

# **The Development of a Strategic Research and Development Plan for the Yellowtail Kingfish Aquaculture (*Seriola lalandi*) industry**

## **FINAL REPORT 2003/215**

**Prepared for**  
Fisheries Research and Development Corporation &  
South Australian Marine Finfish Farmers Association Inc.

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*South Australian Marine Finfish Farmers Association Inc*



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**2003/215 The Development of a Strategic Research and Development Plan for the Yellowtail Kingfish Aquaculture (*Seriola lalandi*) industry.**

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**OBJECTIVES**

1. To develop a five-year (2003 –2008) Yellowtail Kingfish strategic research and development (R&D) plan as the principal source of information on the industry sector's policies, programs and operations as they relate to R&D.
2. To ensure that the Yellowtail Kingfish industry development is based on the best available information and is consistent with community and government expectations.
3. To establish a Yellowtail Kingfish Aquaculture R&D Steering Committee (the Committee) which includes relevant stakeholders in order to enhance and promote the orderly and strategic planning and management of R&D to benefit the emerging industry.

**NON TECHNICAL SUMMARY**

**OUTCOMES ACHIEVED TO DATE**

A representative Research and Development Committee has been established which has endorsed a Strategic Research and Development Plan for the Yellowtail Kingfish Aquaculture Industry. The Committee is able to review proposals to funding bodies and provide authoritative advice based upon the proposals' relevance to the R&D Plan.

Stakeholders have commented that the R&D Plan is an excellent strategic document with clearly prioritised aims, objectives and required outcomes, obtained as a result of an ongoing consultative process.

The Plan places research and development in the context of business, environmental and social issues, providing a framework for the development of proposals, and the assessment of proposals by funding bodies.

In this way limited research dollars will be expended in the most targeted and cost effective manner.

The report explains the process undertaken in order to establish a Strategic Research and Development Plan for the Yellowtail Kingfish Aquaculture industry.

It highlights the need to identify and include stakeholders, and points out that for research to be effective, it must be driven by industry.

The project arose from an initial proposal by the South Australian Research and Development Institute (SARDI), and was developed through the establishment of a workshop including relevant stakeholders.



The workshop members highlighted a range of issues affecting the industry and stakeholders, determined objectives to address those issues, and agreed on initial priorities to be addressed.

The workshop further agreed that a formal R&D Plan should be driven by industry, and that the priorities of the Plan would be constantly updated.

This would require the establishment of an R&D Committee, consisting of industry and relevant stakeholders, which would meet regularly to establish and review the Plan, and consider proposals in comparison with the Plan.

The Yellowtail Kingfish Aquaculture Strategic R&D Plan 2003-2008 has now been completed, and will be regularly updated.

The Plan is appended to the report, but the latest revision is available from the FRDC website at [www.frdc.com.au](http://www.frdc.com.au).

**KEYWORDS: Yellowtail Kingfish, Strategic Research and Development Plan, Research and Development Committee, SAMFFA, aquaculture, finfish, South Australia.**

## **2. ACKNOWLEDGEMENTS**

The author wishes to thank all of the people and organisations who provided advice in the development of this report and the R&D Plan, listed at sections 7, 12 and Appendix 3.

Particular thanks are given to Mr Richard Stevens (SAFRAB); Dr Patrick Hone, (FRDC); Dr Simon Stone (Chair, SAMFFA) and Mr Wayne Hutchinson (SARDI).

## **3. BACKGROUND**

In late 2002, SARDI prepared an FRDC project proposal entitled “Preparation of a Strategic Research and Development Plan for the Yellowtail Kingfish (*Seriola lalandi*) industry with foundation projects”.

In addition to proposing to write a strategic R&D Plan, the proposal itself listed focus research areas and suggested projects.

However, it was clear from the outset, that foundation or other projects could not be identified prior to the establishment of an industry driven Committee, which included relevant stakeholders. This would form the basis of the process of a strategic approach to research and development for the industry.

The FRDC therefore asked SARDI to host a Yellowtail Kingfish Planning Workshop in Whyalla on 7 February 2003.

The workshop was extremely important in laying the foundations for the subsequent R&D Plan and R&D Committee. The workshop and the subsequent process of development is explained in more detail under “Methods” below.

After the R&D Committee had been established, and the draft R&D Plan developed, Wayne Hutchinson, Senior Research Scientist, SARDI, then wrote to FRDC on 24 March 2003. He advised that SARDI wished to withdraw from the project, stating that “SARDI has initiated the process and contributed expertise to support industry to the stage where this plan can be completed without our further involvement”.

A further project agreement was therefore signed on 26 June 2003 between SAMFFA and FRDC, with the objective “To Develop a strategic research and development plan for the Yellowtail Kingfish industry”.

## **4. NEED**

The relatively new Yellowtail Kingfish Aquaculture industry is growing rapidly and has the potential to match existing mature aquaculture industries in terms of economic value and employment generation in regional Australia within the next five years.

However, in common with all new and growing industries, a wide range of research and development issues need to be addressed which will change as the industry develops.

Prior to this project, various research projects had been proposed by various agencies, which either had direct or indirect relevance to the YTK industry.

Some proponents however, did not adequately consult industry, or some proposals were being developed which affected the industry, but did not meet industry’s priorities.

Consultation and a coordinated approach was therefore required between industry, government and researchers, to ensure that research was addressed in accordance with

the priorities of the stakeholders, with clear objectives and that the results of the research would enhance the development of the industry.

The FRDC appropriately considered that such projects should be driven by the industry, or the industry should have close involvement in the determination of project objectives and outcomes. In this way, project outputs would have a much greater chance of being implemented.

As a result, stakeholders expected that any R&D funding assistance should therefore meet the stated strategic requirements of industry and relevant stakeholders.

However, this meant that industry and relevant stakeholders needed a formal mechanism to agree on the best way to determine the strategy.

This would be achieved by the development of an R&D Strategic Plan, and the formation of an R&D Committee to regularly review proposals, projects and the R&D Strategic Plan itself (as outlined in this report).

## **5. OBJECTIVES**

4. To develop a five-year (2003 –2008) Yellowtail Kingfish strategic research and development (R&D) plan as the principal source of information on the industry sector's policies, programs and operations as they relate to R&D.
5. To ensure that the Yellowtail Kingfish industry development is based on the best available information and is consistent with community and government expectations.
6. To establish a Yellowtail Kingfish Aquaculture R&D Steering Committee (the Committee) which includes relevant stakeholders in order to enhance and promote the orderly and strategic planning and management of R&D to benefit the emerging industry.

## **6. METHODS**

The FRDC and SARDI agreed that the first step should be to invite all relevant stakeholders to a workshop hosted by SARDI to discuss the proposal.

Planned Outcomes were listed as:

1. Evolution of Yellowtail Kingfish aquaculture into a knowledge based industry, marketing value added product through inputs from research, production, processing, marketing, training, continuous benchmarking and technology transfer.
2. To ensure that the Australian Yellowtail Kingfish industry's current success builds on Australia's technical ability to respond to world consumer sentiments and deliver superior competitively priced products presented in attractive consumer friendly forms.

Planned Outputs were listed as:

1. To develop an industry R&D structure that fosters the concept that all innovative efforts in Yellowtail Kingfish aquaculture arise from a combination

of collaboration and competition. These efforts will be characterised by a sharing of professional user-pays industry structures that ensure the formation of collective views and collective actions. This includes a pre-competitive sharing of enabling research outcomes and their costs.

2. The development of an R&D blueprint for the Yellowtail Kingfish Aquaculture industry.

This Yellowtail Kingfish Planning Workshop was held at the Whyalla Economic Development Board, 127 Nicholson Avenue, Whyalla, on 7 February 2003.

## **THE WORKSHOP**

The workshop was chaired by Mr Richard Stevens, chairman of the SA Fisheries Research Advisory Board. The invitation/attendance list is provided at appendix 3.

Presentations were made by various stakeholders in order to set out their views and expectations. There then followed more detailed discussion of the issues raised.

The presentations are summarised as follows:

Dr Patrick Hone, FRDC:

Provided the introduction to the workshop and explained that a structured and coordinated approach to R&D would benefit industry and government.

