Decision No. C 131 /2003

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an appeal under section 120 of the Act

BETWEEN **CLIFFORD BAY MARINE FARMS LIMITED**

(RMA 172/03)

THE DIRECTOR GENERAL OF CONSERVATION

(RMA 103/01)

FRIENDS OF NELSON HAVEN AND TASMAN BAY (INC)

(RMA 114/01)

Appellants

AND **MARLBOROUGH DISTRICT COUNCIL**

Respondent

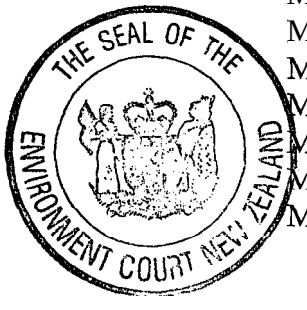
BEFORE THE ENVIRONMENT COURT

Environment Judge J R Jackson (presiding)
Environment Commissioner C E Manning
Environment Commissioner S Watson

HEARING at **BLENHEIM** on 24-28 March 2003
(Final submissions received 14 April 2003)

APPEARANCES

Mr J G Guthrie and Mr P Horgan for Clifford Bay Marine Farms Ltd
Mr B P Dwyer for Marlborough District Council
Ms P N Rutledge and Mr P Beverley for the Director-General of Conservation
Mr S Browning for the Marlborough Environment Centre
Mr Q Davies for Dominion Salt Ltd - as a section 271A party
Mr G Hughes for Ms E Hewitt and himself - as section 274 interested persons
Mr J G Guthrie for Te Runanga o Ngai Tahu and Te Runanga o Kaikoura



(1) INTERIM DECISION

(2) INTERIM REPORT AND RECOMMENDATION

To: The Minister of Conservation

The Marlborough District Council

The Parties

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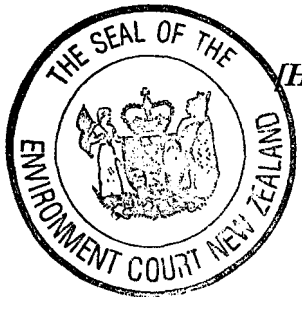

[A] Introduction

[1] What would be the effects on Hector's dolphins of establishing a large marine farm in Clifford Bay on the eastern coast of Marlborough? That is the principal issue raised by these proceedings which concern a proposal by Clifford Bay Marine Farms Ltd ("CBMFL") to establish a large open water mussel farm in the bay. Apparently this application is the first attempt to place a large marine farm in prime Hector's dolphin habitat. As a secondary issue, but of real importance to the neighbours on land, is the question of how a mussel farm on the site would affect their amenities.

[2] On 18 November 1999 CBMFL applied to the Marlborough District Council for consents to establish 2 marine farms on sites containing 1362 hectares and located off the east coast of Marlborough in Clifford Bay. Consent was granted for a single farm of approximately 460 hectares ("the (North Clifford) site"). The farm would run roughly parallel to the coast for 3.5 kilometres and extend seawards for approximately 1.1 to 1.5 kilometres. It would stretch from just south of Cable Road, north along the coast to a point opposite the end of Flemings Road. The southern half would be set approximately 550 metres off-shore with long lines running parallel to the shore, and the northern half approximately 1 kilometre from the coast with long lines running perpendicular to the shore.

[3] After a hearing of submissions the Council issued a decision dated 20 December 2000 recommending the grant of coastal permits for the site, subject to conditions. Two parties appealed: the Director-General of Conservation, and Friends of Nelson Haven and Tasman Bay Incorporated ("the Friends"), a public interest group. A subsequent agreement reached between the applicant and the Friends provides that if the Court consents to the proposal, a gap of 100 metres would be left between the northern and southern blocks for access. However, the Director-General, supported by various section 274 parties, argues that the resource consents should be refused in full.

[4] CBMFL has undertaken a full survey of the area applied for. It showed that the seabed of the site ranges in depth from 7 metres to 16 metres and comprises fine sand, thinning out towards the southern end of the site into patchy sand and gravel on a soft

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Dr R C Murdoch, Evidence-in-chief, para 15.

mudstone platform. Phytoplankton[2] concentrations[3] within Clifford Bay range from less than 0.5 milligrams/litre to 1.5-2.0 mg/l. The variability appears to be related to variations in local climate such as the El Nino and Southern Oscillation events[4]. The two major habitats on the seabed - fine sand and gravel - contain species common to other similar coastal environment[5].

[5] The farm is proposed to contain long lines 220 metres in length set 60 metres apart. The increased distance between lines - three times greater than in most Marlborough Sounds mussel farms - is an attempt to mitigate potential concerns in respect of Hector's dolphins. A maximum of 65 buoys would be set on each long line, including end buoys. The maximum depth of droppers, the vertical lines on which mussels grow, is to be 10 metres with 1 metre long sacrificial lines and the minimum distance between the droppers is to be 500 mm.

[6] The applicant proposes to develop the farm in three stages, and to monitor the effect of each stage prior to the development of the next. After an initial period of baseline monitoring, the consent holder wishes to establish three separate 50 hectare blocks, and to undertake detailed monitoring of their effects for at least one year prior to a review process to consider the next stage of the farm's development. Subject to a review of conditions under section 128, a further three 50 hectare blocks may then be placed in the area of the farm no less than three years after the completion of stage 1. The applicant proposes to undertake a further detailed monitoring programme for at least one year, and subject to a review of conditions may complete the project no less than two years after the completion of stage 2.

Clifford Bay

[7] Clifford Bay is a long sweeping bay between the northern White Bluffs (which separate it from Cloudy Bay) and Cape Campbell. It does not contain any mussel farms at present. However, to the south of the proposed site, a Port zone allows the

2 Planktonic plant cells.
3 R C Murdoch, Evidence-in-chief, para 17.
4 R C Murdoch, Evidence-in-chief, para 18.
5 R C Murdoch, Evidence-in-chief, para 24.

construction of a breakwater jetty and ferry terminal extending 2 kilometres into the bay. A ferry terminal which received resource consents in 1999 is now recognised by the Proposed Wairau-Awatere Resource Management Plan ("PWARMP"). Also to the south of the site a large area of land, including and surrounding Lake Grassmere, is zoned Lake Grassmere Saltworks zone and is used for the evaporation of seawater and the refining and processing of salt. The site itself is in the Coastal Marine Zone[6] in the PWARMP.

[8] Behind the beach and cliffs opposite the proposed farm is rolling land, predominantly zoned Rural 4, though there are small areas of conservation land on the coastal margin. Two dwellings have views over the proposed farm, one at the seaward end of Cable Station Road, and another called 'Muritai Farm' at the end of Flemings Road (owned by G and T Costello).

[9] The whole area of Cloudy and Clifford Bays is shown on the planning maps of the PWARMP as an area of significant conservation value. Appendix D of Volume 2 of this plan describes the area as of national importance for Hector's dolphin.

[10] As we stated at the start there are two basic substantive issues to be resolved. The Director-General of Conservation ("the Director-General") argues that there are potentially significant impacts from the establishment of the farm on Hector's dolphin, an indigenous species with a declining population and endangered status. The Marlborough Environment Centre supports this position and also argues that there would be adverse impacts on the amenity of residents of the area and users of the shore from the operation of the mussel farm. Their second contention is shared by Mr and Mrs T Costello who gave evidence for the Marlborough Environment Centre (a section 271A party) and by Ms Hewitt and Mr Hughes who entered the proceedings as a section 271A party in succession to Mr G Thomas, an original submitter whose property they have recently acquired.

[11] On the major issue, it was the Director-General's case that while definite effects of a marine farm on Hector's dolphin have not been established, there are potential

[6] Extending from mean high water mark springs, to the 12 mile territorial limit.

effects which, if they do materialise, will be of very high impact. Counsel argued that the probability of such effects could not be described as low, and although they were uncertain, the evidence showed the existence of a realistic risk which should be taken seriously. The application should therefore be declined.

[12] The applicant submitted that there was no evidence to the effect that the proposed farm, especially in its initial form, would be capable of causing Hector's dolphin mortalities directly, and that there was no scientifically defensible evidence about potential indirect effects on Hector's dolphin. It contended that the cases of those opposing the farm were based on an "absence of research" and that there was therefore insufficient evidence to support the precautionary approach to the extent of declining the application as advocated by them. It further submitted that if any effects did arise from the proposed marine farm, the extensive monitoring proposed in the conditions of consent, together with the review provisions, enabled these effects to be remedied by an adaptive management response.

[13] Under the PWARMP all marine farms are discretionary activities. We are therefore required to have regard to the matters set out in section 104(1) of the Act prior to exercising our discretion under section 105(1) We identify the following matters as relevant under section 104(1):

- The New Zealand Coastal Policy Statement and the Marlborough Regional Policy Statement (section 104(1)(c));
- The Transitional Regional Coastal Plan ("the TRCP") (section 104(1)(d));
- The Proposed Wairau-Awatere Resource Management Plan ("the PWARMP") (section 104(1)(d));
- The Nelson Marlborough Conservation Management Strategy ("the CMS"), and the New Zealand Biodiversity Strategy ("the NZBS") (section 104(1)(i)); and
- Any actual or potential effects (section 104(1)(a) and (i)).

[B] Status of the activities and applications

History of the application

[14] The application by CBMFL was for "a coastal permit to establish and operate a marine farm occupying 1362.1 hectares, to erect the structures detailed in the structures plan accompanying the application and to farm [mussel] ... species ..."

[15] Despite acknowledging that part of the application was for a restricted coastal activity, the Council's decision stated:

> That it be recommended to the Minister of Conservation, pursuant to sections 105 and 118 of the [RMA], that coastal permits (occupancy activity and structures) for a marine farm at Clifford Bay sought by [CBMFL] be GRANTED IN PART.

The term of the consent was 20 years and it was subject to lengthy proposed conditions. The reference to the coastal permits being granted only 'in part' was that CBMFL had also applied for an area in southern Clifford Bay, but that was declined, and for a greater area in the location where the present consent was granted.

[16] An issue also arises over whether the Council even attempted to grant coastal permits in respect of the matters over which it did have control. On the face of its decision it did not, since the decision only refers to a recommendation to the Minister. Against that is that many of the proposed conditions could be seen as controlling the activity rather than occupation of sea space. In any event CBMEL applied on notice, but out of time, for leave to appeal against any failure of the Council to grant resource consents to it. No party or person appearing opposed that leave, and since there was full opposition to the grant of the resource consents anyway, there seemed to be no prejudice to persons not before the Court in allowing the appeal (RMA 172/03) out of time. No new notice was given by persons not already before the Court in any event, with one exception.

[17] Ms E Hewitt and Mr G Hughes appeared at the hearing without having circulated evidence or indeed having appeared before. They applied for leave to be heard under

section 274 of the RMA on the grounds that they had an interest in the proceedings greater than the public generally and they had a good reason for applying to join inside the 10 working day cut-off[7]. Ms Hewitt explained that they had only recently (January 2003) purchased their property at the end of Cable Station Road from a submitter, Mr G Thomas, and even more recently heard of the aquaculture proposal and the Environment Court hearing. In view of those facts, and that CBMFL itself had been allowed to lodge a very late appeal, leave was granted for Mr Hughes and Ms Hewitt to appear and give evidence.

What coastal permits are required?

[18] Section 68(4) of the Act provides that an activity may be specified as a "restricted coastal activity" only if a rule is in a regional coastal plan and the Minister has required the activity to be so specified. In *Re Canterbury Regional Council*[8] the Environment Court held that as a matter of law, discretionary or non-complying activities became restricted coastal activities only when they are specified as such in an **operative** regional coastal plan. The PWARMP is not yet operative, so the TRCP is deemed[9] to be the relevant operative plan.

[19] In this case, the only activity which is a restricted coastal activity is the TRCP's occupation of the coastal marine area that restricts access to areas over 50 hectares. In respect of that activity the consent authority (and now the Environment Court) is required to make a recommendation to the Minister of Conservation on whether a coastal permit for the activity should be granted.

[20] In addition to a coastal permit for the restricted coastal activity, coastal permits are also required for:

- the placement of structures (section 12(1)(b));
- disturbing the seabed (section 12(1)(c)); and
- carrying out the activity of mussel farming (section 12(3)).

Section 274(2) of the RMA.
C155/99.
Section 370(1)(a) RMA.

These activities are not restricted coastal activities and are therefore within the jurisdiction of the Marlborough District Council.

[21] As a result of the appeal by CBMFL, the Court has before it notices of appeal and inquiry conferring jurisdiction to make the decisions that are appropriate in terms of coastal permits, and to make a recommendation to the Minister on the restricted coastal activity. We note however that CBMFL does not contest the conditions placed upon the consent by the respondent Council (although one of its witnesses, Dr R C Murdoch put forward some amendments).

[C] The guiding principles, objectives and policies

The New Zealand Coastal Policy Statement

[22] The principles of the New Zealand Coastal Policy Statement ("NZCPS") include three which are of particular relevance:

- the protection of habitats of living marine resources contributes to wellbeing (Principle 7);
- the importance of protecting significant natural ecosystems and maintaining indigenous coastal diversity (Principle 11); and
- that "an approach which is cautionary but responsive to increased knowledge is required for coastal management" (Principle 12).

[23] The first two of those principles lead to policies which may reflect the third. In any event those policies give slightly more guidance as to how the principles should be implemented. We will discuss the implications of the principle of a precautionary approach in a later section of this decision.

[24] A policy makes it a national priority to preserve the natural character of the coastal environment (of which Clifford Bay is part) by encouraging[10] appropriate development in an area where the natural character has already been compromised and

[10] NZCPS Policy 1.1.1 (23).

by avoiding sprawling or sporadic development. The possible Clifford Bay ferry terminal several kilometres to the south is provided for in the proposed Wairau-Awatere Resource Management Plan, has received resource consent and may be taken into account. Its potential presence is a very small factor for grouping development in Clifford Bay rather than spreading north to Cloudy Bay, as is the existence of some residential development at the road ends opposite the site. Conversely, the existence of a scientific reserve at Muritai for a rare and endangered native broom[11] weighs in a small way for the naturalness of the area.

[25] The NZCPS also identifies two national priorities which are of particular relevance to the assessment of effects on Hector's dolphin. The first is[12] to avoid (with no reliance on remedying or mitigating):

> areas and habitats important to the continued survival of any indigenous species

The second is[13]:

> … to protect the integrity, functioning, and resilience of the coastal environment in terms of:
>
> …
>
> (c) natural movement of biota;
>
> …
>
> (e) natural biodiversity, productivity and biotic patterns; and
>
> (f) intrinsic values of ecosystems.

