DR. JAMES COLLOPY
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6.5.14.

Dear Sir/Madam.

I would like to OBJECT to the proposed abalone farm MP 10_0006. My objections remain unchanged from my original objections which date back to 21.1.2003 as the new proposal is essentially unaltered with the exception of now having two inflow and two outflow pipes, which will pump 50 megalitres (50 olympic swimming pools) instead of the previous 6 megalitres per day. The dilution of potential pathogens does not make them less pathogenic nor does dilution of pollutants make them less polluting. The fact that the proponents are wanting to pump so much water would suggest that they are very much aware of the dangers that their abalone farm present to The Port Stephens Estuary. It should

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again he noted that the pipes lie immediately adjacent to a reserved part of the Port Stephens Marine park.

Please note the papers referring to the outbreak of a Herpes like virus in a Victorian abalone farm in 2006 which devastated the one third of Australias wild abalone fishery and is now the subject of an $82 MILLION class action against The Victorian Government and Southern Ocean Mariculture.

Australia Leafield p/l has some scientific knowledge in relation to abalone per se but to my knowledge this handfull of people have no experience in commercial farming of abalone.

With regard to The Pindimar Bundabah Community Associations challenge to Great Lakes Council, Port Stephens Council and

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Graham Hounsfield and Kenneth Lee (please see attached papers) in The Land and Environment court on 19TH March 2007, Judge Preston referred the matter to a second day of hearing but the ~~Hhhhh~~ respondents Hounsfield and Lee withdrew ~~their~~ from the case, implying that their case was on shaking ground and consequently the matter was dismissed and no written judgement was made.

I would suggest that no decision be made regarding this proposed abalone farm without a SITE VISIT as it is a special place.

Yours.

James Collopy.

THE STANDARD

Court told DPI knew of abalone disease risk

By JARED LYNCH Sept. 24, 2013, 4 a.m.

Abalone licence-holders began their $82 million class action against the Victorian government in the Supreme Court yesterday.

A HERPES-LIKE virus that wiped out one-third of Australia's wild abalone industry spread after an aquaculture farm failed to properly clean out its tanks — and what's more the Victorian government knew it — a court has heard.

Abalone licence-holders began their $82 million class action against the Victorian government in the Supreme Court yesterday.

The plaintiffs' counsel David Curtain SC said the Department of Primary Industries (DPI) failed to control the outbreak of the disease after it spread from the Southern Ocean Mariculture farm near Port Fairy into open waters in early 2006.

The disease has since ravaged wild abalone stocks from the Victorian/South Australian border to Cape Otway, as well as eroded life savings, with the value of commercial abalone licences plunging from about $6 million before the outbreak to less than $1 million.

Mr Curtain said the virus first surfaced in January 2006, when Southern Ocean Mariculture imported live abalone to use as brooding stock from interstate.

Initially the DPI couldn't take enforcement action because the virus wasn't listed in the livestock disease act.

But that changed a month later on February 9 when it was gazetted as an exotic disease.

Still, the department didn't take any action, mainly because the farm managed to confine the disease to the property, disinfecting tanks with chlorine, while affected abalone were destroyed and buried.

The virus, which has a 95 per cent death rate, seemingly disappeared. But on March 23 there was another outbreak, which the DPI's former chief vet Hugh Millar described as "explosive".

By early April the disease had infected 81 of the farm's 184 tanks, and in May abalone divers had detected the virus on a reef outside the property.

Mr Curtain alleged the disease was more virulent during the second outbreak because Southern Ocean Mariculture merely removed dead and affected abalone from the tanks, without disinfecting them or removing fish exposed to the virus.

This was despite, Mr Curtain said, evidence showing the disease was spread through the water column, not direct contact between infected and healthy abalone.

And the farm continued to pump 40 million litres of virus-infected water into the Southern Ocean each day.

"What we have got here is (the DPI) monitoring the wild but not doing anything to stop the virus-laden water being pumped in its millions of litres into the wild where there is a great proximity to abundant abalone," Mr Curtain said, adding that then Labor agriculture minister Bob Cameron, Dr Millar and Fisheries Victoria executive director Peter Appleford were "vicariously liable" for the outbreak.

But defence counsel argued that there was no direct evidence when the virus escaped from the farm, and the DPI had to weigh up, in taking enforcement action, the possibility of an outbreak in the wild versus shutting down the mariculture farm, which would have caused an instant loss, with the death of about one million abalone.

The trial continues today.

THE AGE

The Sydney Morning Herald

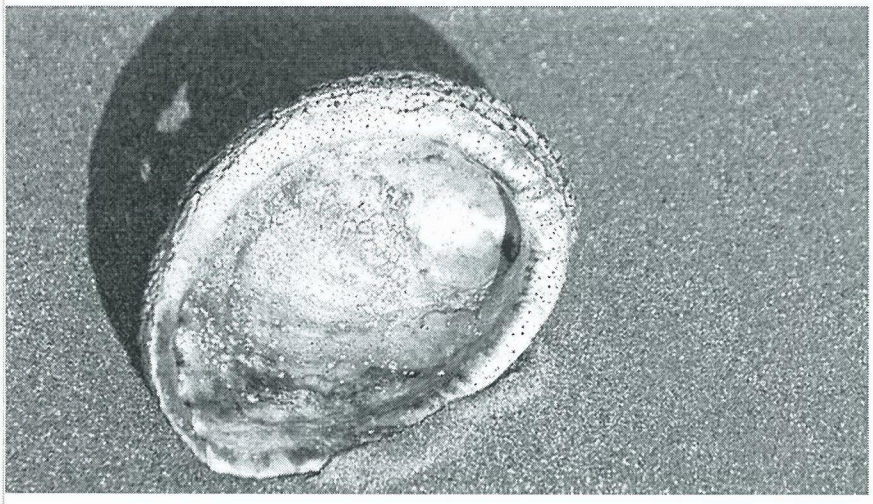
BusinessDay

Abalone chiefs in class action over ravaging disease

August 19, 2013

Read later

Jared Lynch



The state government is blamed for allowing the wipeout of a third of Australia's abalone industry.

An $82 million class action is seeking compensation after the wipeout of one-third of Australia's abalone industry following the Victorian government's alleged failure to control an outbreak of a herpes-like virus.

Maurice Blackburn is acting on behalf of 10 licence-holders who controlled 32 per cent of Australia's abalone exports. Those exports generated $70 million annually.

A trial is scheduled to begin in the Victorian Supreme Court next month.

The once lucrative industry was ravaged in early 2006, when the disease spread from an aquaculture farm in south-west Victoria into the ocean.

At the time, Victorian Premier Denis Napthine accused the then Labor government of "absolute failure" to control the outbreak.

Maurice Blackburn principal Jacob Varghese said the owner of the farm, Southern Ocean Mariculture, reported the outbreak to the Department of Primary Industries, but the DPI failed to shut down the farm, allowing it to continue to pump contaminated water into the ocean.

Infected wild abalone were found soon after on a reef near Port Fairy, he said.

Over the next few years the virus, which has a death rate of at least 90 per cent, spread from the South Australian border to Cape Otway.

Mr Varghese said life savings had been lost, with commercial licences plunging in value from $6 million to less than $1 million since 2006.

He said the virus-affected area, called the western zone, accounted for about 32 per cent of Australia's abalone exports before the outbreak. Most of those exports went to Asia, where abalone is considered a luxury food.

"Before the virus they were talking 220 tonnes [a year] out of the western zone. That has dropped to about 16 tonnes, so it's a huge drop," Mr Varghese said.

"There are a couple of licence-holders who have liquidated, while others have retired. Then there are others who are just holding on, hoping things improve."

But it could take decades for the western zone to fully recover from the virus.

This is something Dr Napthine, whose electorate covers the bulk of the virus-affected area, acknowledged in parliamentary speeches in 2007 and 2008.

"The time lag to recover from this disease could be five, 10 or 15 years. This is absolutely devastating," said Dr Napthine, a former veterinarian.

"I have described it previously as 'the foot-and-mouth of the sea' or 'the foot-and-mouth of the abalone industry'.

"If we had foot-and-mouth in our livestock in Victoria, we would have a massive response by all states and territories - all resources would be put

into dealing with that disease - yet little or nothing has been done in this instance."

In another speech, he said: "The abalone virus is costing our abalone industry hundreds of jobs and millions of dollars, and it threatens the very future of our major fishery, which is one of the few remaining wild-catch abalone industries in the world."

Dr Napthine declined to comment to Fairfax Media because the case was now before the courts.

Maurice Blackburn is representing 10 of the 14 licence-holders in the western zone in the action against the state government and Southern Ocean Mariculture.

Mr Varghese estimated that each licence-holder had lost about $2.3 million, in addition to the devaluation of their licences.

He said further proceedings could potentially deal with abalone divers and processors, and licence-holders, in the central zone, which stretches from Warrnambool to Wilsons Promontory.