The workshop needed to identify industry's vision of its status in 10 year's time, and consequent requirements, such as greater access to marine water and improved production capacity. A whole of industry approach was required.

Any R&D planning process should start with an identification of the planned outcomes and an identification of the factors that were blocking their development.

The key R&D issues relating to the whole production chain needed to be identified such as marketing, training and production etc, and then identify the best way to achieve the desired outcomes.

FRDC needed industry to be an active partner, but other experts needed to be involved in order to actively monitor the research.

The State Government needed to help industry with impartial advice and support. This included areas such as media liaison.

Funding bodies had different priorities and objectives. Therefore, the model chosen for any project proposal would need to fit the funding body objectives. However, the R&D Plan itself would need to be unified and show how the linkages between the projects. He explained the FRDC funding process, as described in the FRDC R&D Plan.

International interest in YTK aquaculture was growing worldwide, particularly in New Zealand, which had begun to invest significantly on research.

Existing research in other areas of aquaculture may also overlap with the YTK plan priorities and needed to be taken into account. The Aquatic Animal Health Subprogram and Aquafin CRC projects were undertaking research into areas of common interest to the YTK industry, looking at species such a Southern Bluefin Tuna and Striped Trumpeter.

The Australian government's funding towards the National Aquaculture Agenda would provide an overarching framework. The YTK R&D Plan should therefore align with this and other relevant national and State plans and policies.

Wayne Hutchinson, SARDI:

Explained the reason for the workshop was that the content of any R&D plan should be driven by industry.

He explained that previous R&D plans had been structured in such a way as to include vision and mission statements, identified stakeholders and included an explanation of the business environment in which the industry operated.

The way that the above issues were managed would affect the growth of the industry. This also meant that a management plan and process was required to manage the research and implementation of the outcomes of the research.

R&D needed to be timely and delivered in a cost effective manner. Outcomes needed to be reviewed and compared with priorities, which may alter over time.

An R&D Plan was required which would aim to achieve the industry's vision, identify R&D needs, provide a balance of tactical and strategic research objectives, identify mechanisms for funding and offer guidance to R&D providers.

He proposed that the key features should be that the all stakeholders should be involved in the process. The process should be transparent, well documented and provide a strategy to guide proposals.

The role of an R&D Steering Committee should be to identify and review priorities, audit R&D resources, deliver R&D projects and programs, promote industry collaboration, identify funding sources, support the commercial uptake of R&D and foster R&D partnerships.

Marty Deveney PIRSA:

Advised that 27 YTK licences had been issued to date in South Australia, which consisted 21 marine growout, 4 landbased growut and 2 hatcheries. More licence applications were expected. He explained the estimated expected growth of the industry as follows:

Year	Tonnes	Value \$	Staff numbers
1999	45	400,000	30
2001	200	1.5 million	55
2003/4	3,200	24 million	190

The industry was the only growing sector in regional South Australia when one includes the related secondary growth in boat building, transport, etc. The industry also brought in export income and foreign trade.

It was therefore important from a State perspective that the industry grows because regional income and employment had been falling.

From the State Government's perspective, environmental sustainability was important. The plan needed to define what needed to be measured and clear reporting measures needed to be determined.

Public perceptions needed to be addressed including consideration of any potential interaction between wild and farmed fish, shark interactions and containment and escape issues.

Fish health also required a high priority of R&D, including a risk assessment model and ongoing monitoring of moribund and dead fish. A suite of compounds needed to be identified to control existing and future parasites and diseases.

Efficacy trials were being conducted on two potential treatments for flukes, and two antibiotic toxicity tests. Compliance with the SA Aquaculture Act and Fisheries Regulations would be required prior to any approval.

Dr. Peter Montague, Aquafin CRC:

Explained the CRC objectives, budget, funding arrangements and range of existing projects. Explained how YTK project proposals may be able to access CRC funding if the YTK industry wished to join the CRC.

CRC projects had a strong focus on quality, innovation and commercialisation.

Dr Sue Murray –Jones (Department of Environment and Heritage, Coastal Protection Board):

Advised that information was needed to make judgements on appropriate locations, growth etc. Results of R&D would guide policy decisions on the acceptable levels of any positive or negative impacts of YTK aquaculture.

She suggested that related research may wish to consider cage impacts, biofouling issues, nutrient sedimentation, species interaction, water quality phytoplankton blooms, biodiversity, sea grass status. Safe buffer zones needed to be determined. Shark interactions needed to be addressed. Little was known about behaviour.

Martin Smallridge, SA Seafood Council:

Suggested that the industry didn't need to reinvent the wheel, and could pick up on existing or previous research. Similar industries tended to go through similar growth patterns. YTK aquaculture was now part of a \$2.5 billion seafood industry, and needed to integrate and interact with the rest of the industry.

This interaction included shared resources and probably accessing similar markets. It needed to develop priorities for the short, medium and longer term, and develop as an opportunity, not a threat.

The Seafood Council were supportive of the YTK R&D initiative and the broader industry shared many of the same issues, eg marketing, public perception etc. The Seafood Council had built up a relationship with the Conservation Council, which would help the process.

The Prawn industry were also willing to make their R&D and boats available to assist, and the wild fisheries sector was expected to support sustainable aquaculture.

Dr Ingo Ernst, University of Adelaide:

Explained that a Yellowtail Kingfish Parasite Management project was underway. The Japanese had been growing Kingfish for 40 years and now grow 140,000 per year, but still had parasite problems.

Research needed to be focussed on practical outcomes and needed input from regulators. For example, solutions would not be practical if it was too expensive to obtain approval. An integrated pest management strategy would be the desired outcome.

Dr Simon Stone (representing the industry):

There were 5 member groups farming kingfish. Until recently, the industry was embryonic and uncoordinated. However, it was now more unified and collaborative.

Enterprises had contributed funding to support the shared industry direction and had recently engaged a full time executive officer.

Industry had invested significantly to date (approximately \$50 million) and therefore industry members felt that the industry should drive the R&D plan.

Industry fully supported the R&D Plan and Committee initiative, which needed to be integrated, responsive and flexible.

YTK was not the cheapest species to grow, and therefore premium prices were required. The key market driver was the Clean and Green image of the product and the location.

Overseas research on seafood had raised questions about food safety. The ability to prove local YTK quality would be beneficial to sales, but lack of evidence may be a limiting factor. Adverse publicity would damage the industry.

Industry proposed that a siege mentality and a “blame game” was not constructive for any stakeholder. The R&D Plan and Committee should develop solutions to problems and propose R&D on a reasonable basis.

The industry considered that protection of IP was important in order to help grow the industry. Research therefore needed to be categorised as to its commercial or generic benefit.

He explained that industry representatives had previously met and had determined three integrated R&D priority areas:

Industry Sustainability, Fish Health and Stock Security.

The specific issues under these headings, were itemised and placed on a whiteboard, in consultation with the other stakeholders. (see below).

### **Issues Identified and Initial Priority Formulation.**

The workshop members agreed that it was appropriate that industry would drive the development of the unified strategic R&D plan to provide the best vehicle to achieve appropriate, coordinated and timely research.

The group agreed to list the issues identified by stakeholders on a whiteboard.

Next to each issue, the group considered whether the issue was being adequately addressed by existing or future research, whether it was categorised as research or development, any relevant comments, and assigned a level of priority to the issue.