We will put a great deal of weight on these policies because of their place in the hierarchy of instruments to be considered.

[26] We have regard to the remainder of the policies of the NZCPS but do not identify them specifically because they either merely repeat parts of Part II of the Act, or are insufficiently detailed or relevant.

11 Carmichaelia muritai.
12 NZCPS Policy 1.1.2(a)(i).
13 NZCPS Policy 1.1.4.

The Marlborough Regional Policy Statement

[27] The Regional Policy Statement ("MRPS") adds little to the NZCPS or indeed to Part II of the Act. Indeed these proceedings have shown some omissions in both of the mid-level policy documents we have to consider - the NZCPS and the MRPS - in that they do not contain any methodological guidelines for either the assessment of risk, or a substantive ecological checklist as to what might be at risk in the ecosystems.

The proposed district plan (the PWARMP)

[28] The PWARMP was notified in November 1997 and the Council notified changes, made in response to submissions and hearings, in October 1998. The PWARMP is contained in three volutnes:

- Volume 1: Objectives and policies;
- Volume 2: Rules; and
- Volume 3: Maps.

Chapters 9 (Coastal Marine) and 10 (Natural Character) of Volume 1 are theoretically relevant. However most of the relevant objectives and policies in those two chapters either simply repeat similar statements in the NZCPS or are subject to (as yet unheard) references to the Environment Court because they are alleged to be inconsistent with that higher document. Accordingly we give very little weight to those objectives and policies, and much more to those in the NZCPS.

[29] In Volume 2 (Rules) of the PWARMP, marine farms are, as we have stated, a discretionary activity[14]. There are nineteen general matters[15] to assess when considering an application and thirteen specific assessment matters[16]. Again some of those assessment matters[17] simply repeat matters currently[18] in section 104 (1) of the RMA. However the following general matters are relevant:

14 Rule 14/3.1 [PWARMP Vol 2 p. 255].
15 Rule 14/3.2.1 [PWARMP Vol 2 p. 257-258].
16 Rule 14/3.3.8 [PWARMP Vol 2 p. 259-260].
17 eg Rule 3.2.1.1, 3.2.1.2 and 3.2.1.3.
18 i.e. before amendment by the Resource Management Amendment Act 2003.

3.2.1.4 The likely effects of the proposal on the natural character of the coastal environment;

…

3.2.1.7 The extent to which the proposal will add to the cumulative adverse effects of use and development on the coastal environment;

…

3.2.1.14 The extent to which the proposed activity will damage or otherwise modify an area of indigenous flora or habitat of indigenous fauna within the site or area, the integrity and functioning of marine ecosystems ... and the likely effectiveness of any proposed measures to avoid, remedy or mitigate adverse effects.

Of the more specific criteria for marine farms, these are relevant:

3.3.8.1 An assessment of the present nature of the site, both physical and biological - nature of the sea floor, species to be found in the area.

…

3.3.8.9 The visual impact of the farm and its operations.

3.3.8.10 The effect of the activity on areas of natural character.

3.3.8.11 Likely effects on water quality and ecology.

[30] The evidence we heard on the potential effects of the proposal leads us to the view that the proposal would create the potential for adverse effects on the habitat of indigenous fauna, especially Hector's dolphin, and on the natural character of the area, and the presence of a Port zone raises the possibility of cumulative adverse effects.

[31] However, the status accorded the activity gives us cause for concern. It was the evidence of Ms Dawson, an experienced planner called by CBMFL, that the provision of discretionary activity status for marine farms in the whole Wairau-Awatere Resource Management Area suggests that applications for farms will be treated in the same way as those in areas of the in-shore waters of the Marlborough Sounds, the CMZ2 zone, by virtue of the obligation upon the Council to provide integrated management for all the areas under its control. She said that in her view the PWARMP does not anticipate that Clifford Bay could be considered generally inappropriate for marine farming, and added "I consider it inconceivable that no marine farm could be undertaken in this bay". We take it she was referring to the by now well-established principle that a discretionary activity is one that is generally appropriate in a zone but not on every site. This is of

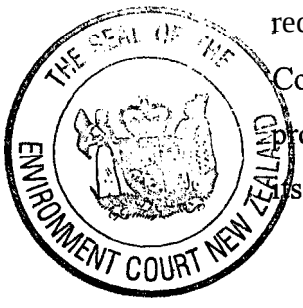
course subject to the precise definition in the relevant plan of the particular discretionary activity.

[32] To some extent the PWARMP is rather more restrictive than many discretionary regimes. It contains provisions which seek to exclude marine farming from areas of high conservation value (which must be read with the statement in Appendix D which identifies the area as an area of national importance for Hector's dolphin). However the PWARMP does not contemplate that Clifford and Cloudy Bays are totally off limits for marine farming. In any event, on the facts that result is not forced on us. Dr E Slooten, who gave evidence for CBMFL, stated that Hector's dolphin exhibit a preference for the first two or three nautical miles, that is four kilometres off-shore. This figure was derived by Dr Slooten from sightings of the various South Island Hector's dolphin populations on the Canterbury coast, the Otago and Southland coast and the West Coast. The placement of the farm is clearly within the in-shore areas preferred by the species. So if we were to refuse consent in these proceedings, it is possible a subsequent consent could be granted for a site further out to sea.

[33] Acknowledging the discomfort between some of the objectives and policies of the statutory documents and the proposal, we consider that in as much as these objectives and policies are implemented by the rules of the PWARMP, the policy statements and plans so far discussed which form the compulsory statutory documents are not necessarily opposed to the proposal. The result depends on the assessment of the risks. There are a number of other matters which help us in that assessment.

Section 104(1)(i) - Other matters relevant and reasonably necessary to determine the application

[34] Ms K A Hughes referred us to the Nelson/Marlborough Conservation Management Strategy ("the CMS"). The Conservation Management Strategy is a requirement of the Conservation Act 1987, and the Strategy for the Nelson-Marlborough Conservancy was passed by the Conservation Authority in 1996. The document provides an overview of the issues in the conservancy and sets an overall direction for its activities. Curiously this type of document, whilst it must be had regard to when



preparing a regional policy statement[19] or plan[20], or a district plan[21], is not expressly included in the list of section 104(1) matters to which regard is to be had when considering a resource consent. However we agree with Ms Hughes that the CMS is a relevant "other matter" within section 104(1)(i) of the Act.

[35] In summary, the CMS aims to ensure that no threatened species are lost, and aims to protect them in their natural environment; it recognises the impacts marine farming, among other human activities, can have on habitat and the significance of cumulative impacts; it further recognises the need for adequate monitoring as knowledge in a number of significant areas is lacking and includes as one of its strategies the use of district and regional planning processes, including resource consents, as a means of protecting natural values.

[36] There are two aspects of the CMS we should particularly comment on. First the CMS aims to achieve the objective of[22]:

> … maintain(ing) the full diversity of native species and communities found in Nelson and Marlborough

In discussing species priorities, the document tells us that a comprehensive system has been developed to determine priorities for the recovery of threatened plant and animal taxa. It then refers us to table 23[23] which sets out priorities for species management based on a national ranking system combined with local assessment of conservation needs. In this table Hector's dolphin has a national ranking of B - high, though not the highest; a conservancy priority of 4, which is low, and the proposed action is, rather inadequately in retrospect, to 'record sightings'.

19 Section 61(2)(a)(i) RMA.
20 Section 66(2)(c)(i) RMA.
21 Section 74(2)(b)(i) RMA.
22 CMS Chapter 4 (p. 141).
23 CMS Part 3, chapter 4, p.148.

[37] Dr Baker under re-examination said that if he were making recommendations on priorities now, he would favour a national ranking of A, and a conservancy priority of 2 (high), but qualified his answer by saying:

> In the absence of any currently documented threat of any large significance, I could not give it a very high [1] priority at this moment.

[38] Secondly, Ms Hughes noted that the CMS acknowledges the following issues as to research and monitoring in the coastal marine area:

- **Research** - most of the public take the continued functioning of the vast . . . marine ecosystem for granted, but our knowledge of the sea relative to terrestrial systems is extremely poor[24];

and

- **Monitoring** - insufficient knowledge often exists including parameters such as: total distribution; population size and status; actual or potential threats; or habitat and conservation requirements[25].

These two issues are interesting because they relate to one of our prime concerns in the proceedings - the lack of scientific knowledge on almost every aspect of the proposal (despite the efforts of a small number of scientists researching marine mammals in New Zealand waters).

[39] While Ms Hughes indicated that it was proposed to begin a review of the CMS in 2004, there was no evidence before the Court that the conservancy either had reviewed, or was intending to review, the priority status of Hector's dolphin prior to that. Otherwise we do not find the CMS to be of much assistance to us. We accept it may be vital to the Director-General for management purposes, but it adds little to the principles of the RMA as amplified in the objectives and policies of the NZCPS, the PWARMP or the NZ Biodiversity Strategy which we examine next.

[24] CMS Part 2, chapter 4, p.179.
[25] CMS Part 3, chapter 4, p.144.

The New Zealand Biodiversity Strategy

[40] Ms Hughes also cited to us a number of principles and objectives from the New Zealand Biodiversity Strategy ("the NZBS"). These largely cover matters found in the statutory documents and the CMS, including the need to preserve coastal species threatened with extinction and protect a full range of natural habitats. Of the thirteen Principles for managing New Zealand's Biodiversity listed in the NZBS, she identified two as of particular relevance to this case:

> Principle Eight - In situ Conservation
> Biodiversity is best conserved in situ by conserving ecosystems and ecological processes to maintain species in their natural habitats . . .[26]

> Principle Twelve - Precautionary Decision Making
> Management actions to conserve . . . biodiversity should not be postponed because of a lack of knowledge, especially where significant or irreversible damage to ecosystems can occur or indigenous species are at risk of extinction.[27]

[41] The NZBS identities[28] fisheries by-catch as a 'problem' for Hector's dolphin; and states[29] that both:

> Land use activities (such as nutrient enrichment and pollution from sewage, sedimentation from land runoff, and coastal development) and aquaculture activities can adversely affect habitats important to both fishery stocks and marine ecosystems, and they need to be managed accordingly.

It is interesting however that the identified threats to coastal marine biodiversity do not include fragmentation of habitat. That is in contrast to Theme 1 of the NZBS which relates to biodiversity on land and identifies[30]:

> The key threats to indigenous species on land . . . [as including first] insufficient and fragmented habitat.

We return to the issue of fragmentation of habitat later.

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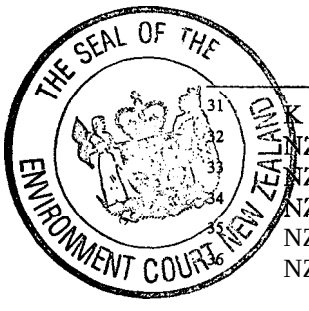
26 NZBS p. 24.
27 NZBS p. 25.
28 NZBS p.57.
29 NZBS p.58.
30 NZBS p.35.

[42] Ms Hughes identified[31] the objectives in Theme 3 (Coastal and Marine biodiversity) which are relevant to this case as:

> Objective 3.3 Sustainable coastal management
> Protect biodiversity in coastal waters from the adverse effects of human activities . . . in this coastal zone.[32]
>
> …
>
> Objective 3.4 Sustainable marine resource use practices
> Protect biodiversity in coastal and marine waters from the adverse effects of . . . coastal and marine resource uses.[33]
>
> …
>
> Objective 3.6 Protecting marine habitats and ecosystems
> Protect a full range of natural marine habitats and ecosystems to effectively conserve marine biodiversity, using a range of appropriate mechanisms, including legal protection.[34]
>
> …
>
> Objective 3.7 Threatened marine and coastal species management
> Protect and enhance populations of marine and coastal species threatened with extinction, and prevent additional species and ecological communities from become threatened.[35]

[43] In our view Ms Hughes has omitted another important objective included in Theme 3. It is to[36] :

> Substantially increase our knowledge of coastal and marine ecosystems and the effects of human activities on them.



31 K A Hughes, Evidence-in-Chief para 89.
32 NZBS p. 65.
33 NZBS p. 66.
34 NZBS p. 67.
35 NZBS p. 68.
36 NZBS p. 64.

Actions:

(a) Improve our knowledge of marine species, including taxonomy, distribution, habitat requirements, and the threats to species.

(b) Survey, assess, and map habitats and ecosystems important for indigenous biodiversity and develop an agreed bioregional classification system

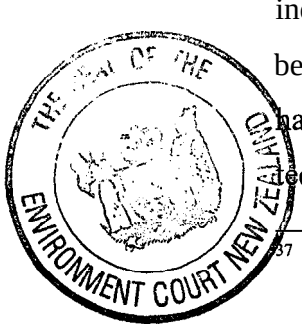
(c) Identify the uniqueness, representativeness, and importance of the biodiversity of New Zealand's coastal and marine ecosystems.

(d) Identify, assess, map and rank the threats to New Zealand's coastal and marine biodiversity.

(e) Develop an environmental monitoring system to provide information and a spatial understanding of: the status of marine species; fish stocks; habitats important for indigenous biodiversity; marine environmental health, threats to biodiversity; and the effectiveness of measures to avoid, remedy or mitigate the adverse effects of activities on marine biodiversity. Ensure that this information is readily accessible to all interested groups.

(f) Promote individual and community awareness of the effects of activities on marine biodiversity, and the opportunities and responsibilities to protect and maintain habitats and ecosystems of importance to biodiversity.

[44] Further, that objective of the NZBS is expanded in its own Theme 9 on "Information, Knowledge and Capacity". The relevant objectives and actions include[37] identifying and filling critical gaps in scientific knowledge (including applied research) and prioritising and coordinating future research to address key issues and threats to biodiversity; investing in relevant research; accelerating biodiversity survey, identification and assessment of threats to key ecosystems; developing and using cost-effective methods for monitoring threats to indigenous biodiversity; ensuring that local, regional and national reporting informs ongoing priority as a key part of an adaptive management approach; developing resources and systems that promote the consolidation and sharing of information; and investigating and raising awareness of the range of incentives (including financial information and property based mechanisms) which resource managers can use to encourage and reward sympathetic management of indigenous biodiversity. We have quoted from and summarised this theme quite fully because the NZBS is more up-to-date than the NZCPS and the CMS. While the NZBS has less statutory weight of course than the NZCPS, it is useful in that it incorporates techniques which start to look around the difficulties caused, with the best of good



[37] NZBS p. 111 et ff: we have omitted the identification of "key players" that follows each proposed action. However, "research providers" seem to be included at every point.

intentions, by the precautionary approach inherent in the RMA and explicit in the NZCPS. In our view all these objectives and actions are relevant.

