment.[47]

3.86 Winter flooding of the original Lake Pedder was common place and the beach usually all but disappeared. A submission received from Mr Paul Tanner, for example, included a photograph of Lake Pedder in full winter flood with only the outer margin of the beach and shore line visible. Mr Tanner submitted that the beach was generally only exposed for about 3 - 4 months per year. A similar view was put by Mr Raymond Tilley who submitted that the Aero Club of Southern Tasmania, which organised scenic flights to Lake Pedder, was often disappointed because the beach was not exposed and that in some years it only appeared for a few weeks.

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45 Mr Ted Pritchard, Chief Operations Manger, HEC, Evidence p 328.

46 Evidence p 313.

47 Evidence p 328

3.87 Winter flooding in a natural unrestricted catchment is not the same as a increase in water levels behind a dam and there might be a greater risk of periodic inundation of the original Lake Pedder and the Serpentine catchment if the dams were retained. The HEC explained that to drain the Huon impoundment it would be necessary to remove Scotts Peak Dam and that if the Dam is not removed the water from the Upper Huon will spill into the Serpentine River.[48] It would be preferable to either remove or modify the Scotts Peak Dam. With this proviso, it can be said that draining the impoundment would be physically possible but it might be expensive. Breaching or removing the Scotts Peak Dam would also reduce the option of retaining some flood mitigation capacity.

3.88 The concept of a partial draining of the present Huon-Serpentine impoundment was raised during the inquiry. The Lake Pedder Committee of Enquiry, in its Interim report of June 1973, had recommended a moratorium on the filling of the lake to allow time for detailed investigation into possible alternatives to flooding the lake. The Committee of Enquiry favoured most the alternative of abandoning the Huon waters and pumping from the reduced Serpentine storage into the Gordon storage. The possibility of re-employing such alternatives as compromise proposals in the draining of Lake Pedder aroused a certain amount of comment.

3.89 Senator Devereux made a submission to the Committee, in which he proposed a partial draining alternative based on lowering the level of the impoundment by about 16 metres, thus creating three separate bodies of water, a Serpentine impoundment, a restored Lake Pedder and a Huon impoundment. The Serpentine would be pumped into Lake Gordon if needed, and the Huon could be used for flood mitigation, irrigation in the Huon Valley and recreation. No estimate was made of the cost but it would involve building a tunnel, a pumping station and spillways on both the Serpentine and Scotts Peak Dams.

3.90 Dr Alan Polack also submitted that the proposal made prior to the flooding of Lake Pedder to install a pump at or near the Serpentine dam could be implemented as a compromise which would enable the original lake to be restored, while retaining two separate, substantial bodies of water, possibly linked by a tunnel. While estimating that such an alternative would only reduce the power generating capacity of the Gordon power station by approximately 2 per cent, Dr Polack acknowledged that this compromise position would involve substantial costs. He claimed that this would be offset by a reduction in the amount of exposed terrain that would have to be revegetated.

3.91 At the public hearing on 6 April Dr Brown said that he was not in favour of partial draining as it was a solution that nobody would be happy with,[49] a view that was also expressed by the HEC:

> Partial draining options are technically feasible, but to examine them in the necessary detail would require a study of considerable expense. At this stage, it is far from evident that any of the possible options would be any more acceptable for the proponents of draining the existing lake, than is the present arrangement.
>
> Any partial draining option would involve very considerable new capital works ...[50]

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48 Hydro-Electric Commission, Supplementary Submission (April), p 9.

49 Evidence p 313.

50 Tasmanian Government , Submission p 34

3.92 Although he did not favour retaining a Huon impoundment Dr Brown referred to the role that the Scotts Peak Dam could play in flood mitigation on the Huon River. Fears have been expressed by primary producers in the Huon Valley that removal of the dam would make them vulnerable again to the pre-1972 flood regime. Dr Brown argued that keeping the dam's release mechanism intact would allow a temporary flooding of the plains as a sensible alternative to downstream flooding.[51]

3.93 It appears that partially draining the current impoundment would be technically feasible and would overcome some of the concerns of those opposed to the restoration proposal, at least to the extent that it would satisfy flood mitigation requirements and would retain part of the hydro water storage capacity. However the engineering works that would be required to provide a continued supply of water to the Gordon Power station and to allow the Huon catchment to be drawn down and maintained at the required level would be very costly.

3.94 If the proposal were to proceed then work would be required to either modify or remove Scotts Peak Dam regardless of whether it was decided to retain an impoundment behind the dam. Retaining or fully draining the impoundment in the Huon catchment would not make any difference to restoring Lake Pedder, provided that the level in any retained impoundment was kept below the level of the saddle between the Huon and the Serpentine catchments. If the restoration proposal were to proceed, it would make sense to retain an impoundment behind the dam if it were required for flood mitigation.

3.95 Retaining an impoundment behind the Serpentine seems less sensible. It would not augment the hydro system unless costly engineering works were installed, and a reduced Serpentine impoundment would make only a marginal contribution to the system. It would also prevent rehabilitation of the Serpentine Valley and might increase the risk of flooding extending back up the valley and inundating the re-exposed original Lake Pedder.

51 Evidence p 312