Land and Environment Court of New South Wales

The ⇦ Pindimar ⇨ Bundabah Community Association Incorporated v Great Lakes Council & Ors [2007] NSWLEC 165 (19 March 2007)

Last Updated: 30 March 2007

NEW SOUTH WALES LAND AND ENVIRONMENT COURT

CITATION: The ⇦ **Pindimar** ⇨ Bundabah Community Association Incorporated v Great Lakes Council & Ors [2007] NSWLEC 165

PARTIES:
APPLICANT
The ⇦ **Pindimar** ⇨ Bundabah Community Association Incorporated

FIRST RESPONDENT
Great Lakes Council

SECOND RESPONDENT
Port Stephens Council

THIRD RESPONDENT
Graham Housefield and Kenneth Lee

FILE NUMBER(S): 10679 of 2006

CATCHWORDS: Development Application :- intensive aquaculture - tank-based aquaculture

of Abalone - pipes for saline water for tanks to be placed in estuary - permissibility of pipes - compliance with site location requirements under State Environmental Planning Policy No 62 - Sustainable Aquaculture

LEGISLATION CITED:

CASES CITED:
Minister for Planning v Gales Holdings Pty Ltd [2006] NSWCA 212; (2006) 146 LGERA 450

CORAM: Preston CJ

DATES OF HEARING: 19 March 2007

EX TEMPORE DATE: 19 March 2007

LEGAL REPRESENTATIVES

APPLICANT
Mr J E Lazarus (barrister)
SOLICITORS
Environmental Defender's Office NSW

FIRST & SECOND RESPONDENT
Mr T Robertson SC
SOLICITORS
Mallik Rees

THIRD RESPONDENT
Mr J Johnson (barrister)
SOLICITORS
Rick Jones & Associates

JUDGMENT:

THE LAND AND ENVIRONMENT COURT OF NEW SOUTH WALES

PRESTON CJ

19 MARCH 2007

10679 OF 2006

THE ⇦ PINDIMAR ⇨ BUNDABAH COMMUNITY ASSOCIATION INCORPORATED v GREAT LAKES COUNCIL, PORT STEPHENS COUNCIL, GRAHAM HOUSEFIELD and KENNETH LEE

JUDGMENT

1 **HIS HONOUR**: The third respondent proposes to cultivate abalone in tanks on land at ⇦ **Pindimar** ⇨, adjoining the Port Stephens estuary. Abalone live in saline water, not freshwater. The saline water for the tanks will be drawn through an influent pipe from the Port Stephens estuary. Water from the tanks will be discharged after passing through a reconditioning system back to the estuary.

2 The permissibility of the third respondent's proposed development rests on the application of State Environmental Planning Policy No 62 - Sustainable Aquaculture (SEPP 62). SEPP 62 applies to aquaculture development (cl 5A) of two generic types, namely intensive aquaculture and natural water-based aquaculture (cl 17).

3 Tank-based aquaculture and pond-based aquaculture are two types of intensive aquaculture. Pond-based aquaculture is defined in cl 4 of SEPP 62 to be:

"intensive aquaculture undertaken predominantly in ponds, raceways or dams (including any part of the aquaculture undertaken in tanks such as during the hatchery or depuration phases), but not including natural water-based aquaculture".

4 Tank-based aquaculture is defined in cl 4 of SEPP 62 as:

"intensive aquaculture undertaken exclusively in tanks, but not including natural water-based aquaculture".

5 "Intensive aquaculture" is defined to be:

"aquaculture undertaken by providing supplementary food for the fish or marine vegetation (whether or not naturally occurring food is also consumed or available for consumption by the fish or marine vegetation)."

6 In the notes to the definitions, the typical pond-based aquaculture is stated to be the pond culture of prawns, yabbies, or silver perch. The typical tank-based aquaculture is stated to be

the tank culture of barramundi or abalone. In this case, of course, the proposed development involves the tank culture of abalone.

7 SEPP 62 applies to development of the type specified in certain parts of the State. For pond-based and tank-based aquaculture, SEPP 62 applies to the parts of the State described in cl 1 of Sch 1 (cl 5(a)). Clause 1(2) of Sch 1 of SEPP 62 identifies the local government area of Port Stephens as one of the areas to which SEPP 62 applies. The Port Stephens estuary is in the local government area of Port Stephens.

8 Development to which SEPP 62 applies is permissible if it complies with certain requirements, as specified in SEPP 62 and Sch 2 thereto. These requirements differ depending on the type of aquaculture development, namely whether the proposed development is pond-based aquaculture (both estuarine and fresh water), tank-based aquaculture or natural water-based aquaculture (both oyster aquaculture and other aquaculture).

9 Aquaculture development to which SEPP 62 applies that is not permissible is prohibited by SEPP 62 (cl 11). This prohibition prevails in the event of any inconsistency with other environmental planning instruments, including local environmental plans (cl 6).

10 The requirements for development for the purpose of either pond-based or tank-based aquaculture are contained in cl 7 of SEPP 62 and Sch 1 of SEPP 62. Clause 7(2) provides:

"A person may carry out any such aquaculture development [being development for the purpose of pond-based aquaculture or tank-based aquaculture: see cl 7(1)] with development consent if, in the opinion of the consent authority, it complies with the site location and operational requirements set out in Schedule 1 for the development (the **minimum performance criteria**)."

11 Division 1A of Part 2 of Sch 1 contains the site location requirements for the Hunter and Central Coast Region and Div 2 of Part 2 of Sch 1 contains the operational requirements for all regions, including the Hunter and Central Coast Region.

12 Clause 7B of Div 1A of Part 2 identifies acceptable areas for estuarine pond-based aquaculture in the Hunter and Central Coast Region. For the Port Stephens estuary, the areas are the areas coloured green on an identified map, the Estuarine Aquaculture Map 11, Port Stephens Estuary (dated 25 May 2003).

13 Some of the areas coloured green on this map abut the waters of the Port Stephens estuary, and other areas are connected to it, but the areas do not include the waters of the estuary.

14 Clause 7C of Div 1 of Part 2 of Sch 1 identifies the zoning under environmental planning instruments in the Hunter and Central Coast Region, in which aquaculture development may be carried out. The zoning is identified by reference to particular environmental planning instruments in the Hunter and Central Coast Region. These instruments are listed in column 1 of the Table to cl 7C.

15 The zones in these instruments that are listed differ for pond-based aquaculture (listed in column 2) and tank-based aquaculture (listed in column 3). For land to which Port Stephens Local Environmental Plan 2000 applies (being the relevant environmental planning instrument in this case for the water components of the proposed development), for "pond-based aquaculture", the zones identified in column 2 are 1(a) Rural Agriculture "A", 1(c1) Rural Small Holdings "C1", 6(a) General Recreation "A", 6(c) Special Recreation "C", 7(a) Environment Protection "A" and 7(f1) Environment Protection "F1" (Coastal Lands). For "tank based aquaculture", the zones listed in column 3 are 1(a) Rural Agriculture (A), 1(c1) Rural Small Holdings "C1", 1(c2) Rural Small Holdings Zone "C2", 4(a) Industrial General "A", 6(a) General Recreation "A", 6(c) Special Recreation "C" and 7(f1) Environment Protection "F1" (Coastal Lands).

16 Of relevance to this case, the influent and effluent pipes that will be located in the waters of Port Stephens estuary will be located to a large part in the 7(w) Environment Protection "W" (Waterways) Zone. This is not one of the listed zones for tank-based aquaculture, or for that matter for pond-based aquaculture.

17 The applicant on the appeal seizes upon this fact to argue that the third respondent's development, either in whole or in part, is prohibited. This question has been raised in issue 6A of the applicant's amended statement of issues. The question of the permissibility of the proposed development in this respect has been listed as a separate question to be heard and determined before the balance of the proceedings.

18 The applicant argues that the influent and effluent pipes are an essential and integral part of the third respondent's proposed development, and ought properly to be characterised as being for the purpose of tank-based aquaculture. By dint of cl 7(2) of SEPP 62, the third respondent would only be permitted to carry out development for the purpose of tank-based aquaculture if, in the opinion of the consent authority, it complies with the site location requirements in Sch 1 of SEPP 62 for the development. The applicant submits that the proposed development, or at least that part that involves the influent and effluent pipes, does not comply with the site location requirements in Sch 1 because those pipes are not located in any of the zones listed in column 3 of the table opposite the name Port Stephens Local Environmental Plan 2000. Hence, the applicant submits, either the whole development or alternatively that part of the development involving the influent and effluent pipes, is prohibited by cl 11. The proposed development is not State significant development and the prohibited part cannot be approved as it was in a *Minister for Planning v Gales Holdings Pty Limited* [2006] NSWCA 212; (2006) 146 LGERA 450.

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19 The first and second respondents and the third respondent dispute the applicant's submission. They argue that each of the site location and operational requirements in Sch 1 of SEPP 62 do not necessarily apply to all of a proposed development for the purpose of pond-based aquaculture or tank-based aquaculture. On a proper construction, some of the site location or operational requirements apply only to certain components of development for the purpose of either pond-based aquaculture or tank-based aquaculture, but other requirements apply to all of the components of development for the purpose of either pond-based aquaculture or tank-based aquaculture.

20 In this case, the respondents submit, the zoning requirements in cl 7C of Sch 1 of SEPP 62 only apply to those components of development for the purpose of pond-based aquaculture or tank-based aquaculture which answer the definition of "pond-based aquaculture" or "tank-based aquaculture" respectively. This is evident, the respondents submit, from the draftsperson's use of the prefatory words "pond-based aquaculture" in cl 7C(1) of Sch 1 of SEPP 62 and "tank-based aquaculture" in cl 7C(2) of Sch 1 of SEPP 62, rather than the words that the draftsperson used in cl 7(1) of the policy itself of "development for the purpose of pond-based aquaculture, or tank-based aquaculture". The draftsperson must be taken to have intended to limit the zoning site location requirements to that part of development for the purpose of either pond-based aquaculture or tank-based aquaculture that actually meets the definitions of "pond-based aquaculture" or "tank-based aquaculture" respectively.

21 These definitions, as set out earlier, focus on that part of the aquaculture development that is undertaken, in the case of pond-based aquaculture "predominantly in ponds, raceways or dams (including any part of the aquaculture undertaken in tanks such as during the hatchery or depuration phases)" and, in the case of tank-based aquaculture, "exclusively in tanks": cl 4(1) of SEPP 62.