This was summarised as follows:

Issue	Priority	Comment	Existing R&D	Proposed R&D 2003
<b>Industry Sustainability</b>				
1.a Nutrient impacts and carrying capacity. Oceanographic study required, model tidal flow, develop monitoring methodology, ascertain seasonal algal patterns.	<b>Medium Research</b>	PIRSA putting up carrying capacity proposal? CRC?  Fisheries WA have a WEB based model for determining nutrient budgets for finfish farming – contact Brett Glencross Qld DPI has several studies on bioremediation ESD framework for aquaculture being progressed by ESD Subprogram – Rick Fletcher	FRDC has funded carrying capacity studies for Huon Estuary, Boston Bay and Sydney rock oysters  Have developed assimilative capacity models for prawn farms. Looked at bioremediation using filter feeders Environmental risk assessment with Pearl – Peter Jernakoff and Brett McCallum Aquafin CRC – has considerable investment in environmental affects of aquaculture	PIRSA/SARDI projects – carrying capacity and environmental audit  CSIRO – Sydney rock oyster  Fisheries WA – Lake Argyle barramundi carrying capacity model
1b.Seafloor Impact Analysis (refer 2e) Ascertain ecology of different systems at sites. Are farms in the right place?	<b>Medium Research</b>	Relevant for environmental and MSC certification.	Aquafin CRC projects 1) PCR probes by SARDI 2) Novel monitoring techniques by TAFI	
1c Meat Quality	<b>High Research</b>	There is a national residue survey. SARDI addressing affects on fish quality.	National Chemical registration project – Peter Taylor Crop Protection Authority	SARDI have 3 applications that address this subject 1) risk assessment for feed ingredients 2) residue analysis SBT 3) Quality of bait fish
1d Processing and packaging technologies	<b>High Devel.</b>	Food Science Australia?  CRC for packaging ?  Centre for Food Technology – Qld	FRDC projects on MAP technology and packaging design FRDC with SBT did a project on chain analysis for SBT – freight etc Farm Innovation is investing in enterprise level projects	
1e Broodstock bloodline	<b>Low Research</b>	Tracking mechanism will take years-need to start.  CSIRO – Nick Elliot NRE Vic – Nick Robertson QldDPI – Wayne Knibb Uni New England	Investing in selective breeding technology for: Atlantic salmon abalone Pacific and Sydney rock oysters, Marron	
2a Disease management. Risk identification and analysis.	<b>HIGH Research</b>	Barbara just done Tuna. Unprepared for fluke pathogens. Japan and China info needed.	Risk assessments for SBT, abalone	CRC new SBT for developing surveillance program 2 new applications by PIRSA
2b Emergency response protocols	<b>HIGH Development</b>	Marty Deveney-, manual and paper to AAC for consultation.	The Aquatic Animal Health Subprogram has invested with FRDC have invested in enterprise manuals	



2c “Next generation” technologies	<b>HIGH Research</b>		Aquafin CRC looking at vaccines	
2d Stress management	<b>High Research</b>		FRDC has invested in stress indicators for fish with Flinders Uni – Kathleen Soole and John Caragher.	
2e Impact on sea floor (refer 1b)	<b>High Research</b>	Under cage disease management. Structure and hydro dynamics Probes-\$80,000 each?	Studies by SARDI, CSIRO, Adelaide Uni Aquafin CRC – several studies	
3a Containment technology 1. Antifoulants 2. Wire Trace predator 3. electronic predator repellants	<b>High Research</b>	CRC doing antifoulant project  Previous CRC for marine engineering @ Maritime College – looked at cage design	Old Aquaculture CRC biofouling projects with Wattyl, Uni Tas and Salmon Industry. FRDC have funded biofouling projects wit oysters, SBT, Pearls. Aquafin CRC report on biofouling trial for SBT completed. FRDC funded predator project with salmon and SBT.	applications for biofouling from pearls and SBT
3b Predator Ecology	<b>High Research</b>	CSIRO – Barry Bruce, John Stephens etc doing extensive work on shark ecology Terry Walker – MAFRI Kate Rodda (SARDI)	FRDC are funding lots and lots or work on sharks – but none in relation to fish farm interactions. CSIRO good knowledge of sharks based @ Port Lincoln.	
3c Recapture methods Escapee behaviour and capture strategy. Fish trap technology. Size variation / specificity.	<b>High Research</b>	SARDI looking at methods to mark fish. Cameras to show wild fish around cages?		
3d Technology Transfer. 1. Containment technology 2. Predator control 3. Fouling control	<b>High Research</b>		Seafood Training Australia – Ross Ord National Aquaculture Action Agenda	FRDC looking to invest hatchery training ?

## THE ESTABLISHMENT OF THE YELLOWTAIL KINGFISH AQUACULTURE RESEARCH AND DEVELOPMENT COMMITTEE (the Committee)

After the initial priorities were agreed, the workshop attendees agreed that a Yellowtail Kingfish Aquaculture Research and Development Committee would be formed to enhance and promote the orderly and strategic planning and management of R&D to benefit this emerging industry.

This committee was to include:

- Independent Chairperson

- Chair of the South Australian Finfish Farmers Association Inc (SAMFFA)
- Three other industry representatives
- Executive officer of SAMFFA (Executive Officer of the Committee)
- A representative of Primary Industries and Resources SA (PIRSA -South Australian Government)
- Three Scientific representatives (South Australian Research and Development Institute (SARDI, University of Adelaide)
- Fisheries Research and Development Corporation (FRDC) representative (Australian Government)

Observer:

- Aquafin Cooperative Research Centre representative

The workshop agreed that the role of the R&D Steering Committee was to;

- develop an R& D plan for the Yellowtail Kingfish aquaculture industry that provides strategic direction for research and is responsive to change through a review process;
- set R&D priorities to maximise investment in areas of need;
- monitor national and international research to avoid duplication, and identify approaches that may achieve the greatest potential return;
- plan and assist R&D application development;
- manage existing R&D projects to ensure progress meets milestones and advise on changes where needed to ensure projects maintain relevance;
- manage intellectual property;
- promote collaboration between all industry stakeholders;
- communicate regularly with potential beneficiaries; and
- facilitate the adoption of R&D results.
- attract R&D funding and influence how funding entities apply their investments in this industry sector.

The Yellowtail Kingfish Aquaculture R&D Steering Committee was to meet every two months, or as needed.

The workshop attendees then asked the SAMFFA executive Officer to arrange the first meeting of the R&D Steering Committee and prepare an agenda.

### **YELLOWTAIL KINGFISH R&D COMMITTEE FIRST MEETING**

The first meeting of the Committee was held at Fishing Industry House, Dockside, North parade, Port Adelaide, on 19 February 2003.

The agenda included a determination of the role of the Committee, the development of the draft Strategic R&D plan and consideration of development of proposals in the key areas outlined at the workshop.

At this first meeting, the members discussed the necessity to link an Aquaculture Yellowtail Kingfish (YTK) R&D plan to other strategic plans.

There would be a need to plan the active management and funding of projects. The initial research would be tactical, solving immediate problems, and require hands on project management, querying ongoing research, terminating inappropriate lines of enquiry etc.

Other stakeholders would need to be consulted to ensure public interest issues were considered. After discussion about previous lack of consultation between industry,

government and researchers, the members agreed that they should now concentrate on the future, not the past. It was expected that no FRDC projects would be considered unless passed through the SA Fisheries Research Advisory Board, provided to industry for comment and provided for independent scientific peers for review.

**The Committee members agreed that:**

- The Committee should be small, outcome orientated and meet regularly initially.
- All project proposals, which include research pertaining to YTK, to be referred to this Committee for comment, prior to approval.
- Proposals to be developed through this Committee, and a range of funding resources should be accessed.
- YTK R&D projects should be centrally coordinated and managed.

The Committee members agreed that the Plan should:

- Provide a brief history of the development of Yellowtail Kingfish farming in Australia;
- Describe the industry and its business environment;
- Highlight the industry sector's planned outcomes for R&D and the immediate needs; and
- Outline the operational, communications and management objectives and the strategies that the South Australian Marine Finfish Farmers Association Inc, through the Yellowtail Kingfish R&D Steering Committee, intended to adopt to achieve these objectives.

**The Committee would:**

- Identify and Review Research priorities.
- Review existing overlapping research.
- Ensure proposals are "ground up" reflecting industry requirements.
- Ensure proposals align with objectives of appropriate funding agencies.
- Endorse R&D project proposals, prior to referral to FRAB, FRDC and other agencies.
- Oversee, develop and endorse an "R&D Strategic Plan Pertaining to YTK Aquaculture"

Various issues were discussed, pertaining to the potential project proposals in alignment with the priorities agreed at the previous workshop, plus the relationship with the Aquafin CRC.

At the end of the meeting, a list of action items was drawn up with action to be taken by nominated members.

These included the development of the first draft of the R&D Plan by Martin Hernen and Wayne Hutchinson, and the development of proposals to address health management, emergency disease response, food safety issues and next generation technologies.