[D] How are the effects to be assessed?

Difficulties with the case law

[45] The most important issue in this case, on the evidence presented to us and in the light of the guiding principles, objectives and policies we have discussed, is the potential effects of the marine farm on Hector's dolphin as a species, as a population, and as individuals. There is very little certainty about those alleged effects, and several were described by witnesses as "cumulative" effects - that is, effects which are[38]:

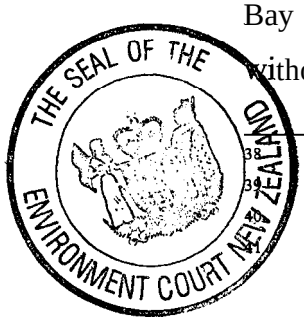
> formed by heaping on, ... increasing in force by successive additions

or[39]

> (1) "growing in quantity, strength, or effect by successive additions or gradual steps"
> (2) "gained by or resulting from, a gradual building up".

[46] One might think that all future effects which might be caused by a proposed activity can simply be considered under section 104(1)(a) of the RMA which imposes a duty to consider 'any actual and potential effects'. That is not so. In *Dye v Auckland City Council*[40] the Court of Appeal has interpreted sections 104(1)(a) and section 3, which defines 'effect', in a restrictive way. Indeed, in our respectful view, this case shows that in two important and related areas the case law under the RMA is losing touch with the natural world of ecosystems[41] in all its confusion and uncertainty. Those areas are, first what is included in the concept of an "effect" in the RMA; and secondly what is the appropriate standard of proof for alleged effects.

[47] To see how problems arise, we recall that the applicant's position is that Clifford Bay with a marine farm will effectively be, for Hector's dolphin, the same as the bay without. There is some evidence - described in part [D] below - that suggests it is



38 The Shorter Oxford English Dictionary 3rd Ed, (1985 reprint).
39 Collins English Dictionary (Fifth Edn 2000).
40 [2001] NZRMA 513.
41 Expressly recognised in section 5(2)(b) of the RMA and included in the definition of 'environment' in section 3.

possible that null hypothesis may not be true. The evidence is that there is an unquantified possibility that the marine farm will cause, for example:

- dolphin entanglement; and/or
- reduction in dolphin habitat; and/or
- removal of a breeding/nursery area; and/or
- fragmentation of dolphin habitat; and/or
- reduction in fish for food;

and that any one of these effects and/or the accumulating effects of those low probability effects may have a high impact on the survivorship and breeding of Hector's dolphins. There is even a (very low) risk that the species could be extirpated as a result of the proposed marine farm in addition to existing factors (net deaths; possible land sourced pollution).

[48] The strange conclusions one could derive from some recent cases are that some or all of those possible results (to use a neutral word) should not be considered because:

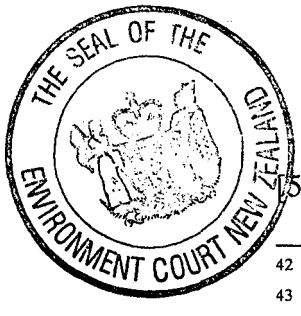
- as accumulating effects of potential effects they may not fall within the phrase "actual and potential effects" in section 104(1)(a) of the RMA; and
- they are not effects established on the balance of probabilities.

What are "effects"?

[49] One problem arises because in Dye the Court of Appeal stated that the reference in section 104(1)(a) to 'actual and potential effects' deliberately excludes the other meanings of "effect" in section 3. It concluded[42] that:

> Had Parliament wished to adopt the definition, it would have used simply the word 'effects'... rather than the words 'any actual or potential effects'.

[50] Further, in Dye the Court of Appeal also stated[43]:



42 [2001] NZRMA 513 at para [41].
43 [2001] NZRMA 513 at para [38].

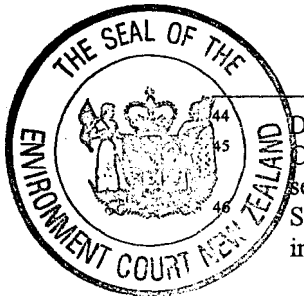
> A cumulative effect is concerned with things that will occur rather than with something which may occur, that being the connotation of a potential effect. [Our underlining]

Although we are bound by that statement it leads to practical problems. As the Environment Court recently stated, in *Waring v Tasman District Council*[44]*:*

- All future effects are potential effects, because they have not occurred yet;
- In criminal jurisdictions concerned with past events, the Courts appear to be concerned with proof to a probability of somewhere between 99% and 99.9%: it therefore seems strange to require 100% certainty of cumulative effects under the RMA.

It may also be worth observing that all cumulative effects are conditional in the sense that resource consents are permissive. Financial or other factors may prevent them ever being exercised.

[51] There are other substantial problems with limiting "cumulative effects" to mean effects which "will" happen. First, in the dark cave of the factual and contingent world in which the Environment Court works, the evidence tends to illuminate very few certitudes[45] about the future, and reveals instead many more potential effects (some of greater, some of lesser probability). Secondly, *Dye* appears to make it necessary for local authorities (and this Court) to distinguish between effects which will happen and those which only may happen. Is it then an error of law to consider cumulative (in the dictionary sense) effects which may happen? The effect of *Dye* is that we have to name such effects something else - perhaps 'accumulative' effects - but surely they are relevant and should still be considered? Thirdly, the Courts, when dealing with cause and effect in environmental law, have turned away from categorising **causes** according to 'abstract metaphysical theory': *Alphacell Ltd* v *Woodward*[6]. However it appears as a result of *Dye* that we might need to **so** categorise **effects.**



44 Decision C115/03 at para [31].
45 Considerable robustness is assumed: that the sun will rise tomorrow, or that new houses require sewage disposal is taken as fact.
6 See [1972] 2 All ER 475 at 489-490 per Lord Salmon (HL). This was cited by the Court of Appeal in *McKnight v NZ Biogas Industries Ltd* 1B ELRNZ 263; [1994] 2 NZLR 664.

[52] That the Court of Appeal was itself aware in *Dye* that its analysis was potentially unhelpful is perhaps revealed by its statement that[47]:

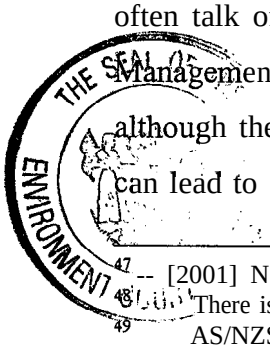
> So far therefore, in spite of the seemingly deliberate decision not to rest on the defined term "effect" it is not easy to see what confining purpose the legislature may have had. [our underlining]

[53] Fortunately we think there is a simple solution. We are of course bound by *Dye*, but it can be distinguished. We adopt the practical approach that all relevant effects, including 'accumulative' effects which on the evidence may occur, must be taken into account as 'effects' even if they do not necessarily fit within any of section 3(a)-(e) or section 104(1)(a) of the Act because the definition in section 3 is inclusive; and as 'other relevant matters' under section 104(1)(i) of the Act.

That approach is important in this case because, as we have said, some of the effects the cetacean experts are concerned about are clearly not 'cumulative' effects within the meaning of section 3(d) as explained by the Court of Appeal. Instead, they are potential accumulative effects of low probability and high impact.

[54] It appears to us that, consequently, there is no legal test for the wide set of accumulative effects (of which 'cumulative effects' in the *Dye* sense are, philosophically, a null or dead set). Whether there are accumulating effects is, in each case, a matter of fact, degree, prediction and essentially, judgement by the territorial authority.

[55] More positively, it is important to note that the definitions of 'effect' in section 3 of the RMA show that generally[48] the Act contemplates that an 'effect' has two relevant components - a probability and an impact on the environment. We note that people often talk of "risk" in this context. Indeed, there is a very useful discussion of "Risk Management" in the Australian/New Zealand Standard[49] of that name. However, although the Environment Court occasionally writes of "risk" (in this decision too), it can lead to sloppy thinking especially if quantified - "high risk" or "low risk". What



47 -- [2001] NZRMA 513 at para [41].
48 There is at least one exception: for 'past effects' included by section 3(c) of the RMA.
49 AS/NZS 4360: 1999 (approved by the Council of Standards New Zealand on 12 March 1999).

those terms do not differentiate are the likelihoods and the consequences which, as we have stated, are both important components of "effects" to be considered under the RMA.

What is the standard of proof?

[56] Before we turn to the standard of proof, we should first mention the agreed approach to the burden of proof on an applicant for a resource consent. Mr Guthrie, counsel for CBMF, accepts that there is a legal and initial evidential burden on CBMF as applicant for the resource consents to show that granting them will achieve the objectives and policies of the relevant plans under which consent is required, and, ultimately the purpose of the Act: *Shirley Primary School v Christchurch City Council*[50]. All counsel agreed that the evidential burden shifted (or was potentially able to be shifted) as each party gave its evidence.

[57] More contentious in this case is to what standard the parties have to prove their respective cases about the risks to the environment of Clifford Bay, and in particular to the Hector's dolphins which live there, and to the amenities of humans who live nearby.

[58] It is beyond dispute that disputed facts in issue in proceedings under the RMA have to be proved on the balance of probabilities. In a case under the RMA in which one issue was whether certain land was waahi tapu - *Ngati Maru Iwi Authority v Auckland City Council*[51] - Doogue J confirmed that:

> … the appropriate standard of proof upon someone asserting a fact, . . . [is] the balance of probabilities. I do not read *Shirley Primary School* as in conflict with what is common to so many decisions of the Environment Court.

We take it that the second sentence in that passage shows that Doogue J was carefully confining his statement to the standard of proof of facts. He was not stating anything about the standard of 'proof' of the judgements about possible future events and their effects which is the principal task of decision makers under the RMA.

50 [1999] NZRMA 66.
51 High Court, Auckland AP 18/02 Doogue J 7/6/2002 at para [68].

[59] However, in the earlier decision of *McIntyre v Christchurch City Council* the Planning Tribunal stated[52]:

> … the evidence must satisfy us of the fact (ie that there will or will not be such an effect) on the balance of probabilities and having regard to the gravity of the question.

To similar effect are recent decisions of the Environment Court in *Contact Energy Ltd v Waikato Regional Council*[53] and *Kiwi Property Management Ltd v Hamilton City Council*[54]. It should be noted that those cases differ from the statement in the *Ngati Maru* case in two ways: first *McIntyre* refers to propositions about the future, which must usually be only contingently factual, and secondly it contains the qualification as to "the gravity of the question". With respect there are questions raised by the statement in *McIntyre* which need to be unpacked to find the meaning of the formula used:

(1) Can all propositions about a possible future event be described as a 'fact'? (Some can: a very high statistical probability may be described as a "fact". But a particular event perhaps not: it may be the exception.)

(2) Is it suggested that a statement about the risk of a catastrophic event (say the failure of a dam) should always be decided on a 50-50 basis?

(3) The answer to (2) is obviously 'No' because of the gravity of the question. So when is an issue sufficiently grave to demand a different standard of proof? And to what standard?

[60] In *Contact Energy Limited v Waikato Regional Council*[55] another division of the Environment Court considered issues about the standard of proof on an application for resource consents. First it recorded[56]:

> **Standard of proof**
>
> [41] The District Council submitted that to grant the consents, the Court must have a high degree of assurance and certainty about the extent, location and probability of adverse effects and that the effects can and will be avoided or remedied, or very substantially mitigated. The respondents contended that the applicant had not produced the

52 [1996] NZRMA 289 at 306-7.
53 (2000) 6 ELRNZ 1.
54 A045/2003.
55 (2000) 6 ELRNZ 1.
56 (2000) 6 ELRNZ 1 at paras [41] and [42].

> compelling evidence required to satisfy the Court that the potential impact of the effects will not occur. Counsel for the Tauhara Middle Trusts submitted that because there is not enough detailed scientific knowledge about the southern part of the Tauhara Geothermal Field to be able to predict its performance as a result of drawdown of fluid from the northern part of the field, a very conservative approach is called for.
>
> [42] Those submissions, and the response to them on behalf of Contact, were said to have to do with the standard of proof to be applied by the Court in deciding this appeal. Having considered the submissions on this topic, **we have concluded that they do not relate to the standard of proof of facts on which findings have to be made. Rather, we consider that they are arguments relevant to the exercise of the discretionary judgment under section 105(1) to grant or refuse the consents sought.** We will address those submissions in that context, later in this decision. On the question of proof as such, we adopt the submission of counsel for the respondents, Mr Taylor, that in these proceedings there is no burden of proof on any party, only an obligation on a party who asserts a fact to present evidence in support of it, and the standard of proof required is on the balance of probabilities, and should reflect the gravity of the situation. [Our emphasis]

Starting with the last two points in that passage from Contact Energy: as for the standard of proof we disagree with the stated breadth of the principle for the reasons given above. We also disagree with Contact Energy as to the burden of proof, but that is not an issue in this case because CBMFL accepted it had the initial burden.

[61] More importantly, we draw attention to the statement that submissions on scientific knowledge of potential impacts "do not relate to the standard of proof of facts on which findings have to be made". The Court is there recognising the sorts of problems with identifying and appraising potential impacts of low probability that another division of the Court struggled with in *Shirley Primary School* and with which we are wrestling here. However, in our view holding that all findings by a local authority, or the Court, are as to facts and that all judgements by the Court occur later leads to four related difficulties. First, the approach suggests that the evidence a local authority or the Environment Court decides on consists only of facts. That, unfortunately, is not correct. Many of the "facts" are actually statements about the future. Sometimes these are made on a proper scientific basis, so that they are very like facts". But in other cases, a local authority is asked to make judgements about risk of the hypothetical sort we have described. We add there is nothing unusual about what we

do - most humans subjectively assess various risks every day of their lives. Local authorities and the Environment Court seek to assess them in a more rational and transparent (but still often subjective) way. Secondly, leaving everything to the end loads a huge quantity of discretionary judgements into the section 105(1) assessment. Thirdly, as a corollary to that point, in our view a decision should show on its face that even when assessing the effects of a proposal under section 104(1)(a) and (i) of the RMA a local authority is making judgements, not simply deciding facts. Fourthly, it decreases the transparency of a decision. The reasons for a decision can be ascertained more readily if the assessment of the risks of each relevant (adverse) effect are given.