22 The influent and effluent pipes that connect the ponds etcetera or the tanks with water bodies (whether estuarine or fresh) are not included in these definitions. Accordingly, the zoning site location requirements in cl 7C of Sch 1 do not apply to these influent and effluent pipes. Hence, there is no non-compliance under cl 7(2) of SEPP 62.

23 In contrast, the respondents point out, other requirements in Sch 1 of SEPP 62 are not limited to only the component of the development for the purpose of pond-based aquaculture or tank-based aquaculture that meets the requirements of the definitions of "pond-based aquaculture" or "tank-based aquaculture" respectively. An example is to be found in the site location requirements for conservation exclusion zones in cl 7 (for the North Coast Region) and cl 7D (for the Hunter and Central Coast Region). These requirements apply to all components of development for the purpose of pond-based aquaculture or tank-based aquaculture. Hence, if influent or effluent pipes were to be located in the identified conservation exclusion zones in cl 7 or 7D, the development would not comply with this site location or requirement.

24 The first and second respondents and the third respondent corroborate their submission as to the proper construction of cl 7C of Sch 1 of SEPP 62 by reference to other clauses and requirements in Sch 1. They point out that cl 7B of Sch 1 identifies areas coloured green on the Estuarine Aquaculture Map 11, Port Stephens Estuary, as being acceptable areas for estuarine pond-based aquaculture. Estuarine pond-based aquaculture depends on saline water from the estuary. Some of the areas that are coloured green on the map are located abutting the estuary and others are connected to the estuary. It is reasonable to assume that estuarine pond-based aquaculture will have influent pipes drawing saline water to the estuarine ponds from the estuary and will discharge treated saline water back into the estuary.

25 Clauses 11 and 12 of the operational requirements in Sch 1 support this assumption. Clause 11 provides that:

"All saline water discharged from an aquaculture farm (except tanks and raceways) must be held in a reconditioning system for a minimum of 24 hours prior to discharge and must be returned to the tidal reaches of the waterway."

26 Clause 12 provides:

"All outlets from ponds, tanks and other facilities must be screened to avoid the escape of fish."

27 It will be remembered that pond-based aquaculture, typically, involves the culture of prawns, yabbies or silver perch.

28 If the applicant's argument as to the construction of Sch 1 of SEPP 62 were to be correct, because the waters of Port Stephens estuary are not within any of the zones identified in column 3 of the Table to cl 7C of Sch 1, estuarine pond-based aquaculture would be prohibited, notwithstanding that cl 7B identifies areas abutting or connected to Port Stephens estuary to be acceptable locations. However, if the respondents' construction of SEPP 62 and Sch 1 were to be adopted, estuarine pond-based aquaculture would be permissible provided that the part of the development that meets the definition of "pond-based aquaculture" is in one of the identified zones in column 3 next to the applicable environmental planning instrument, Port Stephens Local Environmental Plan 2000. The other part of the development involving the influent and effluent pipes could be within another zone, such as 7W Environment Protection (Waterways) Zone.

29 In my opinion, the respondents' construction of SEPP 62 and Sch 1 is correct for the reasons that they give and I have set out above (paragraphs 19-28).

30 Accordingly, the third respondent's proposed development does not fail to comply with the site location requirements in Sch 1 by reason of the influent and effluent pipes being located in the 7(w) Environment Protection "W" (Waterways) Zone under Port Stephens Local Environmental Plan 2000 and the proposed development is not prohibited for this reason alone. This answers the separate issue. The matter should now proceed to a hearing tomorrow on the balance of the issues.

****

NSW GOVERNMENT | Planning & Infrastructure

20 March 2014

Contact: Kerry HamannKerry Hamann
Phone: (02) 9228 6516
Fax: (02) 9228 6455
Email: kerry.hamann@planning.nsw.gov.au
Our ref: MP 10_0006

Dr J F Collopy
39 Bradleys Head Rd
MOSMAN NSW 2088

Dear Sir / Madam

Subject: Extended Exhibition of Environmental Assessment – Pindimar Abalone Project (MP 10_0006)

Planning and Infrastructure sent you a letter last week regarding the proposed Pindimar Abalone Farm Project. The agency is now informing you of changes to the exhibition arrangements for the Environmental Assessment (EA) for the proposal.

The EA for the proposal will now be on public exhibition from **Thursday 20 March 2014** until **Monday 12 May 2014** (previously the exhibition of the EA closed on Monday 5 May 2014).

In addition to the previous exhibition locations, the EA will also be available during regular business hours at the Great Lakes Council Tea Gardens District Office and at Port Stephens Council at Raymond Terrace. Please refer to the advertisement overleaf for specific address details.

If you wish to make a submission on the Pindimar Abalone Project you should read the submissions section overleaf. Submissions must reach the agency by close of business **Monday 12 May 2014.**

The agency will make your submission available to the proponent, interested public authorities and on the agency's website. If you do not want your name to be made available to the proponent, these authorities, or on the agency's website, please clearly state this in your submission.

Yours sincerely

C. Ritchie

Chris Ritchie
Manager – Industry
Industry, Key Sites and Social Projects

NSW GOVERNMENT | Planning & Infrastructure

Exhibition of Environmental Assessment Pindimar Abalone Farm

(Extension of Exhibition Period and New Locations added for the Exhibition of the Environmental Assessment)

Application	MP 10_0006
Location	180 Clarke Street, South Pindimar
Proponent	Austasia Leefield Pty Ltd
Council Area	Great Lakes and Port Stephens
Approval Authority	Minister for Planning and Infrastructure

Description of proposal

Austasia Leefield Pty Ltd is proposing to:

- construct and operate a land based abalone aquaculture farm;
- produce approximately 60 tonnes per annum of Blacklip Abalone; and
- develop associated infrastructure including two pipelines for the intake of marine water from Port Stephens and two pipelines for the release of treated wastewater back into Port Stephens.

Exhibition

A copy of the Environmental Assessment (EA) may be viewed on the Planning & Infrastructure's website (http://www.planning.nsw.gov.au). The EA will also be on exhibition from **Thursday 20 March 2014** until **Monday 12 May 2014** during regular business hours at:

- **Planning & Infrastructure**: Information Centre, 23-33 Bridge Street, Sydney;
- **Great Lakes Council**: Breese Parade, Forster;
- **Great Lakes Council (Tea Gardens Office)**: 245 Myall Street, Tea Gardens;
- **Port Stephens Council**: 116 Adelaide Street (Old Pacific H'Way), Raymond Terrace; and
- **Nature Conservation Council**: Level 2, 5 Wilson Street, Newtown.

Submissions

Any person wishing to make a submission should use the online form if possible. To find the online form go to the web-page for this proposal via www.majorprojects.planning.nsw.gov.au/page/on-exhibition.

Your submission must reach the agency by Monday 12 May 2014. Before making your submission, please read our Privacy Statement at www.planning.nsw.gov.au/privacy or for a copy, ring the number below.

The agency will publish your submission on its website in accordance with the privacy statement.

If you cannot lodge online you can write to the address below. If you want the agency to delete your personal information before publication, please make this clear at the top of your letter. You need to include:

- your name and address, at the top of the letter only;
- the name of the application and the application number;
- a statement on whether you support or object to the proposal;
- the reasons why you support or object to the proposal; and
- a declaration of any reportable political donations made in the previous two years. To find out what is reportable, and for a disclosure form, go to planning.nsw.gov.au/donations or ring the number below for a copy

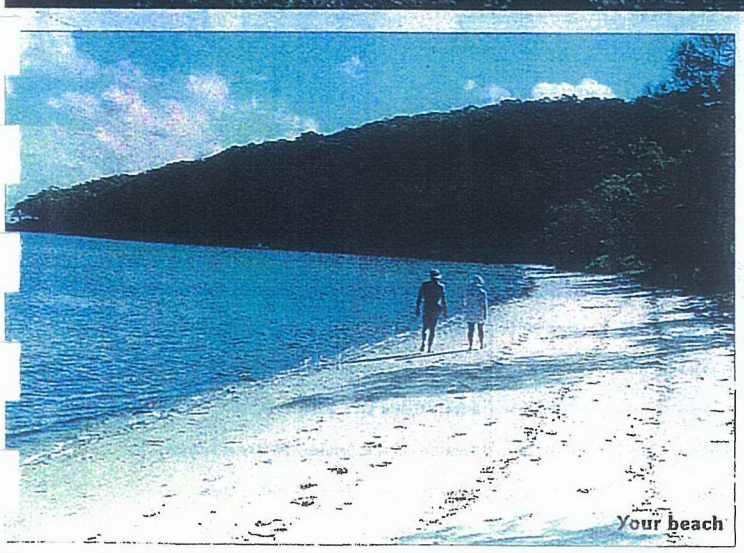
Contact

Phone: Information Centre - 1300 305 695 / Kerry Hamann (02) 9228 6516 or Chris Ritchie (02) 9228 6413
Address: Development Assessment Systems & Approvals, Planning & Infrastructure, GPO Box 39 SYDNEY NSW 2001, or fax to (02) 9228 6455. Your submission should be marked Attention: Director, Industry, Key Sites and Social Projects.

PINDIMAR BAY

ABALONE FARM

NELSON BAY



PINDIMAR - PORT STEPHENS - *'Paradise'*

Situation Set on the North Shore of Port Stephens, close to the resort towns of Tea Gardens and Hawks Nest, just over two hours North of Sydney and one hour from Newcastle.

Style This unique unspoiled property has title to the high water mark and is in arguably the nearest true holiday area to Sydney's North.

Main Features Expansive views of Port Stephens from hinterlands with old-growth Eucalypt forest, 600 metres of sandy beach, 1(a) rural zoning (currently under review) with the possibility of future sub-division and tourism development.