**AFTER THE MEETING**

Wayne Hutchinson, Senior Research Scientist, SARDI prepared an initial draft of the R&D Plan on 21 February 2003, which included the priorities as agreed at the workshop.

The Executive Officer then took over the formation of the R&D Plan and discussed its intended format with various Committee members out of session.

The target audience of the Plan also needed to be determined.

It was agreed that the plan would focus on informing all stakeholders of the R&D needs of the industry, including:

- Yellowtail Kingfish farmers;
- various government agencies and industry corporations that fund R&D activities;
- community organisations interested in the activities of this industry sector;
- researchers and research organisations that provide, or are potential providers, of R&D services;
- industries that provide goods and services to the Yellowtail Kingfish aquaculture industry;
- Australian, State and local governments and their agencies associated with management of resources utilised by Yellowtail Kingfish farmers; and,
- the media.

The Executive Officer then undertook a desktop study to identify R&D and Action Plans prepared by Aquaculture Industry representative bodies at the State and national level.

He also undertook discussions with various State, Federal and other agencies to identify government and other strategies, which were relevant to the plan. (these are explained at point 7 in this report).

A comparison was then made as to how the YTK R&D Plan could be written so that its objectives would interface and support overarching aquaculture industry directions for development as outlined in the various plans (see point 7).

A list of references is also provided at item 12).

## **FORMAT OF THE PLAN**

After further discussion with Committee members, out of session, the following headings were agreed:

### **The Agreed Vision for the Industry.**

This would show that enterprises within the industry had a common goal, and that R&D would therefore have a common benefit.

### **Introduction**

To briefly explain why the Plan was developed. (This report explains why how it was developed in more detail).

### **Our Audience**

This was to show that the Plan was focussed on informing all stakeholders of the R&D needs of this industry.

### **The Composition and Role of the Steering Committee**

To explain the process to stakeholders as above.

## **Industry Overview and Business Environment**

This was intended to explain:

- The development of the industry, thus far, to the reader.
- The potential growth of the industry.
- The need for certifiable quality in both product and process, in order to meet expected market demand for a demonstrably superior product.
- The need for R&D to support the development of the quality product and process.

## **Products and Processing**

This generally outlined the intended positioning of the product in the market as premium quality rather than commodity.

## **Marketing**

This was intended to outline the main issues confronting the successful marketing of the product.

## **Features and Benefits**

This identified why consumers should buy the product.

## **International Competition**

This again identified that the product could not compete as a commodity in the world market. However, the world niche market for premium quality product showed that demand should exceed world supply.

## **R&D Objectives**

After setting the scene as above, the R&D Plan objectives were to be listed.

However, the Executive Officer and Committee members agreed that a statement was needed at this point to explain that the issues and objectives were not isolated, but were all inter linked.

Outcomes in one area would affect other areas e.g quality certification would affect farm management practices, processing and marketing. In this way, research and development would have a continuous synergy which needed to be continuously reviewed and evaluated.

On 2 March 2003, the Executive officer completed and circulated the second draft of the Plan to Committee members and stakeholders and prepared an agenda for the next R&D Committee meeting.

In addition to the industry members, the draft plan was circulated to:

The federal government, including FRDC, AFFA, Aquatic Animal Health sub Program, CSIRO (Barry Bruce), Barry Wakelin, Federal member for Grey (covering the Spencer Gulf and Eyre Peninsula).

South Australian Government, including Primary Industries and Resources SA, SARDI, the Environment protection Agency, the Office of Economic Development, the Centre for Innovation, Business and Manufacturing, the Department for Environment and Heritage; Department of Transport (Transport Policy and Strategy Group).

It was also been circulated to all members of the South Australian Aquaculture Council (SAAC), including the Tuna Boat Owners Association, the SA Oyster

Growers Association, the Inland Aquaculture Association, and Hudson Howells, consultants, undertaking projects on behalf of SAAC.

In addition,:

The Aquafin CRC; University of Adelaide; Flinders University; the SA Seafood Industry Development Board; the Seafood Training SA; the SA Seafood Processors and Marketers Association; SA Fishing Industry Council; SA Conservation Council; Vicky Wadley, Tasmanian Salmonid Growers Association; the Fishing Industry Training Board of Tasmania; Netcraft Pty Ltd; Mr Mark Sheppard, Canadian Aquatic Veterinary Consultant; Buzzfish, Consultants; Adrian Collins, Department of Primary Industries, Queensland; Geoff Gooley, Marine Aquaculture R&D, Dept of Fisheries, Victorian Government.

### **YELLOWTAIL KINGFISH AQUACULTURE R&D STEERING COMMITTEE MEETING 13 MARCH 2003.**

The Executive Officer advised the Committee that it was gratifying to note that the draft R&D Plan document was being discussed within networks across Australia, with the result that further copies of the draft had been requested for reference.

The only generic comments received to date were favourable, supporting its format and review process, and that the draft was actually being used as a model document. The draft plan had also acted as a catalyst, which allowed a framework for a more coordinated research approach beyond the Yellowtail Kingfish Aquaculture industry, and which had already influenced other proposals.

Researchers had contacted the Executive Officer regarding proposals or projects, which either had direct relevance to Yellowtail Kingfish, or were addressing similar issues to those listed in the draft plan, but with different species.

It was agreed that the draft incorporated the outcomes of the R&D workshop, but needed to better define outcome measures. Comments on the draft were to be provided to Martin, particularly from industry representatives and PIRSA.

The Committee then considered proposals, which had been initiated by PIRSA and SARDI.

After considering the proposals objectives and outputs, the Committee provided comment to the FRDC regarding support or otherwise for the proposals and the strategic fit of the proposals to the draft plan.

#### **These proposals included:**

- Determination of food safety issues relating to Yellowtail Kingfish
- A project to determine whether it was possible to discriminate between wild and farmed fish.
- Counting techniques for skin and gill parasites.
- Understanding nutrient flows around cages.
- Solutions for aquaculture planning.

The executive Officer then provided a briefing on the status of the proposals entitled:

- Detection and Management of YTK Health Risks –the Foundation for a health program for Australian Finfish Aquaculture and
- Emergency Response Protocols

The benefits of a Committee approach were apparent as overlaps with existing projects could be identified, objectives, outcomes and methodology could be discussed and agreed.

#### **YELLOWTAIL KINGFISH AQUACULTURE R&D STEERING COMMITTEE MEETING 4 JUNE 2003.**

The Executive Officer advised the Committee that favourable comments about the draft R&D plan had already been received. Copies had already been requested from interstate agencies.

The draft plan had been circulated to members by email for comment. However, members requested more time to review the draft plan in order to suggest amendments. For example, industry advice was that the growout size to market could be more than 3 to 5 kilos, and YTK aquaculture in Japan started in the 1920's. Also the industry was changing on a quarterly basis.

In terms of the value of the industry, it was suggested that the plan refer to reports undertaken by Econsearch (for PIRSA) and Mark Makrid and Associates (for the SA Seafood Industry Development Board).

The Committee noted the inclusion on page 14 of the determination of potential fish diseases which may be contracted by humans (such as Coccidia) as requested by an industry member.

It was suggested that Committee member comments should be sent to the Executive Officer by 13 June 2003.

Dr Hone advised:

The FRDC were supportive and impressed with the draft YTK R&D Plan, and had never seen a plan considered and developed so quickly. Although measurement of performance still needed to be addressed, this was therefore a good sign that the FRDC could invest in well developed YTK projects the coming year.

The Board had recently gone through an R&D round, which had just finished. He advised that never before had a global industry been required to meet needs from such a wide range of stakeholders.

Therefore competitive proposals had to be developed and progressed through the SA Fisheries Research Advisory Board.

The Committee agreed that if the R&D Plan was to be revisited, then it was inappropriate to produce too many copies, and that ring bound copies could be produced for distribution.

It was suggested that when the Committee had agreed on a more long term document, the FRDC may be requested to consider funding a printed version. Dr Hone advised that FRDC would also be prepared to place the plan on the FRDC web site as a PDF file.