[62] As we have stated, the majority of 'factual' disputes in this Court - and this is what distinguishes its jurisdiction from that of most other Courts - are about possible future activities and their possible effects. In *Fernandez v Government of Singapore*[57] the Privy Council advised that referring to 'the balance of probabilities' is:

> … a convenient and trite phrase to indicate the degree of certitude which the evidence must have induced in the mind of the Court as to the existence of facts . . . But the phrase is inappropriate when applied not to ascertaining what has already happened but prophesying what, if it happens at all, can only happen in the future.

[63] In *Shirley Primary School v Christchurch City Council*[58] the Environment Court concluded:

> [The] distinction between evaluation and fact-finding is of crucial importance under the Act. Almost every case under the Act is concerned about the evaluation of many risks and thus issues as to the standard of proof are even more misconceived. As *Cross on Evidence* states succinctly:
>
> "Unfortunately, Judges sometimes apply the balance of probabilities test to evaluations of fact when in truth the test has no part to play."

We agree. To apply the balance of probabilities test to predictions of risk or any other prediction of future effects on every occasion is unhelpful. It conveys a sense of scientific rigour to a decision which may be unwarranted. Further, to qualify the reference to the standard of proof being on the balance of probabilities, having regard to

57 [1971] 2 All ER 691.
58 [1999] NZRMA 66 at (120).

the seriousness of the issues is to apply a test where the parameters can and often do pull in different directions. The standard suggests that if the consequences are trivial (to whom?) the test for non-harm may be less than 50-50, but if the effects are serious (again, to whom?) then the test to prove no harm may be set significantly higher than a 50% risk[59].

[64] It is possible, of course, to avoid the problem by stating: "we find that on the balance of probabilities there is a 10% (say) risk that a certain effect will happen". We have four observations about that:

(1) Both statements about probabilities are about our ignorance and uncertainty. They are not assessing different things;

(2) Consequently, while a 51%/49% result is satisfactory in civil proceedings where a positive result to one party must occur, that is not so satisfactory in public litigation under the RMA. No decent scientist would regard an effect as satisfactorily proved if the confidence limits were only 50%. On the other hand, science and statistics can often claim much higher predictive power for populations, of small risks, e.g. there is a 0.002% risk[60] of dying while having an appendix removed;

(3) It is unusual for the Environment Court to have precise statistics on the issues before it: much more likely is that it will be given a result scientifically proved to a certain (say 95%) probability for an alleged similar effect, and then invited to infer an analogous effect and probability in the case before it. Precise quantification of the risk is usually impossible. Far more likely are the qualitative assessments usually given to the Court;

(4) Even then it may be inappropriate to talk of "the balance of probabilities" about a potential risk of low probability. If two witnesses assert different probabilities, does the Council (or on appeal, this Court) decide on the balance of probabilities or does it simply weigh them and decide "on balance" but not "of probabilities"? For example, consider witness A

[59] [1999] NZRMA 66 at (129).
[60] Derived from R C Mitchell's "Risk 'ladder"' as displayed in S Breyer Breaking the Vicious Circle [HUP, 1993] p. 5.

who asserts a risk is of medium probability and medium impact; witness B asserts a risk has high impact but low probability. On the balance of probabilities A might be preferred, but having regard to the potential impact, B might be preferred. That is for the reason stated by the Privy Council in *Fernandez v Government of Singapore*[61]*:*

> There is no general rule of English law that when a Court is required, either by statute or at common law, to take account of what may happen in the future and to base legal consequences on the likelihood of its happening, it must ignore any possibility of something happening merely because the odds on its happening are fractionally less than evens.

[65] The terms in the previous paragraph have been explained more fully and competently by Professor D H Kaye, one of the doyens of research into the relationship between statistics and the burden of proof. He has pointed out that the justification for the balance of probabilities test - more accurately called in the USA, the 'bare preponderance of evidence' test - is not to equalise the rates of errors for plaintiffs and defendants: see 'The error of equal error rates'[62]. The real justification for the civil standard of proof is that[63] "it minimises expected losses"[64].

[66] Further Professor Kaye points out that this form of equality is only appropriate whenever[65]:

> (1) An error is equally serious regardless of who it favours or hurts, and (2) errors for different parties in different cases do not cancel each other out.

Those conditions may often not obtain in resource management cases where there are ecological issues. For example in these proceedings there is a potential profit to CBMFL foregone on one side if the coastal permits are declined. On the other is the potentially much greater cost, (so section 5(2)(b) and section 6(c) assume) if a species of dolphin is made extinct. In other words it is not logical automatically to apply the

61 [1971] 2 All ER 691.
62 Kaye, D H in Law, Probability and Risk (2002) 1, 3-8.
63 Kaye, D H in Law, Probability and Risk (2002) 1 at 7.
64 Which raises a nice point for students of law and economics.
65 Kaye, D H in Law, Probability and Risk (2002) 1 at 6.

balance of probabilities to the judgements necessary under the RMA. That leads us to the cautious approach enjoined by the RMA.

How is a precautionary approach applied?

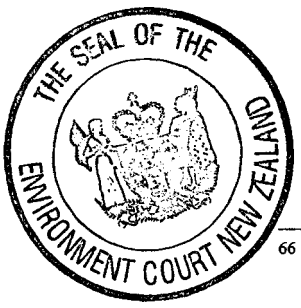
[67] As for the application of a precautionary **principle,** we adopt the statement of the Environment Court in *Shirley Primary School v Christchurch City Council*[66]*:*

> In summary, we do not consider it is appropriate to apply the "precautionary principle: or the other policies suggested by witnesses and supported by counsel for three reasons. First a precautionary approach is already implicit in the Act and emerges in the flexibility of the standard of proof applied by the Court and (as we shall see) in the weight given to evidence that has only been "proved" to a low standard (probability). Secondly such a "principle" is an unnecessary complication in an already complex statutory and factual matrix. Thirdly, application of the precautionary principle (or any of the other rules of thumb) to our decision under s 105(1) would lead to double-counting of the need for caution. If the appropriate standard of proof is on a sliding scale between the balance of probabilities and beyond reasonable doubt, depending on the impact of the effect, the fact is that the appropriate caution has been exercised when deciding under s 104(1)(a) what the effects are to be considered under s 105. If the Court applies the "precautionary principle" as another matter under section 104(1)(i) then the need for caution will have been considered twice.

[68] In our view, there is no Procrustean - one size fits all - principle for risk assessment and the standard of proof of risks under the RMA. In our view the approach the Act requires is that under section 104(1)(a) and (i) of the Act <u>each</u> potential effect raised in the evidence should be assessed qualitatively, or preferably quantitatively, in the light of the principles of the RMA, and the objectives and policies of the relevant instruments as to:

(a) probability of occurrence; and

(b) force of impact.



[66] [1999] NZRMA 66 at (223).

[69] Whilst facts must be proved on the balance of probabilities, there is no single standard of proof for most of the judgements involved in those two steps, nor does the same standard have to be used for each risk. The standard varies according to the weighing of the potential impact of the effect.

[70] We do not overlook that the NZCPS and the NZBS include admonitions to be extra cautious in certain situations. We apply their approaches below.

Finding a useful approach to risk assessment

[71] While section 104(1)(a) and (i) are primarily concerned with "effects" - to analyse "adverse effects" in terms of "risks" is useful for three reasons. First it is a convenient short-hand for the two elements (probability and consequences) of most of the effects which have to be considered. Secondly there is a huge literature on "risk assessment" which can be referred to as a check that there are no relevant aspects of "effects" which are being overlooked. Thirdly it provides a method of finding some practical middle ground in any given case between extremely weak and extremely strong versus a precautionary approach.

[72] Tentatively, and conscious that experts and/or further cases will be able to improve these guidelines considerably, we suggest that the following types of steps[67] are useful in analysing risk (the possibility of adverse effects) in the contexts of the RMA:

(0) **Analyse the relevant principles, objectives and policies**

This step occurs under the introductory words to section 104 (1) - "Subject to Part II ..." - and under section 104 (1)(b) to (h) of the RMA. It is important that environmental effects cannot occur in a vacuum, they must be assessed in their context. We have given this step the number (0) because under the RMA it must occur anyway - under the identified paragraphs of section 104(1) of the Act. Usually risk assessment under the RMA can be thought of as starting at the next step.

[67] See AS/NZS 4360: 1999 'Risk Management" - approved by the Council of Standards New Zealand on 22/3/99; also "Guidelines for Environmental Risk Assessment and Management" DEFRA (UK) 2002; and Breaking the Vicious Circle S Breyer [Harvard UP, 1993] pp 9-10.

The next four steps occur under section 104(1)(a) and (i) of the RMA.

(1) *Identify the risks*

All the relevant risks caused by a proposed activity must be identified. Relevance is determined by reference to the principles, objectives and policies.

(2) *Identify the consequences*

For each relevant adverse effect this may require estimation of the impact or magnitude of the effect and this needs to be assessed in the context of

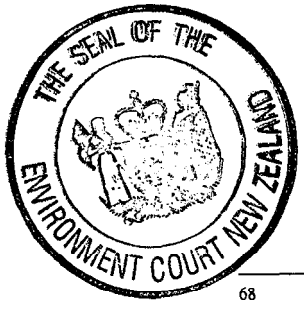
- the spatial scale of the impact;
- the temporal scale of the impact (how long it will take to show and how long it will last);
- any other relevant 'dimension'.

(3) *Estimate the probability of harm*

Simply because an effect on the environment occurs, this does not mean it will be adverse. That depends on the sensitivity of the species or resources being affected, and on the amount and duration of the exposure to the activity causing the effect. This step is very likely to involve a value judgement by the deciding authority (see the next paragraph on expressing scientific uncertainty).

(4) *Evaluate the significance of a risk*

This also involves a value judgement[68] under the objectives and policies of the relevant plans (and under Part II of the Act). If a risk is adverse then the steps (and their costs) which can be taken to avoid, remedy or mitigate the adverse effects must be analysed. Such an evaluation may also need to consider the existing environment.



68 Under section 104(1)(a) RMA.

(5) *A comparative risk assessment*

All the relevant risks will then be assessed in relation to each other. All these evaluations then become part of the Court's overall weighing of the evidence under section 105(1) of the RMA.

[73] Finally we note that there is a paper by C Weiss on "Expressing scientific uncertainty"[69] which might assist discussion on this slightly vexed topic of 'the standard of proof'. After discussing the fact that in the US legal system there are many more standards of proof than the familiar criminal and civil standards, the author presents "a subjective, user-friendly scale of scientific certainty". His Table 3 is a comparison of the "legal", "scientific", "Bayesian" and "IPCC"[70] scales of scientific certainty. We reproduce it as a Schedule at the end of this decision. We have attempted to make our findings consistent in their language by modifying our wording slightly so that it is consistent with the fifth column of that table.

[E] Effects of a marine farm - the evidence

Effects on the local marine environment

[74] The basic position of CBMFL is that Clifford Bay as a whole including a marine farm will effectively be the same (or perhaps better) in ecological terms as the bay in its present condition. The applicant relied on the evidence of Dr Murdoch, a marine scientist employed as Director of Research with the National Institute of Water and Atmospheric Research Limited. Dr Murdoch stated that:

> Based on current knowledge, the total effect of the proposed farm on the marine environment of Clifford Bay is expected to be insignificant. In the unlikely event that an adverse effect occurs … this is not expected to be irreversible.

Cross-examination did not weaken Dr Murdoch's evidence nor was there any serious evidence to the contrary, although he acknowledged that his assessment related to the

Weiss, C in Law, Probability and Risk (2003) 2, 25-46.
Second Report of the Inter-Governmental Panel on Climate Change 2001.

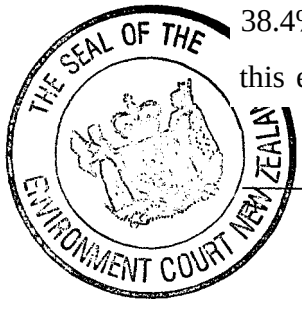
marine and benthic environment in general, and that he had undertaken no specific assessment of the effects on Hector's dolphin.

The facts about Hector's dolphin

[75] The following facts are known about Hector's dolphin (to a probability much greater than 50%). Hector's dolphin is a marine mammal endemic to New Zealand. Its population is found in four population groups, one around the North Island and three around the South Island. Recent genetic research suggests very limited contact between these population groups. The total South Island population is around 7,200. This population is classified as endangered by the International Union for the Conservation of Nature, and nationally vulnerable by the New Zealand Department of Conservation.

[76] The dolphin is an inshore species, living mostly within the 100 metre depth zone, that is, within 4 nautical miles of the shore. Compared with most dolphin, Hector's dolphin has a small range of about 30 kilometres average, hence the very limited inter-breeding between populations. The dolphin live for around twenty years, and females have their first calf at around 7 to 9 years old. They breed from then on at intervals of two or more years. The combination of low reproductive rate (their maximum population growth is around 1.8%) and the adverse impact of fisheries has resulted in the species becoming endangered.

[77] Clifford Bay and Cloudy Bay, immediately northwards, are frequented by Hector's dolphin. Dr E Slooten, a senior lecturer at the University of Otago who has published extensively on the species, and was called as a witness by the applicants, gives the latest abundance estimate at 162, though the co-efficient[71] of variation, 55.4% is very high. Dr A N Baker, a marine scientist with the Director-General who has also published extensively on New Zealand whales and dolphins, gives the lower and upper levels of confidence as 56 and 474. In context, the abundance estimate for the entire coastline between Farewell Spit and Motunau is 285 with a co-efficient of variation of 38.4%. We have little doubt that Clifford and Cloudy Bays are areas of significance for this endangered species.



[71] The 'co-efficient of variation' is not an intuitively obvious idea. It is defined as the 'variation as a percentage of the mean': J Tal Reading Between the Numbers (McGraw-Hill 2001) p.100.

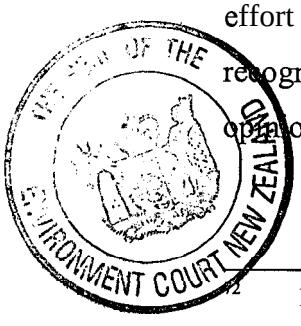
[78] The marine scientist, Dr Murdoch, calculated[72] that if the dolphins' home range was 25 kilometres within Clifford Bay and between 800 metres and 10 kilometres from the shore, the percentage of dolphin habitat occupied by the farm was less than 2% and that unless the site was a particularly preferred area of habitat, this would not be a significant concern.