Additional Features Within easy reach of Hawks Nest golf club and aquatic sporting facilities at Myall River and Lakes, 40 minutes from Williamstown airport. Opposite The Anchorage resort. Frontage to sealed road.

Summary Whether developed as a luxury weekender or reserved for future development, this rare property represents an outstanding opportunity to acquire a private paradise.

Land Area Approximately 71.7 hectares (175 acres)

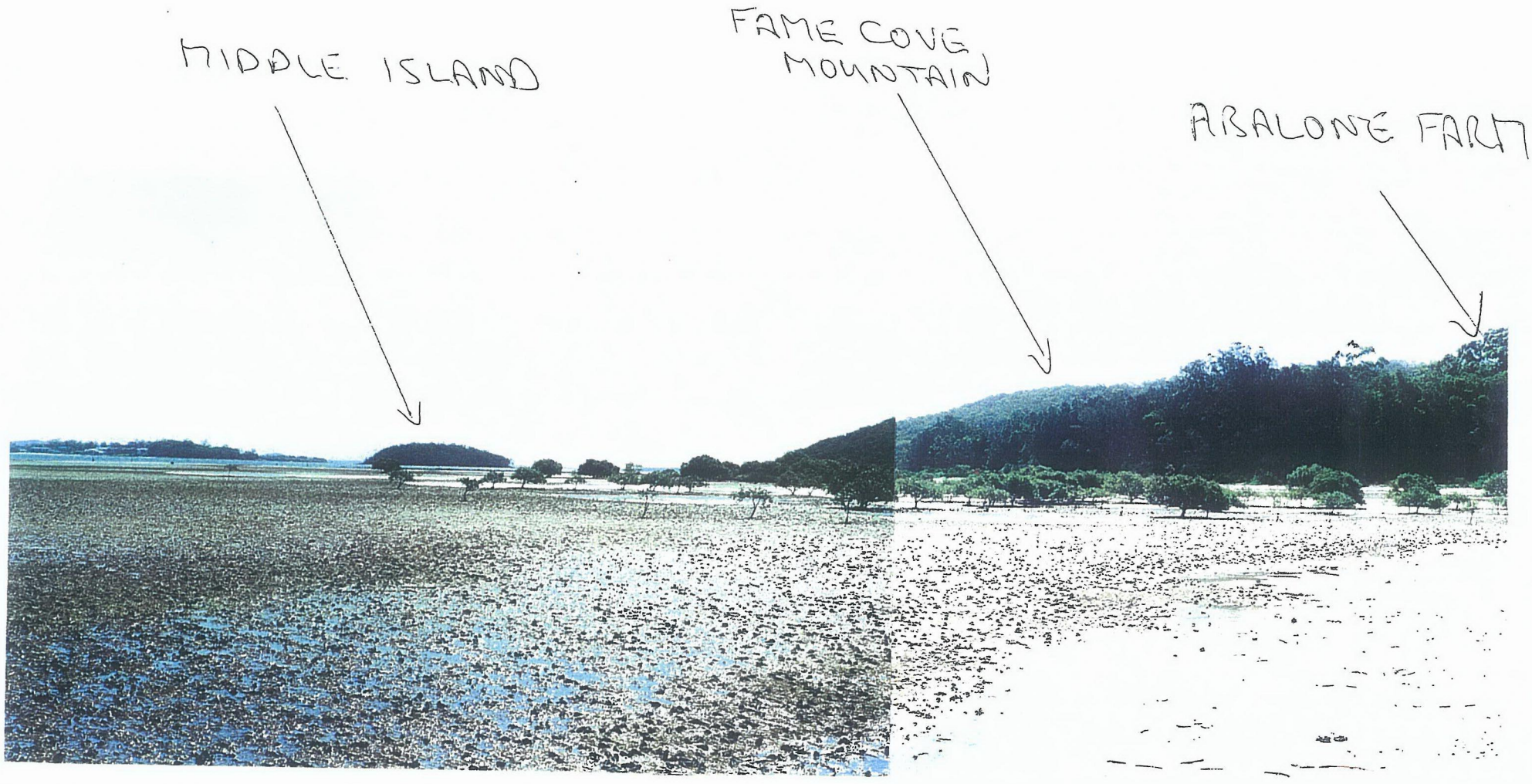
Expressions of Interest Closes 12 June 2000

View By appointment

Co-agent Local agent DCR Property Consultant - Simon Dixon (02) 4997 3335, 0407 223 001

Call John Crampton 9386 3350, 0413 742 742

PINDIMAR BAY - LOOKING WEST.



LOOKING WEST FROM WHERE THE INFLOW AND OUTFLOW PIPES CROSS THE SAND FLATS. THE BLACK DOTS ARE HUNDREDS OF THOUSANDS OF HERCULES CLUB WELKS.

PORT STEPHENS

HEADS

* PINDIMAR BAY

OYSTER LEASES

LOOKING EAST FROM SITE OF OUTFLOW PIPE.

MILLIONS OF WELKS ON SEA GRASS.

PIG STATION HILL TIDAL CREEK

ABALONE FARM SITE

STREET FLOODED AFTER HEAVY RAIN.

CARRUTHERS STREET LOOKING EAST TO FARM SITE.

EASTERN END OF CARRUTHERS ST. FARM SITE IN BACK GROUND

CARRUTHERS ST LOOKING WEST FROM THE ABALONE FARM SITE WHICH IS ON THE RIGHT, WET LANDS + PIG STATION HILL CREEK ON LEFT.

INLET + OUTLET PIPES WILL CROSS THROUGH FIRST GROWTH FOREST + THROUGH LOW, ALREADY ERODED EMBANKMENT CONTAINING MIDDENS

DR. JAMES COLLOPY
MB BS(SYD)(HONS) FRACR
DIAGNOSTIC RADIOLOGIST

THE WHITE HOUSE
89B COWLES ROAD
MOSMAN NSW 2088

TEL (02) 9968 4372
FAX (02) 9969 4120

21st January 2003.

The Mayor,
Great Lakes Council
PO BOX 450
FORSTER NSW 2428

Dear Sir,

DEVELOPMENTAL PROPOSAL FOR A LAND BASED ABALONE FARM
GREAT LAKES COUNCIL DA313/203.

LOT NO DP10146843 SOUTH PINDIMAR PORT STEPHENS

Dear Sir,

Would you please include the enclosed photographs in my previous submission, which was sent to you in November 2002.

These photographs were taken on the sand flats at the point where the 6.6megalitres of water is to be discharged from the proposed abalone farm each day. The photographs are looking to the north where the abalone farm is to be built, to the west towards Fame Mountain and Middle Island, to the southeast towards Nelson Bay and the Heads and to the north east to South Pindimar Bay. As you can see, these sea grass and sand flats are very extensive and from the photographs it is clear that there are millions of Hercules club welks, which like abalone are a form of snail and may be susceptible to perkinsus and rickettsial infections which have devastated wild abalone populations off both the New South Wales coast and the Californian coast. The proponents of the abalone farm must be 100% certain that there is no risk to this important marine environment.

Yours sincerely,

JAMES COLLOPY

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DEVELOPMENTAL PROPOSAL FOR A LAND-BASED ABALONE FARM GREAT LAKES COUNCIL D.A. 313/03

LOT NO. DP10146843 SOUTH PINDIMAR PORT STEPHENS

We oppose approval of this application. While the project may be a dream for Austasia Pty Ltd, the multiplicity of environmental risks associated with the selected site would create a nightmare for future generations. South Pindimar has been described as a paradise (please see enclosed photograph) and this should be preserved.

Reference should be made to SEPP 71 Coastal Protection, the Coastal Protection Amendment Bill (25/09/2002) and the Environmental Planning and Assessment Act 1979 Section 79 (c), which states that in determining a development application a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application, namely the provisions of any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority.

Further reference needs to be made to SEPP14, SEPP15, SEPP26 AND SEPP46.

Reference should be made to the Hunter and Central Coast sustainable aquaculture strategy, land based aquaculture strategy, draft assessment guidelines, a NSW Government initiative.

Reference should also be made to the Port Stephens Local Environmental Plan 2000 as any decision made by the Great Lakes Council Consent Authority is likely to impact on the Port's co-authority which is the Port Stephens Council.

Our objections are as follows:

1. While we recognise that sustainable aquaculture may be desirable, we do not consider that abalone farming within the Port Stephens estuary with its potential risks to the environment will provide any significant food resource to the world's growing population. Abalone is a luxury product being provided to a small niche market, primarily in Japan.

2. With regard to the development application, we consider that there are two major areas where there are conflicts of interest. Firstly, the primary proponent of the development application, Mr Graham Housefield, has provided most of the information in the environmental impact statement before council and Mr Ron Toft, is the owner of the land where the farm is to be sited and has acted as the Engineer and probably the Surveyor for the site.[1]

3. The economics of the proposal are dubious. The business proposal for this farm as detailed in an article taken from the NSW Department of State and Regional Development http.2//www.business.nsw.gov.au/key.asp?cid=157@subCid=159 indicates that a 30 tonne (as proposed) abalone farm would at the end of three years have a positive cash-flow of $336,647 which would rise to $1,140,641 when the farm reaches a production capacity of 60 tonnes which under the new DA it is not proposed to do. This proposed profit would accrue to the four owners of company Austasia Leefield Pty Ltd. (please see enclosed papers). The proposal states that it will employ six people with a possible further six part-time people during the harvesting period. From an economic point of view, this does not make a great deal of sense when one takes into account the jobs that will be lost in the controlled harvesting of wild abalone and potential threats to the Port Stephens Tourist Industry. The proponents state that when and if the farm is successful, further production sites will be found. It seems obvious that these sites would at least initially be placed adjacent to the proposed site, as there is plenty of land available. This would

[1] Development Application Great Lakes Council DA313/03

further increase the risk of the ecology of Port Stephens and the local amenity of South Pindimar.