With regard to other related research, it was noted that reports were usually available from FRDC at a small cost and that SARDI had a public library which retained copies of reports which had been made public.

The Executive Officer also advised that he had attended part of a meeting of the Southern Bluefin Tuna (SBT) Aquaculture Sub program on 3 June 2003. This Committee operated in a similar manner to the YTK R&D Committee in coordinating proposals and projects.

**Action:**

The Steering Committee agreed to review the Plan every 6 months and the Plan to be reviewed as an agenda item at all future Committee meetings.

The status of project proposals was then considered:

Project 2003/216 "Detection and Management of YTK Health issues",

Project 2003/229 "YTK Food Safety Issues ", and

Project 2003/649 "Emergency Response Protocols".

Dr Hone advised that the first two projects had been approved and the third expected to be approved. The lead time for obtaining project approvals was normally 18 months. The first YTK R&D Committee meeting was on 19 February 2003 –less than 4 months previously. This therefore showed the benefit of a coordinated and strategic approach.

The Committee then proceeded to consider new proposals and rank them in order against the priorities in the draft R&D Plan.

These were:

Priority 1: Efficacy of vaccination to control flukes. Measure for immune response. To link with investigation of immuno - stimulants.

Priority 2: Quantitative PCR –techniques for testing pathogens –DNA sampling. (proposed as CRC SBT Aquafin project).

Priority 3: Feed induced intestinal inflammation.

Priority 4: Flesh quality -re shelf life, market acceptance / Quality Index project, Sydney Fish Market.

Priority 5: Ecological effect of escaped kingfish

Priority 6: Status of dusky and bronze whaler sharks

Proponents were to liaise with the Committee members in developing their proposals and refer to this liaison when submitting proposals to the SAFRAB or the FRDC.

**YELLOWTAIL KINGFISH AQUACULTURE R&D STEERING COMMITTEE MEETING 29 SEPTEMBER 2003.**

The Executive Officer advised that no further additions had been made to the R&D Plan. The Committee therefore approved the R&D Plan for submission to FRDC, and requested that the Plan be listed on the FRDC website.

The research proposals were again considered as above, and aligned against the R&D Plan, with the exception that Marketing was now considered to be the top priority at this stage.



## 7. RESULTS / DISCUSSIONS

In developing the R&D Plan, the Executive officer undertook discussions with a range of Australian Government, State Government and industry organisations, in order to identify how the YTK R&D Plan may fit with national and State agendas and policies.

Organisations consulted included:

South Australian Aquaculture Council.

SA Seafood Council

Seafood Training SA

Tuna Boat Owners of South Australia

Fisheries Research and Development Corporation

Australian Government Department of Agriculture Fisheries and Forestry

Australian Government Department of Transport and Regional Development.

Australian Government Department of Employment, Workplace Relations, and Small Business: Adelaide Area Metropolitan Area Consultative Committee.

Department of Industry and Trade (SA), including the Office of Regional Affairs

Primary Industries SA

Deloitte Touche Tohmatsu (Triple Bottom Line Reporting).

When compared with the most relevant documents and policies, the draft YTK R&D achieved the following synergy as follows:

**1. The Australian Government Aquaculture Industry Action Agenda (Dec. 2002) based upon recommendation from the National Aquaculture Development Committee.**

Strategic Fit: The YTK industry is:

- Implementing an industry driven action agenda, ensuring that research and innovation is industry driven.
- Growing the industry within an ecologically sustainable framework.
- Investing for growth
- Promoting aquaculture products in Australia and globally
- Maximise the benefits of research and innovation

**2. The State Action Plan - South Australian Aquaculture Council (November 2002)**

Strategic Fit: The YTK industry will:

- Ensure that the future of South Australia's aquaculture industry is optimised.
- Improve industry / government interaction while minimising impacts on the environment.
- Improve access to resources, streamline the current licensing and approvals system.
- Minimise the risks of disease.
- Optimise investment and enhance marketing capabilities.
- Develop a culture within the industry, which that ensures a common focus.

**3. South Australia's Fisheries and Aquaculture Research and Development Strategy 2002-2007**

Strategic Fit: The YTK industry has the same key goals.

**Key Goals of the Strategy are:**

**Natural resources are utilised in a way that can be maintained indefinitely**

**Priorities:**

Define resources and create objective measures of the health of resources.  
Define threats to resources  
Develop ways to manage threats  
Predict how changing a threat affects the health of the resource  
Enhance governance arrangements

**Ensure that the seafood industry is efficient, profitable and environmentally responsible.**

**Priorities:**

Eliminate technical barriers to improved social, economic and environmental efficiency.  
Evaluate the non biological implications of regulation.  
Identify the best use and highest economic value for seafood production.  
Promote the true value of fisheries and aquaculture to the community at large.

**Increase the professionalism and effectiveness of people in the industry and those providing support services to the industry.**

**Priorities:**

Increase communication among and between industry participants and service providers.  
Develop leadership and communication skills in industry participants.  
Enable participatory co management of resources at the decision making level.

**4. “Aquaplan” Australia’s National strategic Plan for Aquatic Animal health 1998-2003. Agriculture, Fisheries and Forestry –Australia.**

Strategic Fit: The YTK industry has the same key goals, including:

A sustained sense of ownership and collaborative approach at all levels of government and industry.

Reliance on the leadership and input of the private sector.

Priorities for research into diagnostic techniques, disease prevention methods, improved husbandry and management techniques.

**5. Strategic Framework 2002. Seafood Industry Development Board, South Australia.**

Strategic Fit: YTK industry has the same goals, including:

Vision: “The South Australian seafood industry ....will be the foremost producer, supplier and marketer of quality, superior value seafood to Australian and world markets.”

Develop a coordinated and well structured aquaculture industry.

Encourage application of world’s best practice.

Ensure security of commercial access to a common property resource.

Develop a sustainable resource management structure.

Research food safety/quality schemes

Examine product differentiation.

## **8. BENEFITS**

As stated above, the benefit of using a Committee approach including stakeholders was apparent as overlaps with existing projects could be identified, objectives, outcomes and methodology could be discussed and agreed.

The coordinated Committee including stakeholders has allowed a forum for determination of strategic R&D priorities. The Committee structure is also flexible

enough to allow regular review of strategic R&D priorities, allowing these priorities to change with the development of the industry.

The combination of the Committee and the R&D Plan allowed consideration of R&D proposals to be fast tracked where necessary. This should enable all stakeholders to get the best value for the R&D dollar.

The Committee and the Plan have become a reference point for other researchers, who can align proposals with clear priorities and can place the proposal in the context of the business environment of the industry.

## **9. FURTHER DEVELOPMENT**

This Strategic R&D Plan is not a static document, and will be constantly reviewed and updated.

Review of this implementation will result in the identification of new areas of research or in changed priorities.

Research management, monitoring and review will be important to the success of the Plan and will be a core role of the industry R&D Steering Committee, which will continue to meet on a regular basis.

The industry is constantly evolving and it is recognised that the plan will need to be adjusted to accommodate changes in R&D priorities as these arise.

## **10. PLANNED OUTCOMES**

The development of a Strategic Research and Development Plan covering the years 2003 to 2008.

The success of the plan will depend on the ability of the industry, stakeholders and research providers to undertake projects that address the priorities identified.

Any research pertaining to the Yellowtail Kingfish aquaculture industry must now be completed in close collaboration with the industry, which will primarily be responsible for implementation of outcomes.

## **11. CONCLUSION**

The development of the Australian Yellowtail Kingfish Aquaculture now has a strategic and coordinated plan, which will enable the most appropriate use of research and development funding resources.

Research should not now be duplicated, may complement other aquaculture research and can be undertaken in order of agreed priority.

This, and the establishment of a coordinated industry and stakeholder approach will enable issues to be quickly addressed.

This should then enable the achievement of common goals and objectives and fast-track the benefits of a sustainable industry for all stakeholders.

The Yellowtail Kingfish Aquaculture Strategic Research and Development Plan 2003-2008 is at appendix 4 of this report.

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The authors would also like to thank members of the Yellowtail Kingfish Aquaculture R&D Committee, South Australian Marine Finfish Farmers Association Inc and the South Australian Research & Development Institute for their contributions to this document.