Potential effects on Hector's dolphin

[79] The potential adverse effects of a marine farm on Hector's dolphins identified by the expert witnesses are:

(1) Death or injury by entanglement;
(2) Reduction in available habitat;
(3) Removal of what might be a breeding/nursery area;
(4) Fragmentation of dolphin habitat;
(5) Reduction in available food (fish) because of:
    (a) faecal pollution of the seabed under the farm;
    (b) removal of food at the bottom of the food chain by mussels consuming phytoplankton, with consequent reduction in dolphin food species;
(6) The cumulative effects of any one of (1) to (5) above combined with:
    (a) the adverse effects of the Clifford Bay Ferry Terminal (if constructed); and
    (b) the existing set-net and trawling death rate; and
    (c) marine pollution flowing from landbased activities; and
(7) Potential indirect long-term effects such as reduced breeding rates and inbreeding.

There was little disagreement that these are all possible effects, but there was no real effort to quantify the risks or the consequences further. That is not a criticism; just a recognition of the lack of research into the issues. However we accept that the expert opinions of Dr Slooten, Dr Murdoch and Dr Baker should be accepted as beyond mere



[72] R C Murdoch, Evidence-in-chief, paras 49 and 50.

suspicion, innuendo or assertions of no probative value. They rank as expert hypotheses with some analogical evidential backing.

[80] It was agreed by all parties that the effects of aquaculture on whales and dolphins was a new field of study. The effects of marine farms on the behaviour of Hector's dolphin are largely unknown. There was also a substantial measure of agreement between the two cetacean experts, Dr Slooten and Dr Baker, on what the potential effects of the farm might be. They both thought that the risk of entanglement of dolphins in the marine farm was low. However, Dr Baker noted that it was an added risk and Dr Slooten conceded that the sustainable level of impact on the population of Hector's dolphin was very low.

[81] Both experts drew attention to the possibility of **habitat competition,** and reported anecdotal evidence of the behaviour of Hector's dolphins which, from some reports, showed them using, and in others avoiding, the area of mussel farms. They both reported evidence from scientific studies of closely related dolphin species which showed them avoiding the areas of marine farms. A study conducted by researchers from Texas A & M University in Admiralty Bay[73] during 1998-2001 had shown that while dusky dolphins used the bay extensively, their use of areas occupied by mussel farms was relatively low. A study conducted in Shark Bay (Australia) over 12 years, before and after the introduction of an oyster farm, showed that female bottlenose dolphins significantly changed their ranging behaviour after a major extension of the farm. Likewise, the Chilean dolphin, a close relative of Hector's dolphin, has been found to avoid areas used for mussel farming. While those observations are analogical evidence rather than direct observation of Hector's dolphin, the possibility of Hector's dolphin behaving in the same way is not so remote that it can be discounted.

[82] There is no evidence that the site is a breeding/nursery area. And none that it is not.

[83] Dr Baker stated that the seabed is usually changed by the deposition of shell and faeces from mussel farms, and that this **pollution** in turn may lead to changes in

[73] Between Pelorus Sound and French Pass.

benthic[74] fauna and consequential changes higher up the food chain. Dr Murdoch however, told us that the site was influenced by southerly swells, which produced larger waves that not infrequently reached 2 metres in height. The stirring effect of these waves inhibits the deposition of mud in the area, and is likely also to prevent sedimentation of mussel pseudo-faeces in the area. He said that shell material was also likely to be moved during storm events and swell, and that given the existence of greenshell mussels in Clifford Bay, the addition of further shells to the bed by the marine farm is unlikely to have a major effect on the local benthos.

[84] Dr Slooten told us that the changes caused by the presence of a mussel farm to the fish population were unknown and could have either positive or negative effects. However, one of the effects was **competition** for **food.** This would arise indirectly: mussel farms would compete with zooplankton and other filter feeders for phytoplankton. Thus the presence of a sizeable farm with cultured mussels could affect the recruitment of other marine species to the area. While studies of the effect of mussel farming on phytoplankton have focused on ensuring that they do not drop below levels necessary for the growth of mussels, very little is known about whether shortage of phytoplankton impacts on other species before the mussels - a point which was pursued by Mr Browning for the Marlborough Environment Centre.

[85] Drs Baker and Slooten were both concerned that **the fragmentation** of habitat might cause effects out of proportion to the percentage of habitat occupied. An identical sentence was found in the evidence of both experts:

> In some cases patchiness of habitat can produce abrupt changes in distribution and abundance.

Dr Slooten opined that the combination of the marine farm and the potential fast ferry terminal might produce a cumulative fragmenting effect. She was concerned that the two projects would substantially reduce the total amount of undisturbed habitat and fragment what remained. Such fragmentation, in her view, could have impacts on an eco-system as severe as large scale disturbance confined to just one area.

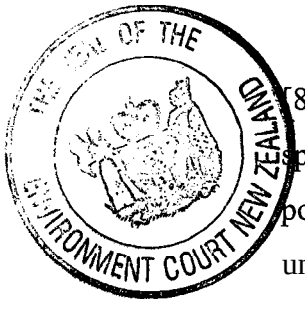
[74] 'Benthic' from 'benthos' = 'the flora and fauna found at the bottom of a sea or lake' The Concise Oxford Dictionary(8th Ed, Clarendon Press, 1990) p.103.

[86] Both cetacean experts also spoke of more subtle indirect effects. Dr Slooten wrote of flow-on effects from displacement such as effects on feeding and reproductive success. Dr Baker was slightly more specific. He considered that fragmentation poses a high risk for species already threatened or vulnerable, as it reduces the opportunity for contact between population groups in the now divided area, which could result in in-breeding and **reduced reproductive success.** Further, Dr Slooten said in cross-examination:

> If the dolphins were to change their habitat use in response to a mussel farm this would be relatively easy and fast to detect ... However if there were a change in population size from year to year this would take a decade, possibly longer to detect.

Such factors as availability of food and efficiency of habitat use were in her view also influential in survival and reproductive rates, although Dr Slooten conceded that the first of these was near the bottom of the list of potential problems. We have not overlooked the wide range of factors which could lead to these indirect effects, in reaching our eventual conclusions.

[87] The experts also agreed that **netting,** which occurred to a limited extent in Clifford Bay, was a far more likely source of immediate danger to Hector's dolphin than a mussel farm. Dr Slooten said that if the presence of the farm reduced the extent of netting, this was of net (sic) benefit to Hector's dolphin. However, Mr A S Baxter, a graduate zoologist employed by the Department of Conservation as a technical support officer (aquatic protection), was of the view that if the fishing activity was simply displaced, and the dolphins were also displaced, the dolphins had an increased likelihood of contact with the fishing activity. Dr Slooten conceded this possibility in cross-examination, and indicated that, off Banks Peninsula, the marine mammal sanctuary had acted to displace rather than remove set net effort from the Canterbury area.



[88] Dr Slooten wrote that while in the past the policy for managing threatened species had been to take action when a particular impact had produced a decline in population size, the problem in practice was that such an impact was difficult to detect unless or until it was very severe, particularly so in the cases of marine mammals, given

the challenges of detecting changes in population size, survival and reproductive rates. By the time an impact can be detected with a high level of statistical confidence it may be too late to halt the decline and recover to the original population size and distribution.

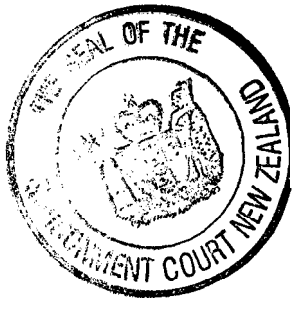
[89] The wide confidence limits for the population of Hector's dolphin (about ± 156 dolphins against a mean that is only a little larger) in Clifford and Cloudy Bays appears to us to confirm the evidence of Dr Slooten in this matter. Moreover, the evidence of Dr Murdoch, which outlined the difficulties in gaining accurate estimates of changes in fish abundance, also lends support to the concern that the monitoring proposed by the applicant may not detect changes that prove to be significant in the long term; at least not early enough to ensure that the effects are reversible. For that reason we find that before any resource consent is commenced (if it is to be commenced) there must be some initial study of the waters of Clifford and Cloudy Bays.

Other threats to Hector's dolphin

[90] Mr Baxter, who specialises in marine ecology and marine mammal management gave evidence of[75]:

> The broader management of Hector's dolphins and the Government's active management of other significant issues facing this endemic species (e.g. strandings, fisheries by-catch issues and marine mammal watching) in order to fully understand and put into context the potential effects of the proposed marine farm.

[91] Mr Baxter stated that[76] "fishing related mortality (i.e. by-catch) especially by set nets, is a very significant threat to Hector's dolphins". He referred to a method to calculate the Maximum Allowable Level of Fishing-Related Mortality ("MALFIRM") for Hector's dolphins. The Cloudy/Clifford Bays population MALFIRM is 0.21. That is equivalent to one dolphin death every five years. His evidence-in-chief does not state how many dolphin deaths are estimated to occur in the Cloudy/Clifford Bays population.



75 A S Baxter, Evidence-in-Chief, para 12.
76 A S Baxter, Evidence-in-Chief, para 18.

[92] In fact he was worryingly vague about this issue. In cross-examination by Mr Guthrie the following exchange took place[77]:

> **Q.** Do you agree that the record of Hector's dolphin deaths shows at least one animal dying in every year of record from gill netting, trawling or other human induced cause.
>
> A. I would imagine that that would be the case without looking closely at the data.
>
> **Q.** Wouldn't that record, in terms of your reference to MALFIRM, that the Hector's dolphin is already irretrievable.
>
> A. Sorry I can't answer that. It would be a question best answered by either Dr Baker or Dr Slooten. I think it's more of a scientific question. I would add in passing that the MALFIRM is calculated, or designed, to allow for the recovery of a population and not just allow for the status quo.

[93] In addition to that, beyond learning that the West Coast/Nelson/Marlborough/ Canterbury by-catch of Hector's dolphin is one (1) per year, we were not advised:

> (a) what the estimated real death rate is, and to what levels of confidence that is estimated;
>
> (b) what other consequential or accumulative effects fishing activity may have on dolphins.

So we are left knowing very little about the fishing by-catch deaths of Hector's dolphin.

[94] Mr Baxter told us of the efforts by the Director-General to promote careful use of set nets in Cloudy and Clifford Bays, and further southwards down the Kaikoura and Canterbury coasts. There is also a Marine Mammal Santuary[78] around Banks Peninsula, although we heard from Dr Slooten that its main effect is simply to move set nets elsewhere.

[95] The Ministry of Fisheries has also imposed[79] tight controls on the Canterbury set net fishery south of the Waiau River (North Canterbury), and encouraged commercial fishers to develop a voluntary code of practice along the Canterbury coast south of

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77 Notes of evidence p. 135, line 26 et ff.

78 Under section 22 of the Marine Mammals Act 1978.

79 A S Baxter, Evidence-in-Chief para 25 et ff.

Banks Peninsula. We received no evidence that the Ministry of Fisheries is taking any interest in the Hector's dolphin population of Cloudy and Clifford Bays.

[96] However, we did hear evidence from Mr D A Wells, a commercial fisherman who regularly fishes in this area, that fishermen are increasingly using "pingers" on their trawl-nets - acoustic devices alert Hector's dolphins to move away. That is an encouraging step, although again there was no suggestion that there is any research being carried out into side-effects of trawl-fishing, or the use of pingers, on Hector's dolphins.

[97] Returning to the Director-General's programme, it is developing a population management plan[80] for Hector's dolphin; although it appears that it will have no application to the RMA unless it is proven that Hector's dolphins actually die as a direct result of aquaculture.

[98] We are left with a concern that, unconsciously, the Director-General's officials are trending towards a double standard. In precautionary terms it is this:

(a) existing users (e.g. trawlers, set-netters, mammal watchers) are permitted to carry on with some restrictions or limited exclusions, with activities that are known to cause some deaths of Hector's dolphins, and further restrictions may only be introduced if further actual deaths are recorded;

(b) in contrast the Director-General's position in respect of the CBMFL application is that it should not proceed unless CBMFL can prove - apparently beyond reasonable doubt - there are no direct, or indirect or accumulating effects.

[99] It is important that Mr Baxter and the other witnesses for the Director-General do not feel we are being critical; we understand the psychological and legal complications that attend dealings with existing users with property rights in ITQ[81] (commercial

80 Dr A N Baker, Evidence-in-Chief para 6 and A S Baxter, Notes of evidence, p. 132.

81 Individual Transferable Quota.

fishers) or expectations of the right to fish (set netters) from "time immemorial"[82]. The idea of setting up similar expectations and property rights in more mussel farms is justifiably of real concern.

[100] However, if a step back is taken, some thought should be given to at least researching the facts to ascertain whether Hector's dolphins have a significantly better (or worse) chance of surviving with marine farming, than they do with the various fishing threats. That is in effect the argument for CBMF. Beyond that there is a national policy issue here that may not be for the Marlborough District Council (or on appeal, this Court) to determine - which is whether at least some parts of the inshore fishery should be ultimately completely displaced for Hector's dolphin management in association with marine farming. However that is an issue for the future, and perhaps under different legislation.

Conclusions about the effects on Hector's dolphin

[101] The applicant, in putting its proposal forward, anticipated the various concerns about adverse effects that would be raised. For example, its experts, Dr Slooten and Dr Murdoch, considered the ecological hypothesis that fragmentation of a population's territory might cause reduced breeding rates. There is no direct evidence for that in Hector's dolphin but they accepted that it was a possibility.

[102] However, in their opinion the probability that the experiment would cause sufficiently serious fragmentation was low enough to justify the first stage of a marine farm being introduced (after an initial period to check the site had no specific significance for Cloudy/Clifford Bays). They came to similar conclusions on the other risks to the Cloudy/Clifford Bays population of Hector's dolphins.

[103] Cross-examination and submissions by the Director-General's counsel tended to be absolutist in terms along the lines of "You can't prove there is no risk, can you?" That tends to be unhelpful for two reasons. First Hector's dolphin is exposed to some of the same risks that *Homo sapiens* is - rogue asteroids, ozone hole effects, volcanic

[82] The phrase humans tend to use for the last thousand or two years (a blink in the history of the planet Earth).

action, pollution caused by humans. Further, the more specific hypothetical risks identified by the CBMFL's witnesses are simply that: hypotheses with some (slight) inferred evidential backing. There was no in depth discussion by the Director-General's evidence or in his counsel's cross-examination of the exposure rates of Hector's dolphin to the marine farm; nor of the comparative risk to the species presented by trawling and set-netting.