4. With regard to the site for the proposed farm, it has been indicated that this 5-hectare site will be subdivided from the present 50-hectare site, which is inconsistent with current planning regulations that apply to this zoning. This matter should be reviewed in the light of SEPP1.

5. With regard to site selection, the area adjoins Fame Mountain and Fame Cove which is an area of 500 hectares of which 50 hectares lies within the Myall Lakes National Park which in a recent evaluation by LAWC and NPWS ref. Native Vegetation or DATR9912 and threatened species report NPWS December 1999 was described as an area of **VERY HIGH CONSERVATION VALUE.** In this area there is a diverse range of vegetation types which include dry shrubby forests, woodland with both wet and dry heath understorey, rainforest, swamp forest, mangrove and salt marsh. These last remnants are described as being inadequately conserved and are therefore endangered. The area contains significant first growth blackbutt trees and from the atlas of NSW wildlife, the following vulnerable species have been identified. The osprey; pied oystercatcher; glossy black cockatoo; spotted tailed quoll; the brushtailed phascogale; the little bentwing bat; the koala and in 1993 a dugong was seen within the Port. We are concerned that the EIS was based on observations made in an extremely limited timeframe. What allowance is therefore made for migratory patterns and seasonal variations. In particular the observations were made at a time of the year when it could be reasonably expected that migratory birds would be in the Northern Hemisphere.[2]

6. The farm site abuts a wetland and Pig Station Hill tidal creek and mangrove system, which provides an important fish-breeding habitat. There has been no mention of this creek in the development application.

[2] Commonwealth Legislation co,pliance required

7. There is an aboriginal midden, which will be affected by the proposed pipes taking and returning water to the Port. This matter needs to be referred to Mr Hilton Naden, Northern Aboriginal Heritage Unit NPWS Coffs Harbour. In the proponents EIS, it is recognised that this important site is potentially at risk of inundation if the protecting bank is destabilised by the laying of the intake and outlet pipes.

8. Carruthers Street which fronts the farm site and which at its western end has the proposed pumping facility becomes flooded after heavy rain (please see photographs).

9. The risk of leakage of salt water and pollutants from the retention tanks into the underlying aquifers and subsequently into the wetlands should be considered. [3] It is not known how adequately or by whom these aquifers have been studied but as the area is waterlogged after rain, they cannot lie very far beneath the ground surface.

10. From the acid sulphate soil risk map prepared by the Department of Land and Water Conservation, it is considered that acid sulphate soils would be present on the low-lying land extending from the farm site to the inter-tidal zone but this is probably of low risk although it is not clear that anyone has done any actual detailed surveys of this region. The map does however describe the inter-tidal zone through which the pipes will go as being of severe environmental risk for acid sulphate soil. The proponent's idea of neutralising this with lime as the trenches are dug for the pipes does not seem very scientific. Again it would be important to have an independent assessment of the risks rather than relying on the EIS of the proponents.

11. The lowest point of the farm is said to be 1.2 metres above the Australian Height Datum, but this has, I think, been surveyed by the owner of the land and should be checked as should the measured distance of 70 metres from the wetlands.

[3] Draft Hunter and Central Coast Sustainable Aquaculture Strategy 2002

12. In the development application it is stated that there is no need for additional land clearing on the site, but it should be noted that in 1997 Carruthers Street was cleared for an overhead power supply to a width greater than approved by the Council and that an area of approximately 2 ½ hectares was cleared without permission in the low-lying area adjacent to the beachfront. This is confirmed in letters from Great Lakes Council. Since that time, the area for the retention pond has been cleared almost certainly without Council permission and illegal clearing of the grow-out facility site may also have occurred.

13. With regard to the environmental safety of the farm there are a number of issues and as is well known, no man-made facility is foolproof and there are many recorded environmental disasters associated with aquaculture. The proposed pipes are to be laid across 120 metres of low-lying ground and will cross through the bank, the top of which is 30cm above the high-tide mark, which in the past has been overrun but not breached during severe storms. The integrity of this bank would be placed at risk by punching the pipes through it or alternatively if the pipes are going above the bank, disturbance to water flow caused by this at high-tides and during storms would certainly risk breaching the bank and inundating the adjacent low-lying ground. Once through the inter-tidal zone, the pipes which will be placed in a one metre by one metre trench would cross 150 metres of important and sensitive sea grass and sand flats before reaching the deep water of the Port. The outlet pipe will finish on the edge of this sea grass and sand flat area and 3.3 megalitres of water will be pumped out of this pipe twice daily at high-tide. This volume of water is the equivalent of **6.6 Olympic swimming pools daily**. Running east and west of this point is four kilometres of sea grass and sand flats which extend from Fame Mountain to North Pindimar and which would average 150 metres in width. We have not been able to determine how long it will take to pump 3.3 Olympic swimming pools full of water through the pipes on each ebb tide. It is known however, that as the outlet pipe lies on the edge of the sea grass and sand flats that water leaving these pipes and moving in an easterly direction with the tide would cross over and then be brought back over the sand flats of the adjacent Pindimar Bay due to an eddy which has

been documented by the Manly Hydraulics Company. This means that any pollution in the form of nutrients such as nitrogen and phosphorus, chemicals such as bleaches which will be used in cleaning the farm, suspended particulate matter all of which cannot be removed as admitted in the EIS, altered water temperature and Perkinsus parasites and other diseases arising within the farm will be recirculated over the sea grass and sea flats of Pindimar Bay due to the eddy.

14. **In the EIS, three abalone diseases are mentioned.** A shell boring worm; parasite **PERKINSUS** and bacteria **RICKETTSIA-LIKE PROCARYOTE.** In an article from the Department of Agriculture in Western Australia [4] the study of Western Australian pteriid oysters and rock oysters identified the presence of the latter two organisms in both wild and farmed samples. Rickettsia-like Procaryote (candidatus xenohaliotis californiensis) is the cause of a severe disease of abalone known as **WITHERING SYNDROME.** This disease has had a catastrophic effect on wild abalone population along the southern half of the Californian coast where it was introduced into the wild from farm raised abalone larvae during an out-plant project which it was hoped would supplement numbers of abalone in the wild. In addition, accidental larval releases occurred from abalone farms. The released and escaped larvae were unknowingly infected with Rickettsia-like Procaryote and resulted in **mass mortalities** of wild abalone from Withering Syndrome along the southern half of the Californian coast. It is considered that the severity of this disease outbreak was exacerbated by warmer water produced by an El Nino event together with initial overpopulation and inadequate food resource for the out planted and escaped larvae. It would seem possible therefore that a similar scenario could occur on the east coast of Australia which is periodically effected by increased sea water temperatures related to El Nino events. Please refer to the enclosed articles by Paul Engstrom, the Press Democrat, Santa Rosa and California And The Continued Declines Of Black Abalone Along The Coast of California; Are Mass Mortalities Related To El Nino Events published in Marine Ecology Progress Series, the 25 October

[4] Hine P M, Thorne Dis Aquat Organ T 2000 Feb 24; 40 (1) *A Survey of Some Parasites and Diseases of several species of Bi-valve Molluscs in Western Australia.*

2002. It seems worrying that such out-plant projects have occurred at the Tomarree Fishery site at Nelson Bay, Port Stephens. **Is there any relationship to the present PERKINSUS epidemic in wild abalone between Port Stephens and Jervis Bay that has resulted in the suspension of all wild abalone harvesting from the 18th November 2002 until 18th November 2007???**[5] In the proponent's EIS statement, he admits that larval escapes might occur from the farm but that as these larvae will be distributed over adjacent sand flats, they will not survive due to the lack of a rocky stratum to which they would normally attach. The admission of this would indicate that the proponent recognises the potential risk of infected larvae escaping into the wild. The proponent's proposition that the larvae would not survive however is flawed as studies performed by the West Australian Department of Fisheries suggest that larvae may disperse over many kilometres before becoming attached to a suitable habitat. [6] This would suggest that any infected larvae might potentially spread throughout all of the Port and into the open ocean.

15. The proponent was planning to obtain his abalone brood stock from the wild population in and adjacent to Port Stephens. In view of the Perkinsus epidemic and the subsequent prohibition of wild harvesting where will this brood stock now come from? If the proponent is to source wild abalone north of Port Stephens it is known that Perkinsus parasite occurs naturally within abalone as a commensal organism, which in the wild and in an unstressed environment may have no deleterious effect on the abalone itself. However, it is well known that aquaculture can produce a stressed environment due to overcrowding, inappropriate feeding, and variations in water temperature and from the North American experience this can result in major outbreaks of disease within farmed abalone. It is also well recognised that diseased larvae can escape from aquaculture facilities in spite of all filtering and regulatory precautions being undertaken. It should be noted that Perkinsus parasite is resistant to all forms of treatment.