#### **Appendix 1**

SAMFFA does not expect to obtain any profit from the intellectual property arising from Yellowtail Kingfish R&D Plan.

#### **Appendix 2. Staff List.**

The following people contributed to the writing and editing of the R&D Plan:

M Hernen, Executive Officer, SAMFFA.

Wayne Hutchinson SARDI.

Dr Simon Stone, Chair, SAMFFA.

**APPENDIX 3**  
**Yellowtail Kingfish Planning Workshop Invitation/Attendance List**

Name	Organisation
Richard Stevens (Chair)	SA Fisheries Research Advisory Board
Dr Simon Stone	SA Aquaculture Management Pty Ltd and Spencer Gulf Aquaculture Pty Ltd;
Tom Hyde	SA Aquaculture Management Pty Ltd
Hagen /Marcus Stehr	Stehr Group /Clean Seas Aquaculture
Stephen Bedford Clark	Stehr Group /Clean Seas Aquaculture
Ross Gordon	Stehr Group /Clean Seas Aquaculture
Paul Robinson	Capital Strategies
Neil Ramsay	Clean Seas
Lyndon Giles	Southern Star Aquaculture
Terry Bryant	Navajo
Joe Ciura	Navajo
Peter Parry	Franklin Harbour Fish Farms
Carl Jaeschke	Franklin Harbour Fish Farms
Steve Shotton	Oceania Aquaculture
Martin Hernen	SA Marine Finfish Farmers Association
Dr Patrick Hone	FRDC
Martin Smallridge	Seafood Council SA
Dr Ingo Ernst	University of Adelaide
Bronwyn Gillanders	University of Adelaide
Mark Cody	SA Aquaculture Council Seafood Training SA
Ian Nightingale,	Director of Aquaculture, PIRSA
Colin Johnston	Fish Health, PIRSA
Marty Deveney	Fish Health, PIRSA
Dr Sue Murray -Jones	Dept of Environment and Heritage
Rodney Grove Jones	SAFRAB
Jeff Todd	EPA
Peter Montague	Aquafin CRC
Dr Barbara Nowak	Aquafin CRC
John Volkman	Aquafin CRC
Dr Anthony Cheshire	SARDI
Wayne Hutchinson	SARDI
Steven Clark	SARDI
Jane Ham	SARDI
Susan Stovell	Whyalla Economic Development Board
Aaron Harris	Whyalla Economic Development Board
Gary Anesbury	Northern Regional Development Board
Irene Chumak	Centre for Innovation, Business and Manufacturing
Lisa Huong Nguyen	Centre for Innovation, Business and Manufacturing
Sagiv Kolkovski	WA Fisheries

**APPENDIX 4**

**Yellowtail Kingfish Aquaculture  
Strategic Research and Development  
Plan  
2003-2008.**



# **Yellowtail Kingfish Aquaculture**

## **Strategic Research and Development Plan**

**2003-2008.**

**Prepared for**

Fisheries Research and Development Corporation &  
South Australian Marine Finfish Farmers Association Inc.

**Prepared by**

Mr Martin Hernen, South Australian Marine Finfish Farmers Association Inc  
Mr Wayne Hutchinson, South Australian Research & Development Institute

**Published July 2003 by the**

South Australian Marine Finfish Farmers Association Inc



*South Australian Marine Finfish Farmers Association Inc*



**FISHERIES  
RESEARCH &  
DEVELOPMENT  
CORPORATION**



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#### ***Further Information:***

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South Australian Marine Finfish Farmers Association Inc (SAMFFA)  
Yellowtail Kingfish Aquaculture R&D Steering Committee  
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Port Adelaide  
SA 5015  
Tel: 8303 2790 or Fax: 08 8303 2791

## **VISION**

**“A profitable, sustainable and valued industry with annual production in excess of 10,000 tonnes by 2008, recognised as producing the world’s best quality Yellowtail Kingfish”.**

## **INTRODUCTION**

This five-year (2003 –2008) Yellowtail Kingfish strategic research and development (R&D) plan has been developed as the principal source of information on this industry sector’s policies, programs and operations as they relate to R&D. The plan has been developed to ensure that the Yellowtail Kingfish industry is developed based on the best available information and is consistent with community and government expectations.

### ***The Plan***

- Provides a brief history of the development of Yellowtail Kingfish farming in Australia;
- describes the industry and it’s business environment;
- highlights the industry sector’s planned outcomes for R&D and the immediate needs; and
- outlines the operational, communications and management objectives and the strategies that the South Australian Marine Finfish Farmers Association Inc, through the Yellowtail Kingfish R&D Steering Committee, intends to adopt to achieve these objectives.

### ***Our Audience***

The plan is focussed on informing all stakeholders of the R&D needs of this industry, including:

- Yellowtail Kingfish farmers;
- various government agencies and industry corporations that fund R&D activities;
- community organisations interested in the activities of this industry sector;
- researchers and research organisations that provide, or are potential providers, of R&D services;
- industries that provide goods and services to the Yellowtail Kingfish aquaculture industry;
- Australian, State and local governments and their agencies associated with management of resources utilised by Yellowtail Kingfish farmers; and,
- the media.

## **YELLOWTAIL KINGFISH AQUACULTURE R&D STEERING COMMITTEE**

The Yellowtail Kingfish Aquaculture R&D Steering Committee (YTKARDSC) was initiated in February 2003 to enhance and promote the orderly and strategic planning and management of R&D to benefit this emerging industry. This committee includes;

- Independent Chairperson
- Chair of the South Australian Finfish Farmers Association Inc (SAMFFA)
- Three other industry representatives
- Executive officer of SAMFFA
- A representative of Primary Industries and Resources SA (PIRSA -South Australian Government)
- Three Scientific representatives (South Australian Research and Development Institute (SARDI, University of Adelaide)
- Fisheries Research and Development Corporation (FRDC) representative (Australian Government)

Observer:

- Aquafin Cooperative Research Centre representative

The role of the R&D Steering Committee is to;

- develop an R& D plan for the Yellowtail Kingfish aquaculture industry that provides strategic direction for research and is responsive to change through a review process;
- set R&D priorities to maximise investment in areas of need;
- monitor national and international research to avoid duplication, and identify approaches that may achieve the greatest potential return;
- plan and assist R&D application development;
- manage existing R&D projects to ensure progress meets milestones and advise on changes where needed to ensure projects maintain relevance;
- manage intellectual property;
- promote collaboration between all industry stakeholders;
- communicate regularly with potential beneficiaries; and
- facilitate the adoption of R&D results.
- attract R&D funding and influence how funding entities apply their investments in this industry sector.

The Yellowtail Kingfish Aquaculture R&D Steering Committee meets every two months, or as needed.

## **STAKEHOLDERS**

Yellowtail Kingfish farmers are the principal stakeholders for the R&D activities aligned to this plan. Interests of all farmers are represented by the peak industry body, the South Australian Marine Finfish Farmers Association Inc. The Association has been operational since 1998 and meets regularly to formulate actions on a range of issues that affect development of the Yellowtail Kingfish aquaculture industry sector.

There is a diverse range of other stakeholders that have some connection to the Yellowtail Kingfish aquaculture industry. These include;

- the commercial fishing industry and fish processors;
- domestic and overseas consumers;
- research providers;
- aquaculture and fisheries managers;
- aquaculture support industries including feed companies;
- recreational and indigenous fishers and fishing charter operators;

- federal, state, and local governments and their agencies;
- training and education providers;
- business, including freight handlers, transport providers and business that provide goods and services to the industry; and
- the community.

## INDUSTRY OVERVIEW AND BUSINESS ENVIRONMENT

### Overview

Yellowtail Kingfish (*Seriola lalandi*) is a native Australian species, which is regularly caught by recreational and commercial fishers in temperate waters.

Commercial culture of Yellowtail Kingfish commenced in South Australia in 1998 when broodstock were collected, conditioned and spawned at a Port Augusta by Spencer Gulf Aquaculture Pty Ltd. This was the first successful spawning of the species in the world.