[104] Conversely the Director-General's witnesses had nothing beyond hypotheses and analogues as evidence of adverse effects. For example, Dr Baker was asked by Mr Guthrie:

> Is there anything known to the department at this time that suggests that any one or more 50 hectare blocks of surface area in the application site is special, different or unique from the rest of the dolphin range in Clifford/Cloudy Bays?

and replied in the negative.

[105] In *Shirley* the Environment Court stated[83]:

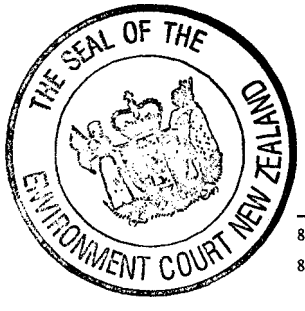
> "… in the case of any hypothesis about a high impact risk a scintilla of evidence may be all that needs to be established in the Court's mind to justify the need for rebuttal evidence."

In the *Ngatu Maru* case Doogue J. commented that:[84]

> A scintilla of evidence may be sufficient, but it must be probative evidence.

"Probative" means "tending to prove" (or "proving").

[106] After weighing the evidence we make the following judgements about the effect of the marine farm on Hector's dolphin:



83 [1999] NZRMA 66 at para [142].
84 H C Auckland AP 18/02 Doogue J 7/6/02 at para [68].

(1) *Death or injury by entanglement*

There is no evidence this has ever occurred. The risk is therefore exceptionally unlikely but of serious impact on the Cloudy/Clifford Bay population. Unless pre-installation research shows the site has special significance for these Hector's dolphins (see part [F] below), we consider this risk is so small that it can be discounted.

(2) *Reduction in available habitat*

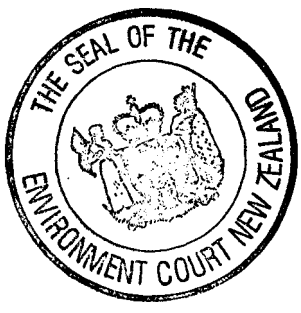
The probability of this is virtually certain but the direct impact is probably very low given that the first 150 hectares proposed is only 2.5% of the preferred inshore habitat (60 square kilometres). Conversely, it appears to us that it is unlikely that Hector's dolphin will find refuge in a marine farm from storms (this has been seen by reputable observers) or from netting by trawlers or set nets. Given that net deaths are a very high probability, this factor tends to weigh in favour of the proposal.

(3) *Removal of a breeding/nursery area*

The probability of this is completely unknown: the impact is potentially high. However this hypothesis could be substantially tested by a one or two year period starting soon and before any marine farm is installed.

(4) *Fragmentation of dolphin habitat*

In general it seems very likely that a population of a particular species at a natural level will diminish if its habitat is reduced. A 'fragmentation effect' is the hypothesis that the value for the species of the remaining habitat is also reduced. In other words reducing the area of a population's habitat may decrease its suitability disproportionately more than the areal reduction would imply. For Hector's dolphin the possibility of fragmentation effects seems to be very unlikely since this is the first marine farm 'patch' being introduced to the Clifford /Cloudy Bays habitat. We are aware that for some land-based species effects of fragmentation do not occur until the original habitat is reduced by 70% or



90%[85]. Even given that a ferry terminal may be built, in our view the probability of this is unknown, although as we have stated - the exposure to fragmentation risk is very unlikely because the first block represents less than 3% of the preferred inshore territory of the population of Hector's dolphin.

(5) *Reduction in available food*

The probability of this is very unlikely, perhaps even exceptionally unlikely. Indeed there is a possibility that there will be more food for Hector's dolphin. There was no evidence that food is a limiting factor for the species, so this potential effect is of low impact either way.

(6) *The potential cumulative and indirect long-term effects*

There is no evidence of cumulative effects - in the *Dye* sense. As for "accumulative" effects, these are completely unknown, although we judge that it is plausible they may occur, and if they do the potential adverse effects could be nearly catastrophic for the species, and certainly so for the Cloudy/Clifford Bays population. However since there is insufficient evidence to establish more than a plausible hypothesis we find that the basic position of CBMFL as stated in the evidence of Dr Murdoch[86] is sufficient discharge of its evidential burden to the requisite standard of proof. We are about 90% sure that this marine farm - if built and managed to the conditions we discuss shortly - will have no significant detrimental accumulative effect on Hector's dolphins.

(7) *Potential positive effects for Hector's dolphin of a marine farm*

In addition to those identified in (2) and (4) above, there is, we judge, a high probability that desperately-needed information about Hector's dolphin could be ascertained from a carefully researched monitoring programme. This would have the additional advantages that it would increase knowledge about existing known but inaccurately quantified

85 Andrén, H 1994. Effects of habitat fragmentation on birds and mammals in landscapes with different proportions of suitable habitat: A review *Oikos* 71:355-66.

86 Quoted at para [74] above.

cause of dolphin mortality from fishing. Further, any monitoring programme could also be adaptive so that if the marine farm did present information that it was causing harm, then it could be substantially reduced in size, or even closed down.

[107] In summary: in these proceedings there was some evidence of risk to Hector's dolphins, particularly of effects with impacts at the lower end of the scale. As the potential impact increased the level of supporting evidence diminished, so that by the time potential effects from marine farming activities that posed a risk to the survival of the species were reached, there was a scintilla of evidence, but no more, left. We also note that for statistical purposes the risks are not necessarily independent. That is, the one effect may influence another so the probability any two or more effects may occur cannot be calculated by multiplying individual probabilities. We consider that the applicant's burden of proof may be discharged by the proposed conditions as amended and expanded in part [F] of this decision.

Effects on zooplankton

[108] Mr Browning was concerned that the mussel farm would remove significant quantities of zooplankton from the water. Dr Murdoch conceded that was a possibility, but stated that it was unlikely given the wide spacing of the longlines and the fast speed of water through the farm. In any event he stated that this could be determined by the initial pre-commencement research.

Effects on the amenity of the surrounding area

[109] Mr T Costello, who resides at Muritai farm at the end of Fleming Road, gave evidence that the development of the mussel farm would have a significant effect on his family's amenities. Their house and garden face the seascape and he believed he would find the proposed marine farm very obtrusive. Ms Hewitt and Mr Hughes propose to live at the end of Cable Station Road. They have recently moved to New Zealand from North America and are appalled to find that their seaside refuge may soon have a large marine farm as a near neighbour.

[l10] They have recently purchased a property, in three titles, at the end of Cable Station Road. They are currently renovating the existing house, but their long-term plan

is to build a house on another title, higher up with views over Clifford Bay. Their existing house does not have a sea view to the north-east where the marine farm is proposed to be sited. Ms Hewitt was most upset that a "factory" was to be placed out in the waters of Clifford Bay and considered it would ruin enjoyment of their land. We can understand when people have such a fierce emotional response - perhaps most people react in that way when change is imposed on their home environment. In this case Ms Hewitt's reaction may have been exacerbated by her perception of the proposed mussel farm as "ecological devastation". For the reasons already discussed, we find it will not be ecologically detrimental. In some respects it may be beneficial.

[111] In relation to the effects of a marine farm on the amenities of the residents at the end of Cable Station Road, we take the following factors into account:

- they live in a Rural zone (under the PWARMP) in which working sights, smells and sounds must be accepted (unless the relevant standards are broken);
- the proposed farm is in the Coastal Marine Zone which contemplates marine farms as a discretionary activity, so that we cannot decline resource consent without good reasons;
- without exception the residents do not have views of the site from their existing homes, only from the beach.

[112] Further, we accept the evidence of the only landscape expert in the proceedings, Mr A Rackham (a landscape architect with very extensive experience of assessing the visual impacts of marine farms), that[87]:

> the complexity of inter-relationships between different factors makes determining visibility and visual impact highly problematic. The advantageous circumstances within Clifford Bay which can be expected to reduce adverse visual impacts include:
>
> - the bay is relatively exposed and smooth sea conditions will occur only infrequently;
> - only two occupied houses have views to the sites and only one of these [the Costello house] is substantially elevated;

87 A M Rackham Evidence-in-chief, para 26.

- most people will experience the Bay from sea level and only very occasionally from elevated viewpoints - and the farm will mostly be seen from a few specific locations;
- the area is not a recognised tourist destination and the surrounding landscape is a working environment;
- there are only two public vehicle access points to the stretch of coast within 3 kilometres of the proposed farm, and one of these is minor and inconvenient;
- the Bay could be substantially modified by the ferry terminal proposal; and
- the density of surface buoys is only about 10% of "traditional" in-shore farms.

Against those factors Mr Rackham pointed out that because Clifford Bay has nothing but water to the east (the Pacific Ocean) the marine farm will always be a contrast with the present open space of the bay; nor is there any backdrop of land.

[113] Mr Rackham presented us with a table[88] to give an indication of the potential visual effects of standard marine farms seen in good conditions and from an elevated viewpoint. He described this as "a relatively crude assessment, but one that has been tested in various locations and has proved to be reasonably robust". Mr Hughes was critical of that description, we are not: these matters of effect on visual amenities are very subjective. The difference between Mr Hughes' and the other residents' assessments compared with that of Mr Rackham is that the latter is very experienced, as we have said, and that he is relatively dispassionate.

[114] Mr Rackham's table of potential visual landscape effects and distances is:

Potential Visual Landscape Effects	**Distance**
Highly significant	Up to 0.5 kilometre
Significant	0.5 - 1.5 kilometres
Minor significance	1.5 - 5 kilometres
Very minor or zero significance	Greater than 5 kilometres

He accompanies it with a note:

88 A M Rackham - Evidence-in-chief, paras 27 and 30.

> This is an assessment of the level of the visual effects, not the distance at which the farms will be visible. It must also be noted that these distances would only apply in good viewing conditions with "conventional" farms. In poor weather or rough seas the effects may be far less. These distances relate to effects from an elevated viewpoint. These effects will be reduced when viewed from sea level or from the beach. [Our underlining.]
>
> The wider spacing of longlines in this application can be expected to reduce the visual effects and, from that point of view, these distances may be generous. However, the scale of the farms suggests that they will be more visible than small isolated farms.

[115] There are three actual or potential residences which will be affected. First, the Costello house is approximately one kilometre from the northern end of the proposed marine farm in an elevated position. Opposite the southern end is a house at the end of Cable Station Road of whose ownership we were not advised It is within 500 metres of the proposed marine farm. Thirdly Mr Hughes and Ms Hewitt were proposing to build a new house on an elevated position at about 500 metres from the marine farm. Since they have not yet built we discount the potential effects on them considerably. If they built they would be coming to the adverse effects, not having them imposed.

[116] Mr Rackham concluded that the proposed farm would have an adverse effect for the Costellos' garden (at an elevated distance of one kilometre) and that it would have a very significant effect to users of the beach at the end of Cable Station Road, about 500 metres away. We accept his conclusions. There was some debate as to whether the marine farm would be visible from the Costello house. Mr Rackham thought not; Mr Costello was adamant it would be, without explaining how much because there are intervening macrocarpa and other trees which would interfere with views from the house.

Positive effects

[117] Mr Hughes submitted that the applicant had given no direct evidence of the value of the proposed mussel farm to the people of Marlborough, and that little weight should be given to the general statements in the evidence of Ms Dawson and Mr Rackham about the value of the industry to the Marlborough economy. We note however, that because Ms Hewitt and Mr Hughes were allowed to enter the proceedings at the hearing itself that the applicant was not apprised that this point was in contention. In the

absence of counter-evidence, we are entitled to rely on the evidence given here and the conclusions drawn in numerous other proceedings before this Court in marine farm cases. Further, the conditions we contemplate imposing, if consent is granted, would impose quite onerous financial obligations on CBMFL, so it will need to calculate its potential profits very carefully, before it places lines in the water.

[F] Possible conditions of consent

Proposed conditions

[118] The applicant has proposed conditions of consent which involve staged development and monitoring. To this extent they have acknowledged at least the possibility that effects may follow which require avoidance, remedying or mitigation. The case must therefore turn on whether the conditions proposed, in particular the monitoring regime and adaptive management strategy can first detect and secondly, remedy any effects that might arise before they become irreversible.

[119] The conditions of consent propose a baseline survey one year prior to the placement of marine farm structures to examine beach profiles, current speed and direction, tuatua in the intertidal zone, seabed environment (including sedimentation and shell drop), Hector's dolphin abundance and habitat usage, fish communities, *macrocystis pyrifera* beds and the water column.

[120] Reviews to determine all those potential effects of the marine farm are to take place prior to the establishment of stages 2 and 3 (outlined in paragraph [6] above). Consent itself is not proposed to be dependent on the results of the baseline study, so the applicant proposes that the phrase "subject to a satisfactory baseline survey" in condition 8 be altered to "subject to completion of the baseline survey". A note to the conditions states:

> The consent holder shall not begin development of any further marine farm structures until monitoring confirms to Council that the subject stages are not individually or cumulatively creating any adverse effects.

[121] The Council's proposed conditions included:

(a) that a baseline study be undertaken of Hector's dolphin abundance and habitat usage; and

(b) the study be every two years after placement of the mussel farm structures (prior to each review of consent).

[122] The applicant has suggested modified conditions as follows:

Surveys to be undertaken prior to establishment of marine farm structures.

5. At least one year prior to the placement of any marine farm structures the consent holder shall undertake the following surveys:

(a) A study of the Clifford Bay Hector's dolphin population, in consultation with Department of Conservation, to establish baseline information regarding abundance and habitat usage of Clifford Bay. This study is to be conducted by way of a survey of the entire bay to determine the areas used by Hector's dolphin, and secondly a study of individual animals to determine their use of the bay.

…

Monitoring and Surveys to be Undertaken Following Marine Farm Establishment

9. The following monitoring and survey shall be undertaken at each stage of the development as specified in condition 8 above:

…

(b) A study of Hector's dolphin abundance and habitat usage shall be repeated every two years after the placement of structures, prior to each review of consent conditions specified in condition 11. This information over time shall be used to study the Hector's dolphin population dynamics. Without limiting the above, the Hector's dolphin monitoring shall specifically include:

(i) Surveys to monitor habitat usage of Hector's dolphins, including any changes in habitat use, feeding, social or resting activities.

(ii) Research on Hector's dolphin diets for changes and impacts.