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[5] NSW Fisheries Department Website. Text downloaded and annexed to this submission

[6] Western Australia Department of Fisheries Fishing Management Papers **Abalone Aquaculture in Western Australia - Key Issues 2.1 Risk of Disease Introduction or Increase in the Wild Fishery.**

16. The risk therefore to the oyster industry of Port Stephens which is a priority 1 aquaculture undertaking must be considered as both Perkinsus parasite and rickettsia like procaryotes have been identified within rock oysters as noted above in Western Australian Fisheries Study. This study also pointed to the risk of increased pathogenicity developing within Perkinsus as may develop within a farmed environment. Any consent authority should refer to Mr Duncan Worthington, NSW FISHERIES DEPARTMENT, SCIENTIFIC OFFICER, and Mr John Smythe, Abalone Management Advisory Committee. His e- mail address is abalone1@bigpond.com

17. Consideration should be given to the risks that abalone may be poached from the wild and identified as farmed abalone.[7]

18. In the proponents EIS it is stated that the Pindimar oyster racks are not longer in use, but this is not the case as there are oyster-men still using these racks for spat collection and the distribution of the collection sticks to other areas of the Port and possibly to other areas of the NSW coast. Has it definitely been determined that there is no risk of RLPs, Perkinsus or shell boring worms being contracted by the spat and then moved to all areas of the Port? While oysters are filter feeders, **HERCULES CLUB WELKS** which live on the sea grass of Pindimar in their tens of thousands, are like abalone, snails and must surely be at risk of RLP's and Perkinsus. Has any research been conducted in this regard? These snails and other less numerous varieties of snails form a crucial part of the Pindimar and Port Stephens sea grass habitat. (Port Stephens, having the largest area of sea grasses in New South Wales.)

19. In the EIS the proponent claims that nutrients with the exception of some nitrogen, algal blooms and suspended particulate matter will be largely removed from the 6.6 Olympic swimming pools of water which will be emptied each day into the Pindimar Bay eddy. What effects might a breakdown in this system have on the crustaceans (yabbies and soldier crabs)

[7] Supra at 4 at **2.4 Compliance Issues**

which inhabit the sand flats and which provide an all important food to both local and migratory wading birds which come from as far as Russia. It is suggested that consent may be necessary from the Commonwealth Government under the Environment Protection and Biodiversity Conservation Act, which is an international agreement for the protection of migratory birds.

20. Determine what safeguards and monitoring will be put in place by the EPA should this proposal go ahead.

21. Due consideration should be given to the Coastal Protection Amendment Bill which requires public access to foreshores. It should be noted that Challis Street, Carruthers Street and Cove Street are all public roads. A padlocked gate has been placed across the western end of Challis Street by the owner of the land denying access to the beach and Port via Cove Street. In addition, lying in relation to the southern parts of these three streets, there are approximately 30 non-urban half-hectare blocks of land, which cannot therefore be accessed by a road by their private owners. It is not know whether or not the Great Lakes Council has notified the owners of these properties to the proposed abalone farm which will be built on the other side of Carruthers Street and which will have its main pumping station on the corner of Carruthers and Cove Streets. Please note that the enclosed map would indicate that Cambage Street continues through to Carruthers Street, which it does not. At the end of Cambage Street are the wetland and Pig Station Hill tidal creek, which denies access across to Carruthers Street.

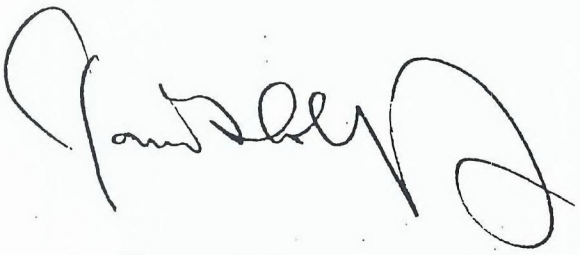
22. What steps have been proposed for decommissioning, site rehabilitation and restoration of any environmental damage caused to either the land, sea grass, sand flats and waters of Port Stephens??

23. As concerned residents we would like assurance that documentation supporting the development application in the

all the areas of concern raised in our submissions is reviewed and authorised by leading experts in the specific area of concern. We would also be grateful if you could provide us with the details of each individual or consultancy firm who will be providing information to an expert review panel in each of our areas of concern. Subsequent to this, the development application should be reviewed for the cumulative impact of the proposal on the local environment, having regard to the principles set out in Part 1 Section 2 SEPP 71 - Coastal Protection Planning Policy.[8]

Yours sincerely,

Bet Collopy



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[8] Environmental Planning and Assessment Act 1979 Section 79c (ii) - Although SEPP 71 was not gazetted until after the Development Application was lodged the consent authority is to take into consideration any draft environmental planning instrument.

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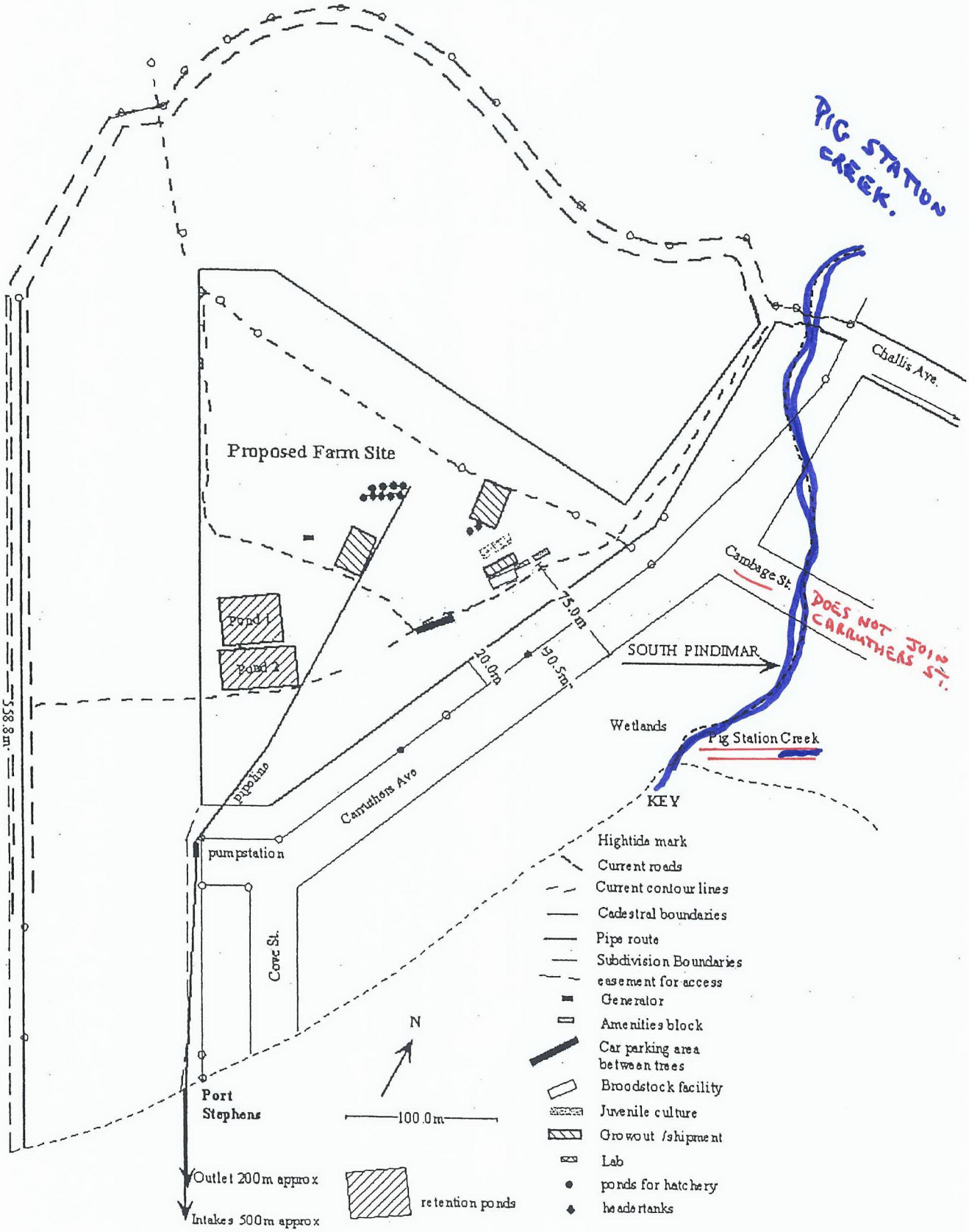
28th November, 2002.