Funding for a project to investigate the aquaculture potential of Yellowtail Kingfish was provided through the Rail Reform Transition Program initiated by the Australian Department of Transport and Regional Services, with the long term aim of stimulating new employment opportunities in the region. Regional South Australia had suffered job losses following the sale of Australian National Railways in 1997, and needed to develop a new industry with export potential, which could build on the strengths of the region.

Early larval rearing trials produced in the order of 6,000 fingerling that were on-grown in sea cages and demonstrated the extraordinary growth capability and market potential of this species.

The industry has since undergone rapid expansion. It now boasts two commercial hatcheries, located at Port Augusta and Arno Bay. Grow-out to market size of 3 – 5+ kg is conducted in sea cage farms at Port Lincoln, Arno Bay, Franklin Harbour and Fitzgerald Bay. Many other sites are also suitable for Yellowtail Kingfish aquaculture in South Australian waters.

An “Aquaculture Industry Market Assessment” report prepared by Marc Makrid and Associates dated May 2002 stated that “the potential for Yellowtail Kingfish is substantial based on either its prominence as part of the Japanese cuisine or its marketing as a more general (but high end) use in the international market.

A report prepared by Econsearch Pty Ltd for the Seafood Industry Development Board September 2002, reported the following estimated projections for farmed marine finfish in South Australia :

Year	Whole Weight (tonnes)	Value (\$million
2000/01	45	0.9
2001/02	1,100	8
2002/03	2,650	20
2003/04	3,200	24
2004/05	4,000	32
2005/06	5,000	40

In June 2000, Invest Australia (Australian Government) produced a report entitled “Making a Case: Investment Potential in the Upper Spencer Gulf”. This report stated that marine finfish was seen as a rapidly emerging industry in the Spencer Gulf.

The Yellowtail Kingfish industry is now the largest marine finfish industry in South Australia after the Southern Bluefin Tuna aquaculture industry and is the largest sector of SAMFFA.

The Kingfish sector has been a significant investor in the State’s regional economies, so far having invested some \$30 million.

Over the next decade, production is expected to increase further as quality seafood shortages emerge in world markets.

“Investing for Tomorrow’s Fish” (The Fisheries Research and Development Corporation R&D Plan 2000 to 2005), states that “By 2020, Australia is expected to have a population of between 22 million and 23 million, and seafood demand is expected to have risen about one-third (by about 80,000 tonnes per year, to 300,000 tonnes) from that of 1999.”

Currently, some 140 direct jobs have already been created on the Eyre Peninsula, with further casual staff being recruited to assist with production peaks. It is estimated that an additional 300 jobs will have been created from the multiplier effect on ancillary industries, such as engineering, transport, boat manufacture, cage manufacture, retail, building, tourism and business services. Tonnages may well increase to a level where employment levels can be expected to mirror the levels experienced by the Southern Bluefin Tuna industry, which grew from some 350 persons to over 1,000 persons in seven years.

Internationally, the culture of Yellowtail (*Seriola quinqueradiat*.) commenced in Japan (where it is known as Hamachi), through the collection of wild fingerlings in the 1920’s and rapid industry expansion occurred through the 1970’s when production rose from 50,000 tonnes pa to 160,000 tonnes pa, which remains the current level of production. The Japanese industry is still mostly reliant on collection of wild fingerlings and juveniles. Feeding remains largely based on wet diets using a combination of baitfish, binders and vitamin and mineral pre-mixes. In addition to Hamachi, Yellowtail Kingfish (Hiramasa) or gold striped amberjack is also cultured in Japan but production is less than 5,000 tonnes. Other countries embarking upon Yellowtail culture now include New Zealand, Spain (*Seriola dumerili*), Ecuador (*Seriola mazatlanana*) and USA (*S. dumerili*)

## **BUSINESS ENVIRONMENT**

In its report “Agriculture: Towards 2015 / 30” published in July 2000, the United Nations Food and Agricultural Organisation (FAO) estimated that by 2030, annual global fish consumption would rise by 25%, consuming 150-160 million metric tonnes. However, the sustainable yield of marine wildcatch fish was estimated at approximately 100 million metric tonnes.

Therefore, aquacultural output, growing at 11 percent a year over the past decade, is the fastest growing sector of the world food economy. In 1950, aquaculture provided less than 1 percent of the fish supply, now it accounts for some 30% of the world fish market.

Climbing from 13 million tons of fish produced in 1990 to 31 million tons in 1998, fish farming is poised to overtake many forms of land based animal farming as a food source.

There will therefore be a worldwide demand for quality seafood and customers will be concerned that any food consumed will be at an acceptable standard. The Yellowtail Kingfish aquaculture industry is poised to tap into this world market.

Worldwide, customers are prepared to pay premium prices for healthy food, grown in a healthy environment and overseas buyers increasingly require environmentally certified products.

Therefore a major goal of the Yellowtail Kingfish industry is to be seen as internationally “clean and green”. This will require the product and the industry to be appropriately certified at world’s best practice standards.

### **Products and Processing**

Yellowtail Kingfish is positioned as a premium quality product, aimed predominantly at the sashimi and “white tablecloth” seafood markets.

In these markets, customers prefer the fish to be grown to approximately 5 kgs.

The fish can be sold whole fresh, whole frozen, filleted, skinned and boned as required, in cutlets or portion packs.

### **Marketing**

#### **Key points:**

- World demand for seafood is increasing, whilst supply (particularly of quality seafood) cannot keep pace with demand.
- Kingfish needs to be positioned as a high quality seafood product.
- The main selling points of Yellowtail Kingfish are that it is very healthy to eat and is grown sustainably in a pristine marine environment.
- Efficient farming technologies ensure that the cost of production will meet market expectations and allow the industry to be competitive in world markets.
- The fish is well known in Asia, and USA, but is not as well known in Europe.
- Markets requiring high quality sashimi and white tablecloth hotels and restaurants are being targeted, predominantly overseas, in Asia and USA. However, European and Australian markets are being developed.
- Therefore, targeted market research, marketing and branding of the product is required, particularly in Europe and Australia. Customers will only pay a premium for the product if they know the features and benefits of the fish.
- International quality assurance is critical to sales. Rigorous environmental monitoring and recording standards are required.
- As a result of product trials, potential customers appear to like the product. Appropriate pricing is the key to sales. The quality and versatility of the fish is attracting the attention of international supermarkets.
- Present economies of scale, production and logistics costs tend to make the product expensive for the frozen market.
- Overseas representatives are required in the markets to develop the brand image and establish “pull – through” orders.

- Long lead times are required to produce a marketable product (18 months – 3 years).
- Overseas markets such as Asia and Europe are potentially huge. Therefore production must be planned well in advance in order to meet future demand.
- Farms may need to specialise to produce products with characteristics to suit particular markets, such as size, fat content etc.
- Therefore farms may need to cooperate in order to service the range of potential customers.
- Fluctuating exchange rate may be a risk.

### **Features and benefits - Drivers**

The main selling points of the product are that:

- It tastes great
- It is safe to eat
- It is a quality product
- The product and the industry are “clean and green”, and have integrity. It is healthy eating. High in protein, vitamin B, Omega 3, Omega 6 and iodine, low in cholesterol.
- It is good looking –presents well.
- It is convenient and easy to cook.

Yellowtail Kingfish has already cemented itself in a number of world markets as a high quality and extremely healthy food. The industry is confident that its product has great export potential over the next decade. In Japan, for example, *Seriola lalandi*, known as Hiramasa, is ranked second only to Southern Bluefin Tuna as a sashimi product.

In relation to sustainability, a number of companies within the industry have already been accredited to the world environmental management standard, ISO 14001. Kingfish aquaculture companies wishing to establish a quality brand are planning to meet the ISO 14001 standard this year. This commitment appears to be unique amongst Australian industries.

The January 2003 Qantas Magazine sings the praises of this quality product. An article by Neil Perry states that:

“Their (South Australian farmed) Kingfish is a handsome creature, weighing in at around 4 kilos, firm fleshed and bright eyed. The flesh itself has an incredibly high fat content, somewhere around 24%, which makes it higher in fat even than salmon. The taste is simply awesome and the texture is rich and creamy. It is simply the best farmed fish product I have ever tasted. It can be cooked, and is delicious, but has to be eaten raw for the sweet flavour to truly stand out”.