(iii) Research on Hector's dolphin mortalities (if found).

(c) The study shall also be used to determine the effects of marine farm orientation and layout on Hector's dolphin behaviour. Investigations of dolphin movement and behaviour within and in the vicinity of, the marine farm structures for each of the block of structures, to determine if there are any differences in effects on dolphins between each block.

[123] Dr Baker stated[89] that he had a number of significant concerns about the approach suggested by the CBMFL's changed conditions:

> Firstly, it is difficult to assess the likely effectiveness of the proposed study programme given the very general nature of the study description. There are insufficient details of how the study is to be undertaken and what criteria would be used to determine effects. Nor are there any existing survey data (e.g. undertaken as part of the resource consent process) that would enable a study to be planned that is statistically robust and which will yield detectable and meaningful results.
>
> Secondly, the short-term nature of the study proposals would prevent any analysis of whether medium or long-term climatic and oceanographic cycles (i.e. El Nino and La Nina - influenced climate changes) could be having an effect on the environment of Clifford Bay and its use by Hector's dolphins. Such seasonal or yearly changes may mask any effects of mussel farms on the dolphin population.
>
> Impacts of marine farming on Hector's dolphins could range from the obvious (e.g. absolute displacement from an area) to the very subtle (e.g. reduced feeding efficiency). The more subtle impacts would be extremely difficult to assess, particularly in light of the levels of natural variability which exists and the resulting difficulty in being able to link cause to effect.
>
> …
>
> In my view, the proposed study would be unlikely to provide information which could irrevocably connect the mussel farm to any adverse effect on the dolphins. The level of natural local variability in abundance and behaviour of the dolphins, and the varying influences of changing environmental parameters, would render any short-term study meaningless. Any baseline study would require at least 10 years of initial detailed recording and analysis, followed by sampling after any construction, and at two control locations, to determine if effects could even be detected.

[89] Dr A N Baker, Evidence-in-Chief, para 37 et ff.

[124] We infer from Dr Baker's evidence that because the study programme gives[90] "insufficient details of how [it] is to be undertaken, and [of] what criteria would be used to determine effects" neither the Director-General nor anyone else is carrying out any such research at present. If they are we would have expected the witness to identify the criteria being used, and indeed the hypotheses being tested. His statement[91] that any baseline study "would require at least 10 years of initial detailed recording and analysis ... to determine if effects could even be detected", also appears to confirm first that detailed research on the effects of marine farming on Hector's dolphins is not being carried on at present; and secondly that there is no data from which we can infer the hypothetical effects are likely to occur. Finally, we are seriously concerned that Dr Baker's evidence (or this part of it) seems to be predicated on the basis that the current marine environment of Cloudy/Clifford Bays is "natural". We find that the dolphins have not evolved with nets whether set or trawled.

Is proposed condition 11 lawful?

[125] Condition 11 states the purpose of the review of the consents is

> to determine the appropriate scale, location, orientation and layout of any subsequent stages of the consent in the light of the results obtained from the monitoring and survey regime, including whether or not it is appropriate for any subsequent stages of development to proceed

and further:

> to deal with any adverse effect on the environment which may arise from the exercise of this consent and to review the conditions of consent, <u>including the continuation of the operation of the consent</u>. [Our underlining]

[126] Ms Hughes, the resource management planner called by the Director General of Conservation, questioned the *vires* of this condition. She cited *Barrett v Wellington City Council*[92] where the High Court stated that section 128(c) was "not intended to open the door to cancellation of the consent itself" and *PVL Proteins Ltd & Anor v Auckland Regional Council*[93] where the Environment Court held that "in changing the conditions

90 Dr A N Baker, Evidence-in-Chief, para 38.
91 Dr A N Baker, Evidence-in-Chief, para 43.
92 [2000] NZRMA 481 at para 23.
93 A061/01 at para 79.

the consent authority would have to have regard to whether the consent would continue to be viable after change".

[127] The applicant accepted that power to alter conditions was not a power to nullify the consent so that the underlined words in condition 11, as quoted above, must be deleted as *ultra vires.* However it submitted that with that limitation the power to change conditions is wide. Counsel quoted the Environment Court's decision in *Feltex Carpets v Canterbury Regional Council*[94] that:

> [T]here is no obvious limit on how far a resource consent could be subtracted from or qualified by new conditions

- a position also adopted in *PVL Proteins*[95]. In respect of mussel farms the Court held in *Kuku Mara Partnership (Forsyth Bay) v Marlborough District Council*[96] that:

> while a review condition cannot require complete removal of marine farming structures and processes it can reduce the scale it if can be shown the scale causes an adverse effect on the environment.

[128] We accept the applicant's submissions in this matter, but note that we have no basis in the evidence to judge the point, in terms of scale, at which a marine farm in exposed waters would lose viability, though we presume that stage 1 is viable, at least on a temporary basis. In any event we consider that each stage of the marine farm could be pared down to two long lines (with reduced droppers) at each side of its area under the review clause.

[129] There is a further point which the parties appear to have overlooked - that a marine farm could be closed down and removed by enforcement action under section 17 of the Act. That section now[97] states (relevantly):

C103/00 at para 20.
A061/01 at para 80.
W24/02 at para 721.
As amended by section 7 of the Resource Management Amendment Act 2003 effective from August 2003.

> (1) Every person has a duty to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by or on behalf of that person, whether or not the activity is in accordance with a rule in a plan, a resource consent, a designation . . .

Certainly the onus would then be on the applicant for an enforcement order under section 314 of the RMA to prove there was an adverse effect. However if the information gathering imposed on the consent-holder was sufficiently rigorous that itself might supply the information that the Director-General or some other person needed to take action.

Can improved conditions be imposed?

[130] It was the Director-General's contention that even if the conditions of consent were within the Council's powers, the monitoring proposed was unlikely to be able to detect adverse effects on Hector's dolphin before significant damage was done. The applicant on the other hand submitted that the effects of a marine farm on Hector's dolphin and their habitat could only be known if staged development of the farm proceeded. Indeed it argued that the research proposed by the conditions of consent have the potential to provide much needed information not only about Hector's dolphin and marine farms, but also about Hector's dolphin and much more invasive human activities such as gill netting and marine mammal watching.

[131] Dr Murdoch pointed out that there is a natural variability in the populations of various organisms in a marine environment, and that it is necessary to distinguish between changes resulting from such natural occurrences as wind, weather, presence of predators and the like, and those connected with the activity under study, in this case a marine farm. Because of this, the research to be undertaken for review purposes includes a number of control sites as well as those within the farm itself.

[132] For the Director-General Dr Baker indicated that this presents particular problems in the case of Hector's dolphin in that if the control sites are established in Clifford and Cloudy Bays, the same population of dolphins will be accessed at both control and impact sites, and therefore both control and impact sites would show similar

indirect results of the farm's presence. Of course, nothing is simple about this: if control sites were established elsewhere there would be different environmental conditions which would need to be factored in to the analysis of results. This concern was supported by Mr P D Johnstone, the bioinformatics/statistics group leader for the Crown Research Institute, Agresearch Ltd, who has 30 years experience in statistics research and was called by the Department of Conservation. He emphasised that any control site must be outside the home range of the Cloudy Bay/Clifford Bay population of Hector's dolphins.

[133] Dr Baker acknowledged, to questions from the Bench, that useful information could be derived from properly designed surveys on the impact of a variety of human activities on Hector's dolphin. However, he remained concerned that substantial effects on the Hector's dolphin population would be undetected for some time. He told us that direct effects such as entanglements or avoidance behaviour would be immediately apparent. However, subtle impacts such as reduced feeding efficiency would be extremely difficult to assess, and even in the case of displacement from a feeding area, the effects of that on such matters as reproductive success, survival, mortality and population dynamics would be difficult to assess, and may not manifest themselves for one or more (dolphin) generations.

[134] Dr Baker, for the Director-General, wrote that a baseline study of Clifford Bay would take at least two or three years, and that some parameters would take ten years to study[98]. Dr Slooten tended to agree[99]. Is the risk to the local Hector's dolphins sufficiently large that no marine farming should take place until adequate funding, qualified personnel, and a research programme all coincide? The Director-General suggested the answer is "yes" and initially we were inclined to agree. However, on reflection, that approach overlooks that:

(1) there are clear and present dangers to Hector's dolphin in this area right now, and they are not being fully researched as the cross-examination of Mr A S Baxter by Mr Guthrie showed[100]

[98] Dr Baker, Evidence-in-Chief para 43.
[99] Notes of Evidence p.17.
[100] Notes of Guidance page 138.

(2) an opportunity exists to research all the risks to Hector's dolphin by way of conditions to a resource consent.

[135] As for post-establishment research, Dr Slooten stated in her evidence in chief[101] that it would be more appropriate to conduct that research at other sites where dolphin habitat and marine farming already overlaps. However, the difference is that there is no indication that research in sufficient detail is being carried out elsewhere, indeed we infer from Dr Slooten's evidence that it is not. Further, the Court has already heard two appeals, both called *Pigeon Bay Aquaculture Ltd v Canterbury Regional Council*[102] where marine farms were proposed to be placed in Hector's dolphin habitat in Pigeon Bay and Double Bay respectively, and no research conditions were proposed by any party. We accept that more intensive research is being carried out into netting deaths in Canterbury.

[136] Dr Baker was concerned[103] that insufficient detail of the research had been given to assess its adequacy. Similarly Mr Johnstone was concerned, as we have stated, about the proposed control sites. In our view the concerns can be remedied. If consent is to be granted then additional conditions should be added to achieve the following:

Initial survey

(1) These coastal permits are subject to the conditions precedent:

(a) that an initial two year survey of the North Clifford site as amended by the Environment Court decision be carried out on the parameters identified in (2) below; and

(b) the results satisfy the consent authorities that it is very probable the site is not of special significance for the Cloudy/Clifford Bays population of Hector's dolphin in terms of breeding, nursing, feeding or sheltering.

(2) The two year survey of the site and surrounding bays shall be carried out to monitor and obtain useful figures on at least the following factors:

Dr E Slooten, Evidence-in-Chief para 46.
The first is reported at [1999] NZRMA 209.
Dr Baker, Evidence-in-Chief paras 36-41.

(a) Hector's dolphins' use of the site and surrounding areas, with particular emphasis on focal points for breeding, nursery, feeding and shelter purposes;

(b) population statistics for Hector's dolphin including causes of death;

(c) existing populations of Hector's dolphin principal prey.

Ongoing research

(3) The subsequent research programme should be subject to the conditions that it be peer-reviewed and approved by an agreed or approved independent expert;

(4) As part of any research, two properly independent control sites must be found, presumably south of Banks Peninsula or on the West Coast of the South Island or somewhere between;

(5) All required research shall be:

(a) carried out by or under the supervision of an independent cetacean expert (such as Dr Slooten) nominated by CBMFL and approved by the Council and the Director-General;

(b) at the expense of CBMFL in all matters including provision of boats and equipment, and payment of the researchers; and

(c) shared with the Director-General and other interested groups[104];

(6) If the Director-General considers it necessary: except for research purposes, no netting shall take place within or from a boat secured to any part of the marine farm.

We envisage that the survey in conditions (1) and (2) above could be commenced shortly after receipt of this decision; since it depends less on a detailed research programme being approved.

[104] NZBS: Theme 3: Objective 3.1; and Theme 9: Objective 9.5.

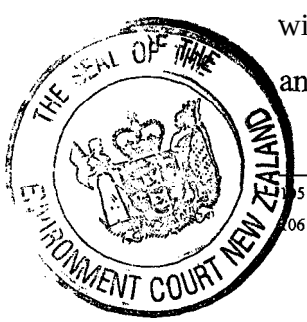
[G] The ultimate issue: achieving the purpose of the RMA

[137] In relation to our discretion under section 105(1) we adopt the statement of the Environment *Court* in *Baker Boys v Christchurch City Council*[105] that:

> … we have to make an overall judgement to achieve the single purpose of the Act. This is arrived at by:
>
> - taking into account all the relevant matters identified under s 104
> - avoiding consideration of any irrelevant matters such as those identified in s 104(6) and 104 (8)
> - giving different weight to the matters identified under s 104 depending on the Court's opinion as to how they are affected by application of s 5(2)(a), (b) and (c) and ss 6-8 of the Act to the particular facts of the case, and then
> - in the light of the above
>
> "allowing for comparison of conflicting considerations, the scale or degree of them, and their relative significance or proportion in the final outcome"[106].
>
> (110) If this test differs at all from that stated in *North Shore City Council v Auckland Regional Council* (1996) 2 ELRNZ 297 it is in emphasising that the judgement of scale or proportion of the facts is guided by the (roughly decreasing) importance given by the Act to the elements in ss 5(2), 6 and 7.

[138] As intimated there, our concern with the *North Shore* "overall broad judgement" is that it does not expressly refer to the weightings to be given by the hierarchy in sections 5 (2)(a) and (b), and sections 6 to 8 of the Act. That is important in this situation.

[139] In our previous discussion we have found that there is potential for adverse effects on Hector's dolphin to occur with a high impact - potentially even catastrophic for this Cloudy/Clifford Bays population; and therefore very worrying for the species as a whole. However, in our judgement the probability of effects of significance occurring without the accompaniment of lesser but more easily detectable effects is the lowest of any of the types of effect we have considered. It is very unlikely. Evidence for



[1998] NZRMA 433 at (109) - (110).
North Shore City Council v Auckland Regional Council (1996) 2 ELRNZ 297.

accumulative effects is the most slender consisting, as it does, of inferences by experts from more general ecological principles and some limited research on other dolphin species.

[140] We have found that the unchallenged provisions of the PWARMP do not set their face against this application. However any evaluation of this proposal under section 104 is subject to Part II of the Act. While an evaluation against the provisions of Part II should always be carried out as a final "check", it is critical in a case such as this where the issues are so finely balanced, and there are matters of national and international importance involved.

Part II

[141] On their face two matters of national importance under the RMA need to be recognised and provided for:

> The preservation of the natural character of the coastal environment . . . and [its] protection from inappropriate . . . use[107], and
>
> The protection of... significant habitats of indigenous fauna[108]

However given that marine farming is discretionary in the PWARMP we consider that is not inappropriate in the whole of the Coastal Marine zone, so that the preservation of the natural character is of reduced importance in these proceedings.