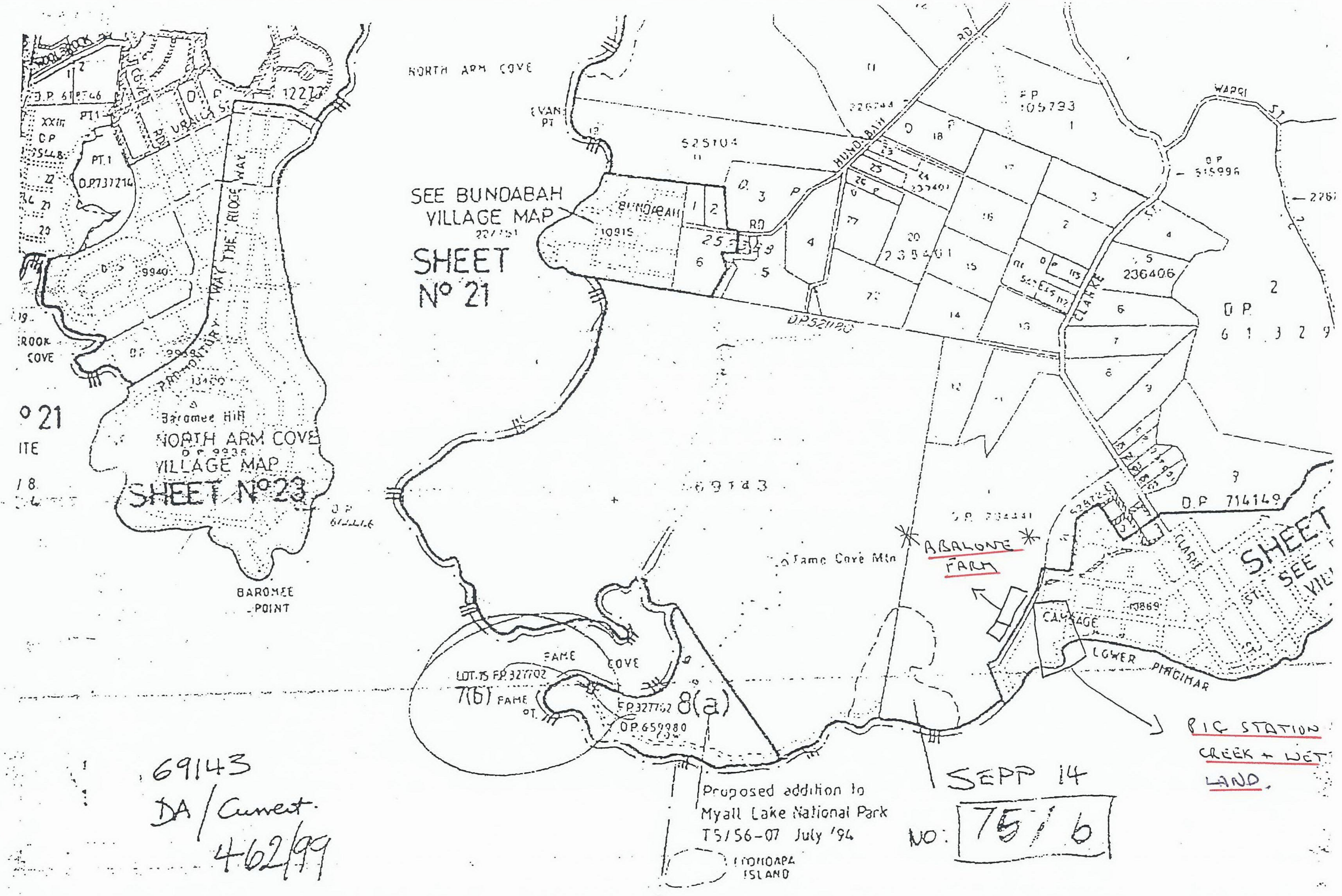
DEVELOPMENTAL PROPOSAL FOR A LAND-BASED ABALONE FARM
GREAT LAKES COUNCIL DA 313/03

LOT NO DP10146843 SOUTH PINDIMAR PORT STEPHENS

Further to our objections, detailed in the preceding letter, an expert hydrology opinion should be obtained as to the potential scouring and erosion that pumping out the equivalent of 6.6 Olympic swimming pools of water each day may have on the Pindimar sand flats. This pumping is to occur during the ebb high tide which may be as little as 1 metre and then dropping so that the pipes are exposed. The outlet pipes lie on the sand flats and not beyond them and only extend for a short height above the sand flats themselves. Any erosion that this amount of water may produce would be exacerbated by tidal influences, particularly during storms and the potential for major erosion of the Pindimar sand flats must be considered. It is well known that the beaches and sand bars within Port Stephens are being constantly eroded and moved throughout the port which is only too clearly demonstrated at Jimmy's beach and Windawoppa.

SCHEMATIC SITE PLAN




NORTH ARM COVE
SEE BUNDABAH VILLAGE MAP
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BUNDABAH RD
CLARKE ST
WARGI ST
D.P. 105793
D.P. 515996
D.P. 61329
D.P. 714149
236406
235401
525104
69143
BAROMEE HILL
NORTH ARM COVE VILLAGE MAP
D.P. 9936
SHEET Nº 23
BAROMEE POINT
PROMONTORY WAY
THE RIDGE WAY
Fame Cove Mtn
ABALONE FARM
FAME COVE
LOT 15 F.P. 327702
7(b) FAME PT.
F.P. 327702
8(a)
D.P. 659980
CARTHAGE
LOWER PINDIMAR
PIG STATION CREEK + WET LAND.
SEPP 14
NO: 75 / 6
Proposed addition to
Myall Lake National Park
T5/56-07 July '94
COONDAPA ISLAND
69143
DA / Current
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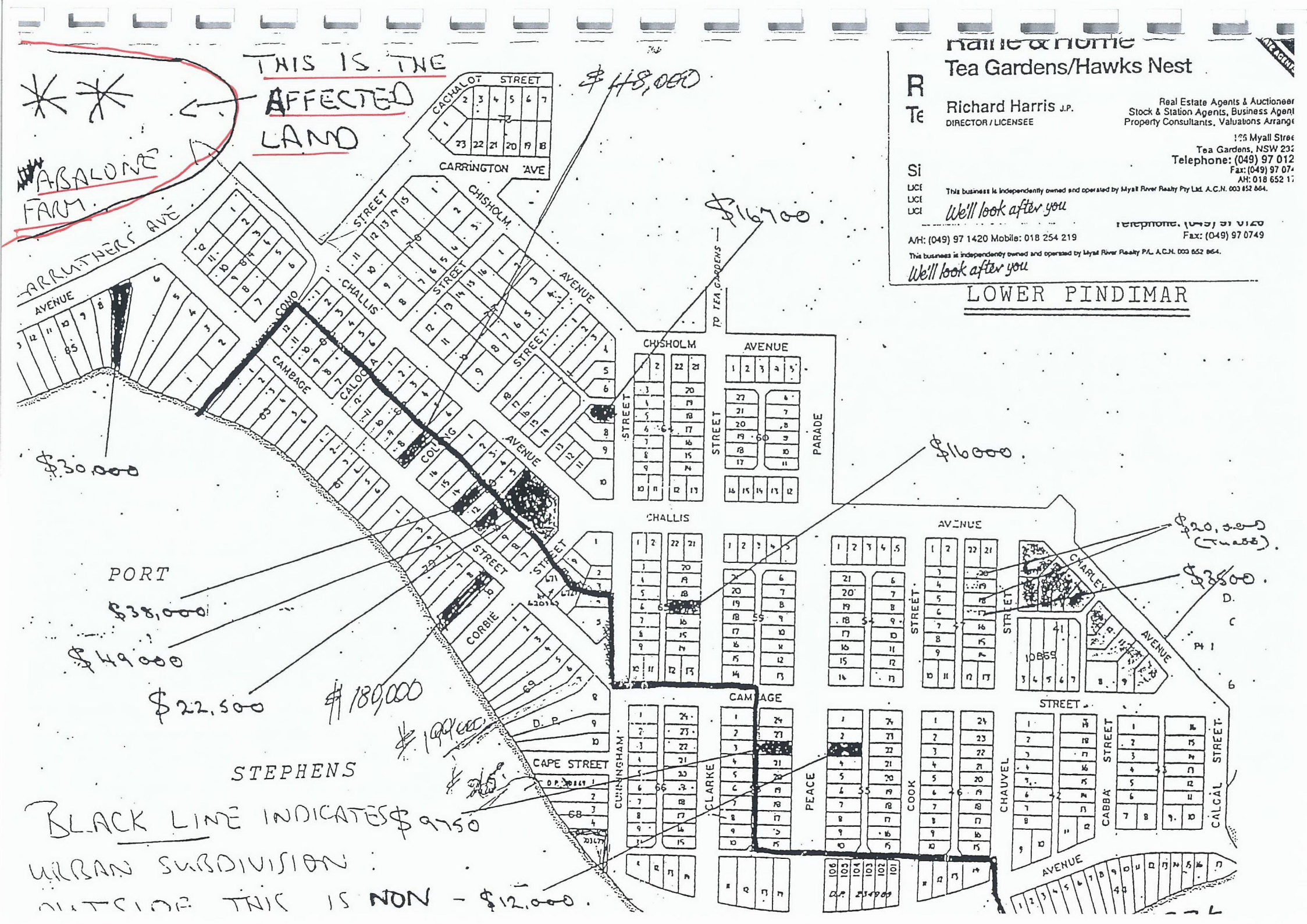

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We'll look after you

NSW FISHERIES PRESS RELEASE – NOVEMBER 2002

One of NSW's highest priced seafood – abalone – has been virtually wiped out in waters from Port Stephens to Jervis Bay, due to a parasite and warm summer water temperatures.

The Director of NSW Fisheries, Steve Dunn, said Perkinsus, a single-celled parasite which lives in the shellfish's blood, has had a devastating effect on stocks around Terrigal, Sydney, Kiama and Port Stephens.

"This parasite is having a serious effect on abalone which currently has a beach price of $50 a kilogram."

"Perkinsus does not affect or harm people."

"NSW Fisheries researchers believe higher summer water temperatures cause stress, making abalone more vulnerable which helps spread this disease."
Mr Dunn said the parasite has caused abalone numbers to drop to just five per cent of their former populations in some locations.

He said commercial and recreational harvesting of abalone is banned for five years from Port Stephens to Jervis Bay in an attempt to give the these populations time to recover.
"Abalone are a relatively slow growing marine snail which graze on seaweed. They take at least five years to reach breeding size."

"During this time NSW Fisheries will closely monitor abalone growing in these areas."
NSW Fisheries scientists will also work with other States, universities and the Commonwealth to research this disease and investigate ways to control its spread.
Abalone harvesting has previously been banned in other areas due to the disease. They include the Entrance to Terrigal, Bondi Beach to Marley Beach in the Royal National Park and Bombo Beach to Werri Beach at Kiama. These areas will now be covered by the current ban.

"It's important the community knows about this problem and helps us protect this shellfish."

NSW Fisheries will undertake an extensive education campaign to spread the message about Perkinsus.

11: J Nutr 2001 Nov;131(11):2898-903

Abalone, Haliotis discus hannai Ino, can synthesize myo-inositol de novo to meet physiological needs.

Mai K, Wu G, Zhu W.

Mariculture Research Laboratory, College of Fisheries, Ocean University of Qingdao, Qingdao 266003, Shandong, P. R. China. kmai@mail.ouqd.edu.cn

The experiments were conducted to investigate the effects of dietary myo-inositol on the survival, growth, proximate composition and de novo synthesis of myo-inositol in abalone, Haliotis discus hannai Ino. The possible inositol-synthesizing capacity of intestinal microflora was also examined. Seven semipurified diets were formulated to provide graded levels of myo-inositol (28.7-1020.1 mg/kg diet). A control diet, the basal diet supplemented with 4 g/kg tetracycline hydrochloride, was employed to suppress synthesis of myo-inositol by intestinal bacteria. Abalone juveniles of similar size (weight, 144.6 +/- 0.8 mg; shell length, 10.92 +/- 0.10 mm) were distributed in a flow-through system using a completely randomized design with eight treatments and three replicates per treatment. They were fed the appropriate diets once daily for 16 wk. Survival, growth, crude protein, lipid, moisture of whole soft body and visceral inositol content were independent of myo-inositol supplementation ($P > 0.05$). The addition of the antibiotic also did not affect the survival, growth and whole soft body composition. It indicated that intestinal microflora contributed little to the myo-inositol nutrition in abalone. The present study, for the first time, demonstrated de novo synthesis of myo-inositol in mollusks because the visceral tissue of abalone showed high levels of myo-inositol synthetase activities (combined activities of myo-inositol-1-phosphate synthetase and inositol-1-phosphatase), ranging from 74.0 to 98.2 micromol/(h x g protein). The enzyme activity significantly and negatively correlated with dietary myo-inositol level ($r = -0.81$). Hence, dietary myo-inositol is not essential for abalone because tissue synthesis of the vitamin appears to be sufficient to support normal growth and health of this mollusk.

PMID: 11694615 [PubMed - indexed for MEDLINE]

12: Dis Aquat Organ 2000 Feb 24;40(1):67-78

A survey of some parasites and diseases of several species of bivalve mollusc in northern Western Australia.

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Pteriid oysters (Pinctada maxima, Pinctada margaritifera, Pinctada albina, Pteria penguin), rock oysters (Saccostrea glomerata, Saccostrea cucullata, Saccostrea echinata) and representatives of other taxa (Malleidae, Isognomonidae, Pinnidae, Mytilidae, Spondylidae, Arcidae) from the wild, and 4670 hatchery-reared P. maxima, from northern and Western Australia, were examined for parasites and diseases. Rickettsiales-like inclusions and metacestodes of Tylocephalum occurred in most species. Intranuclear virus-like inclusions occurred in 1/415 wild P. maxima, 1/1254 S. cucullata, 3/58 Isognomon isognomum, 1/80 Pinna bicolor and 1/45 Pinna deltodes. Perkinsus was histologically observed in 1/4670 P. maxima spat, 2/469 P. albina, 1/933 S. glomerata, 16/20 Malleus meridianus, 12/58 I. isognomum, 1/45 P. deltodes, 5/12 Spondylus sp., 1/16 Septifer bilocularis and 3/6 Barbatia helblingii. One of 1254 S. cucullata was heavily systematically infected with Perkinsus merozoites, meronts and schizonts, and was patently diseased. Other potentially serious pathogens included Haplosporidium sp. in 6/4670 P. maxima spat, Marteilia sydneyi from 1/933 S. glomerata, and Marteilia sp. (probably M. lengehi) (1/1254) and Haplosporidium sp. (125/1254) from S. cucullata. The latter were associated with epizootics on offshore islands, with heaviest prevalence (45%) in oysters with empty gonad follicles. Marteilioides sp.

State Department of Fish and Game Infected Wild Abalone Stocks

State Fish and Game officals say disease has not taken hold of red abalone population despite 1995 mistake

July 12, 2001

Paul Engstrom
The Press Democrat, Santa Rosa

State Department of Fish and Game officials admitted Wednesday they accidentally contaminated wild red abalone along the North Coast with the same disease that decimated the black abalone populations of Southern California.

Officials with the department said they have been closely monitoring the health of Northern California's red abalone ever since they realized their error in 1999.

Fish and Game officials said while the disease is not now taking hold of red abalone beds along the North Coast, it does pose a significant threat.

Tainted abalone seed were introduced to wild populations off the coasts of Fort Bragg and Crescent City in 1995 during so-called outplant projects. The environmentalist-endorsed projects were conducted to learn whether depleted wild stocks of the prized catch could be buttressed with farm-raised abalone.

But in 1999, officials discovered that the farm-raised abalone stock they planted in the wild was contaminated with a bacteria called rickettsia-like procaryote, or RLP, which causes withering syndrome in certain types of abalone.

"In retrospect now, it does appear that some of those (seeds) were infected," said Robert Hulbrock, aquaculture coordinator for Fish and Game in Sacramento. He said the agency continues to sample wild abalone between Crescent City and Bodega Bay to monitor the situation.

Though not harmful to humans, the infectious disease attacks black, pink and red abalone and causes the mollusks to lose weight and eventually die of starvation.

Hulbrock said withering syndrome has not so far been seen north of San Francisco, adding that he's "cautiously optimistic" it won't any time soon.

But he acknowledged that the true extent of the threat will remain unclear until more studies are done.

The disease is best known for having decimated the black abalone populations in Southern California in the 1980s, leading to the demise of the state's commercial abalone industry.

Black abalone populations from San Diego to Cayucos had declined by as much as 99 percent by 1998. The state imposed a partial ban that year on shipments of abalone to and from Northern California hatcheries to keep the disease from spreading northward.

Abalone can host the bacteria that causes withering syndrome, yet not succumb to it.

Researchers at the department's Bodega Bay Marine Lab are studying the possibility that North Coast red abalone haven't contracted withering syndrome because coastal waters north of the Golden Gate are too cold to permit the bacteria's infection of the mollusks.

But they warn that the situation could change in the event of a water-warming climate change, such as another El Niño event.

"We know that in warmer water, this organism causes severe damage," said Dallas Weaver, president of the Aquaculture Disease Advisory Committee at the California Department of Fish and Game.

"But we don't know if it causes as much damage in the North -- if any damage to speak of -- as in Southern California."

Last month, NASA scientists predicted another El Niño could be as little as a year away.

Red abalone, which survive from the Marin County coastline north to the Oregon border, are a favorite catch for sport divers from all over the state, who have been coming to Sonoma and Mendocino counties since abalone harvesting was banned south of the Golden Gate in 1997.

Mature mollusks generate significant tourism income for North Coast communities during the state-sanctioned abalone diving season, which runs from April through November with a monthlong break in July.

But Weaver said sport divers may unwittingly contribute to the spread of RLP bacteria when they clean infected abalone and toss the waste back into the ocean where it is eaten by uninfected abalone.

The threat of withering syndrome has already put a crimp in the operations of North Coast aquaculture facilities that grow and sell the millimeters-long abalone seed to abalone farms or grow the mollusks to maturity for market.

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Agency loosed abalone threat

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July 12, 2001

By PAUL ENGSTROM THE PRESS DEMOCRAT

State Department of Fish and Game officials admitted Wednesday they accidentally contaminated wild red abalone along the North Coast with the same disease that decimated the black abalone populations of Southern California.

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Continued declines of black abalone along the coast of California: are mass mortalities related to El Niño events?

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ABSTRACT: The intertidal black abalone *Haliotis cracherodii* has experienced mass mortalities along the coast of California, USA, since the mid-1980s. Mortality is due to infection by a pathogen that leads to a fatal wasting disease called 'withering syndrome', where the foot of the abalone atrophies until it can no longer adhere to the substratum. Massive die-offs due to withering syndrome were first noted on the Channel Islands in 1986, and by 1992 withering syndrome was observed near Point Conception on the mainland and was suspected to be spreading northward up the coast of California. The timing of the initial mass mortalities following the strong 1982 to 1983 El Niño and an isolated outbreak of withering syndrome in 1988 at Diablo Cove, north of Point Conception, following warm water discharge from a power plant, led to the hypothesis that the onset of mass mortalities due to withering syndrome may be triggered by elevated seawater temperatures. We surveyed black abalone populations at 7 sites along the mainland coast of California (including 3 where withering syndrome was already present) from 1992 to 2001, a period spanning 2 El Niño events, to determine whether (1) withering syndrome and associated declines of black abalone were spreading northward up the coast; and (2) these mass mortalities of black abalone could be related to elevated seawater temperatures during El Niño events. Mass mortalities of black abalone due to withering syndrome were observed at the 5 most southern sites (>90% decline in numbers in all size classes), but not at the 2 most northern sites, and there was a clear pattern of decline from south to north over time. Massive die-offs of abalone were not exclusively associated with times of elevated sea surface temperatures due to El Niño. Nevertheless, rapid declines of abalone at 2 sites coincided with the strong 1997 to 1998 El Niño, and declines during El Niño events were faster than those during non-El Niño years. Abalone at the 2 most northern sites, where only slight declines occurred during the 1997 to 1998 El Niño, may not have been infected by disease. It appears, therefore, that in the presence of the pathogen, warm water conditions associated with El Niño may accelerate the development of withering syndrome and the rate of decline of black abalone. Consequently, anthropogenic disturbances, such as discharges of heated water or global warming, may increase the incidence of this fatal disease.

KEY WORDS: Withering syndrome · El Niño · *Haliotis cracherodii* · Human disturbance · Mass mortalities · Marine diseases · Intertidal zone

INTRODUCTION

Mass mortalities of marine organisms due to outbreaks of disease appear to be increasingly common throughout the world's oceans (Harvell et al. 1999). Along the coast of California, USA, the ecologically

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