[142] For the Director-General counsel submitted that section 5(2)(a) and (b) would not be achieved if the proposal went ahead - future generations of humans might not be able to experience Hector's dolphin in Clifford Bay and the dolphin life-supporting capacity of the Bay might be lost. They submitted that there was no evidence the proposal will safeguard the ecosystem's capacity to maintain Hector's dolphins. In fact there are at least two significant indirect ways in which it might: the evidence suggests that the mere presence of the marine farms might prevent some net deaths if set-netting and/or trawling in this part of Clifford Bay diminished; and observers could provide more accurate figures about such deaths. Further we are satisfied that there is a 85%

107 Section 6 (a) of the RMA.
108 Section 6 (c) of the RMA.

probability the specific proposal - a marine farm initially with three separate blocks of 50 hectares - will not cause harm to the Cloudy/Clifford Bays population of Hector's dolphin. That 85% figure is a metaphor, designed to show:

(a) That we are satisfied well beyond the balance of probabilities;

(b) That there is less than the 95% confidence limits often relied on by scientists; and

(c) There is less proof than is required to be satisfied beyond reasonable doubt. In other words, there is a reasonable doubt that we are wrong, but it is very likely we are right.

[143] If there is a 85% probability that a marine farm on this site will have no adverse effects on Hector's dolphins as a species or on the Cloudy/Clifford Bay populations, then there is a 15% chance that it will. The adverse effects of an error are potentially very serious. However the advantage of this particular marine farm and its operating conditions is that it may significantly increase knowledge of the other known threats to Hector's dolphin. It is about 99.99% certain that, elsewhere, set nets drown them, but the death rate and factors affecting it are unknown for Clifford Bay. Similarly, while there is a possibility that land-sourced pollution is indirectly affecting Hector's dolphin, the nature of the impacts and their rates are not known.

[144] What it all comes down to is that we simply do not know whether this type and scale of aquaculture will affect Hector's dolphin. The only way of finding out for sure is to test the water. But the problem with that - which the witnesses and counsel returned to over and over is that the testing might cause catastrophic effects on the Cloudy/Clifford Bay population. Looked at in that light Dr Baker's suggestion of a 10 year "base-line" study is a good idea.

[145] Also, for the Director-General, Ms Hughes concluded in her evidence that[109]:

> In my view the technical evidence from Dr Baker and Mr Baxter indicates that the proposal is likely to adversely affect Hector's dolphins in Clifford Bay.

[109] K A Hughes, Evidence-in-Chief, para 150.

We have three difficulties with that conclusion:

(1) The evidence from Dr Baker was that adverse effects were possible, not likely; from Mr Baxter that their probability was uncertain;

(2) There is no express consideration by the witness of the confounding factors - the other threats to the Hector's dolphins, especially the established (but not quantified) risks from trawling and set nets;

(3) There is no discussion of the need for further knowledge (despite the importance of the issue both practically and in the CMS and in the Biodiversity Strategy).

[146] Counsel for the Director-General submitted that:

> Research of the impacts of the farm by a consent holder is a consequence of resource use not reason for the resource use. A refusal to undertake research into the habitat use of the site by an endangered species prior to the development is not sufficiently precautionary.

That may be correct where there are no other human-caused risks to the relevant species, but in our view it is not correct when there are existing but insufficiently quantified human causes of death to the endangered species. Bearing in mind the need for increased scientific knowledge about factors affecting the dolphin and that some of this may be ascertained by monitoring of the project, and incidental (volunteered) research, we consider the need to know, combined with the potential for preventing fishing by-catch deaths, tends to outweigh the total avoidance approach in this situation.

Adaptive Management

[147] In the circumstances the rational way to make progress is cautiously to test the waters of Clifford Bay, by permitting a marine farm to be established but on conditions that allow hypotheses to be tested in a scientific way with controls to check for false positives.

[148] *In Shirley Primary School*[110] *the* Court recognised:

[110] [1999] NZRMA 66 at para (129).

> … the psychological fact that intuitively humans rank probabilities differently according to their assessment of the seriousness of the impact.

The Court then gave the example of the different assessments of a 1 in 6 chance of dying compared with one roll of the dice as a bet. The psychological factor can lead to a paradox where safety is concerned: the more risks are minimised the less opportunity there is to find out what the risk is (i.e. its probability). This is well-known to statisticians - the trade-off between the power (informativeness) of the research and its uncertainty.

[149] However, in making an assessment as to whether to expose humans or dolphins (or less charismatic fauna like spiders, worms or microbes) to effects, one of the matters that should in our view be taken into account are the surrounding circumstances. For example, take a researcher who finds a substance that appears to be 90% successful in curing a fatal form of cancer. It is surely worth taking the pill and risking the 10% chance of failure. That is an extreme example and life does not often present quite such stark choices, although as it happens this case may not be so far away from that scenario.

[150] In our judgement:

(1) Hector's dolphins are undoubtedly endangered due to the small size of their population and existing additional human causes of mortality;

(2) There are the possibilities identified in part [E] of this decision that the Hector's dolphins of this stretch of coast will be adversely affected by a marine farm in Clifford Bay; but there is a possibility they will be beneficially affected too; and

(3) The <u>actual</u> threat to Hector's dolphins from fishing is far more significant than the <u>possible</u> threat of the proposed marine farm[111] as showed by Dr Baker's answer to Mr Guthrie, and by the *New Zealand Biodiversity Strategy*[112].

[111] Notes of evidence p. 116.
[112] MFE 2000, p.57.

[151] The answer put forward by the applicant is that the adaptive management of the NZBS could be achieved by its proposal. That term is defined as follows[113]:

> **Adaptive Management:** An experimental approach to management, or "structural learning by doing". It is based on developing dynamic models that attempt to make predictions or hypotheses about the impacts of alternative management policies. Management learning then proceeds by systematic testing of these models, rather than by random trial and error. Adaptive management is most useful when large complex ecological systems are being managed and management decisions cannot wait for final research results.

In these proceedings we find it is appropriate adaptive resource management if a small (in the context of the preferred Hector's dolphin habitat of 60 square kilometres) marine farm is set up after a short (2 years[114]) preliminary survey and intensive ongoing research and monitoring into all factors affecting Hector's dolphin in this area (and in two remote control sites).

[152] The Director-General's case that the decision as to whether or not to allow marine farming until full results are obtained has to be looked at in the context of what is happening at present: that Hector's dolphins are being killed directly by other human activities and possibly indirectly by others (reduction of fish supplies, pollution). Counsel for the Director-General in their excellent submissions pointed out the Minister of Agriculture and Fisheries ("MAF") is taking some action to prevent Hector's dolphin deaths as by-catch, but we were not given evidence as to current death rates and estimates of accuracy.

[153] In our view what is needed, certainly for the Clifford/Cloudy Bays area, and probably New Zealand, is considerably more intensive research into Hector's dolphin generally and causes of death and population decline in particular. Continuing with the current lack of knowledge seems a greater risk.

[154] The initial survey by the consent-holder - which, as we stated, could be started very soon without finalising details of any conditions of consent, could go a

[113] NZBS Glossary p. 137.
[114] This figure is chosen to give some idea of possible annual fluctuations.

considerable way towards identifying one of the immediate concerns - whether the site has a special value to Hector's dolphins as a breeding ground or nursery[115].

[155] To CBMFL's argument that this resource consent, if granted, may lead to knowledge that could be used to ascertain the capacity of Hector's dolphin to co-exist with aquaculture, the reply of counsel for the Director-General was that such research could be carried out on existing marine farms inside Hector's dolphin habitat. That answer overlooks that there is no incentive for the applicant to finance research on someone else's marine farm. In these proceedings the applicant is stating it is willing to carry out an independent monitoring - in effect a research programme - at its expense.

[156] If the Director-General or someone else was carrying out detailed hypothesis-based research into the impacts of aquaculture on Hector's dolphin[116] at present we might have a different approach to the issue. But since we have no evidence that such research is being carried out, and several statements from which we infer it is not, we consider the need for knowledge is important in this context.

[157] The two options open to us are to decline consent, or to grant it in such a way that if any adverse effects on the use Hector's dolphin make of the habitat arise, they are limited, and measures to reverse them speedily can be implemented. The probability of undetected adverse effects of significance occurring unrelated to, and unaccompanied by, other existing adverse effects are of sufficiently low probability that they should not lead us to decline the application altogether.

[158] However our concerns are such that we considered whether we should limit the proposal to Stage I, and to a term no longer than enabled the consent authority to ensure the expeditious removal of the farm if adverse effects were detected. In deciding ultimately to grant consent beyond Stage I we place heavy reliance on condition 11, the review condition, to limit the expansion, and cut back the extent of the development should the research required by the consent suggest that this is necessary.

115 Notes of evidence, page 137, lines 24 to end.

116 This is not intended in any way as a criticism of the very dedicated research that is being carried out on Hector's dolphin.

[159] Relevant factors under section 8 of the RMA in favour of the application being granted are first that the tangata whenua have approved the application, and secondly, counsel advised us that both Te Runanga o Ngai Tahu and Te Runanga o Kaikoura ("TROK") are shareholders in CBMFL, indeed TROK is the second largest shareholder. The effect of granting the application would be to give those two entities, and indirectly the tangata whenua, a stake in the seabed of the site.

[160] We find that the effect of the proposal on the amenities of the residential neighbours is not so significant, if mitigated by a noise condition restricting music and other recorded noise being emitted from the site so as to be heard on land. We also find that the effect on the visual amenities on so few people in a working landscape cannot outweigh the CBMFL proposal, if the proposal is moved clearly away from where Mr Rackham assesses the effect will be highly significant. We will direct that no part of the marine farm's above water structures be closer than 700 metres to the shore. This may have additional advantages for Hector's dolphins also, by removing the farm a little further from their preferred habitat. Subject to there being no jurisdictional difficulties[117], we consider the seaward side of the marine farm should move out to retain the same area as granted by the Council.

[161] One final observation about cross-boundary resource management. If a marine farm and research programme are established on this area of open water and on two control sites elsewhere around the wash of the South Island, there will need to be some co-operation between regional councils, or at least oversight by the Minister of Conservation, to ensure that coastal permits for other open water marine farms are not issued in the control territories for this research programme. Otherwise the value of the research we envisage will be severely compromised.

[H] Outcome

[162] We recommend under both the transitional and proposed district plans that the Minister of Conservation grant a coastal permit for occupation of the site (under section 12(2) of the RMA) as shown on the map attached to the decision of the Marlborough

There should be none : see *North Taranaki Environmental Protection Association Inc v The Governor General* [1982] 1 NZLR 312 (CA).

District Council, and on the conditions also annexed to that decision, but subject to the amendments and additions we describe in the next paragraph.

[163] We confirm what we understand to have been the intention of the Council's decision and we grant under both the transitional and proposed district plans coastal permits to CBMFL to:

(a) place structures as shown on the plans annexed to the application (under section 12(1)(a) of the Act);

(b) disturb the seabed by anchoring the structures as stated in the application (section 12(1)(c) of the Act); and

(c) farm green-lipped and blue mussels (section 12(3) of the RMA)

upon the conditions annexed to the Marlborough District Council's decision but with the following changes:

(1) Inclusion of conditions of the type discussed in para [136];

(2) Deletion of the *ultra vires* words from condition 11;

(3) The conditions requested by Dominion Salt Limited and Friends of Nelson Haven and Tasman Bay Inc are included; and

(4) A noise condition prohibiting radio, music, talk shows (i.e. amplified noise) from reaching the shore is included; and

(5) Inclusion of a condition that no part of the marine farm's surface structures be closer than 700 metres to the shore (but the seaward edge may be extended proportionately); and

(6) Inclusion of any other conditions necessary to meet the spirit and intent of this decision.

[164] There was some disagreement between the parties and their experts over the precise wording of some other conditions. We hope that, in the light of this decision, the parties can resolve their differences on all conditions. If they cannot agree on conditions then leave is reserved for any party to apply to the Court for a further hearing (in Court or on further papers) to resolve workable conditions.

[165] There is one other cross-regional boundary issue which the Department of Conservation and the Minister of Conservation will need to bear in mind. The control sites needed to comply with this marine farm's conditions will probably need to be in waters of the coastal marine area administered by one or two regional councils other than the unitary Marlborough District/Regional Council. It seems to us that it would be appropriate for the Director-General to draw to the attention of such a local authority (or on appeal, other divisions of this Court) the possibility of any further marine farms in Hector's dolphin habitat interfering with vital research on the species. Of course it is not for us in these proceedings to dictate where the most appropriate site for an experimental marine farm is. That appears to be a matter for the Minister of Conservation, when deciding whether or not to grant a coastal permit.

[166] Costs are reserved. Any application would probably be inappropriate until after the Minister of Conservation's decision on our recommendation is issued.

DATED at CHRISTCHURCH 22 September 2003.

For the Court:

J R Jackson
Environment Judge

Issued[118] 24 SEP 2003

[118] Jacksoj\Jud_Rule\D\rmal72-03.doc

SCHEDULE

Comparison of the "legal", "scientific", "Bayesian" and "IPCC" scales of scientific uncertainty[1]

Level	Legal standards of proof	Informal scientific levels of certainty	Bayesian probability	Level in IPCC scale
10	"Beyond any doubt"	Fundamental theory that explains a wide range of observations	100%	Obscure
9	"Beyond a reasonable doubt"	Rigorously proven; critical experiment(s) give(s) a clear result	> 99%	"Virtually certain"
8	"Clear and convincing evidence"	Substantially proven; a few details remain to be worked out. "Reasonably certain"	90-99%	"Very likely"
7	"Clear showing"	Very probable	80-90%	"Likely"
6	"Substantial and credible evidence"	Probable: evidence points in this direction, but not fully proven	67-80%	"Likely"
5	"Preponderance of the evidence"	If I have to choose, this seems more likely true than untrue	50-67%	"Medium likelihood"
4	"Clear indication"	Attractive but unproven: evidence is beginning to accumulate in this direction	33-50%	"Medium likelihood"
3	"Probable cause: reasonable grounds for belief"	Plausible hypothesis, supported by some evidence	10-33%	"Unlikely"
2	"Reasonable, calculable grounds for suspicion"	Possible	1-10%	"Very unlikely"
1	"No reasonable grounds for suspicion"	Unlikely: available evidence is against it, or violating existing paradigms, but not entirely ruled out	<1%	"Exceptionally unlikely"
0	"Impossible"	Against the known laws of physics or other science	0%	

[1] Weiss, C Table 3 in "Expressing Scientific Uncertainty" : Law, Probability and Risk (2003) 2, 25-46 (with the sixth column omitted).