### **International competition**

The product will not compete on price in the international commodity market, but rather on its, and Australia’s, clean and green reputation, plus its safety, quality and convenience.

In addition to its great taste and looks, customers will pay a premium to feel confident that they know where it grows, how it is grown, what’s in it and what’s on it.

Competition can be expected from other countries catching or farming the same or related species or from other high quality seafood. However, the industry expects



that international competition will not be able to supply the expected international demand.

Therefore, the main characteristics of the business environment are:

- A large up front capital investment is required in fish farm facilities.
- Other major costs are labour, feed and transport.
- Long lead times to produce marketable product (18 months – 3 years).
- There are various potential markets for various product types.
- Returns will vary according to target market, and varying cost of production.
- Farms will need to cooperate to be able to service the potential range of customers,
- Market research and marketing are required, to identify best market opportunities.
- Markets predominantly export, but Australian market may be developed.
- However, the supply chain is undeveloped and requires significant development.
- Potential demand may outstrip supply, therefore industry must be able to ensure continuity of supply.
- Seasonal harvesting can match supply demand in northern hemisphere countries and needs development to match customer needs.
- Fluctuating exchange rate may be a risk.
- Quality assurance is critical to sales.
- Improved quality assurance will require higher competency levels in workforce.
- The amount of and type of processing has yet to be determined.
- There are limited specialist export certified processing facilities in South Australia.
- The distance between fish farms and processing facilities is critical.
- Refrigerated transport is required.

## **RESEARCH AND DEVELOPMENT**

Research and Development must:

- be developed across the whole of the supply chain –from hatchery to plate,
- take account of stakeholder needs.
- take account of industry's need for a competitive advantage.
- be focussed on implementation of outcomes.
- be regularly reviewed.
- strive to achieve world's best practice.

This R&D plan identifies the strategic areas, which need to be addressed in order to accelerate the sustainable growth of the industry in an economic, social and environmental sense.

Research and development is cyclical. An area of investigation is identified and research undertaken. The results of the research cause policies and practices to be reviewed, revised and implemented, constantly aiming for world's best practice. Any industry "standing still" will be overtaken, so constant monitoring of these practices raises the need for further research and development.

The following quote from the wine industry is also relevant to the Yellowtail Kingfish aquaculture industry (reference "The Australian Wine Industry – Success

Through Industry Leadership, Planning And Innovation” Prime Minister's Science, Engineering And Innovation Council 1999):

“Without appropriate research funding, new knowledge is not generated and, without continual industry input, the right research will not be performed. Second, without communication, even the most useful R&D outcomes remain meaningless. Finally, without an educated work force, even the best research and communication strategy is inconsequential.”

“Equally important, however, has been the transformation of grapes and wine into a value-added knowledge-based product with inputs from education, research, production and marketing, supplemented by continuous benchmarking and technology transfer. Research and education with an industry focus have been indispensable for the establishment of a ‘learning culture in pursuit of excellence’.

Over the period of this Yellowtail Kingfish R&D Strategic Plan, a range of issues will be addressed. These issues are all inter linked and outcomes in one area will affect other areas e.g quality certification affects farm management practices, processing and marketing.

However, research and development takes time, and not all issues can be addressed at once.

This plan proposes that the following objectives be addressed in relation to the Yellowtail Kingfish Aquaculture Industry:

### **Objective 1: SUSTAINABLE FARMING ENVIRONMENT / INDUSTRY GROWTH**

#### **Planned Outcome:**

To develop an ecologically sustainable Yellowtail Kingfish industry that meets and exceeds consumer and community expectation.

#### **Strategies:**

- 1.1: To increase the knowledge of the environmental effects of Yellowtail Kingfish aquaculture.
- 1.2: To develop knowledge, processes and technologies that result in environmental certification of Yellowtail Kingfish aquaculture.
- 1.3: To understand the assimilative capacity of the environment in response to Yellowtail Kingfish aquaculture and apply this knowledge in farming practices.
- 1.4: to increase and apply knowledge on site selection factors and to develop decision tools to improve the planning certainty for Yellowtail Kingfish aquaculture.

### **Objective 2: FISH HEALTH**

#### **Planned Outcome:**

To ensure the highest level of fish health based on appropriate risk planning and management

#### **Strategies:**

- 2.1: To improve knowledge of diseases and pests of Yellowtail Kingfish.

2.2: To develop environmentally sustainable methods of preventing fish diseases and develop sustainable treatments.

2.3: To establish and maintain a health emergency response plan for Yellowtail Kingfish aquaculture.

### **Objective 3: FISH QUALITY/ FOOD SAFETY**

#### **Planned outcome:**

To ensure the product is recognised at the highest international standard for its quality and safety.

#### **Strategies:**

3.1: To understand the factors which determine the intrinsic quality of the product.

3.2: To determine what evidence is required by markets and consumers, in order to prove quality and safety.

3.3: Obtain appropriate international certification.

International markets increasingly require traceability assurance that food products are free of contaminants. The industry supports research to determine levels of heavy metals, PCB's, dioxins etc in farmed Yellowtail Kingfish. This information will potentially facilitate access to the large export markets required to allow expansion of production.

### **Objective 4: PROCESSING / VALUE ADDING**

#### **Planned Outcome:**

To ensure that sufficient appropriate internationally certified processing facilities are available in South Australia which are able to meet customer requirements and obtain the highest value for the product.

#### **Strategies:**

4.1: To accurately determine the present and future processing and value adding requirements of customers.

4.2: To establish or improve technology in South Australia to meet customer requirements in the areas of processing, packaging, improved product quality and shelf life.

Research and development issues that need to be addressed are:

- South Australia presently needs to increase its processing capacity for finfish.
- Some overseas markets prefer to process product overseas (as they have under utilised capacity). Strategies need to be developed to ensure that value adding occurs in Australia.
- Processed products attract higher tariff rates.
- Fresh, healthy product attracts a premium. Therefore projects need to be considered which can extend the shelf life of the product.
- Suitable packaging methods need to be developed and adopted to meet overseas requirements (eg. USFDA limitations on vacuum packed or gas water fired products)

## **Objective 5: MARKET DEVELOPMENT / SUPPLY CHAIN DEVELOPMENT**

### **Planned Outcomes:**

To undertake market research in order to obtain customer requirements in each of the target world markets, USA, China, Hong Kong, Singapore, Europe including Germany, Italy and the UK.

Using this information, develop, implement and review an industry marketing plan which positions South Australian Yellowtail Kingfish as a premium product.

### **Strategies:**

5.1: To determine customer product requirements, packaging requirements, traceability etc.

5.2: To develop an appropriate brand which reflects the fact that the product achieves all customer requirements.

5.3: To define and improve distribution channels and logistics for the product.

## **Objective 6: PEOPLE DEVELOPMENT TRAINING AND SUPPORT**

### **Planned Outcome:**

To ensure that all staff engaged in the Yellowtail Kingfish Aquaculture industry are competent to undertake their function. That is, they have appropriate knowledge and skill and can apply that knowledge and skill on the job.

### **Strategies:**

6.1: To determine the particular knowledge and skills required by people working in the industry.

6.2: To determine how this knowledge and these skills are applied and assessed on the job.

6.3: To convert codes of practice or protocols into training programs which can assess competence.

6.4: To determine and deliver the most appropriate forms of training and assessment.

All of the R&D projects will require associated industry training programs in some form.

Focus areas will be animal husbandry, fish health, product quality, environmental standards, emergency protocols and occupational health safety and welfare (OHS&W)

## **Objective 7: COMMUNICATION**

### **Planned outcome:**

To ensure that the industry is perceived to have integrity and is a good corporate citizen by all stakeholders.

### **Strategies:**

7.1: To improve the participation, consultation and communication processes between the industry, other stakeholders and customers.

7.2: To assist government, stakeholders and communities to understand the industry, and its value to South Australia.

7.2 To actively communicate the industry's sustainable development strategies to the public via a range of media.

7.3: To communicate policies and programs that have provided generic benefits to a wide range of stakeholder interests.

7.4: To communicate appropriate results of R&D projects to other stakeholders, where this does not affect the maintenance of the industry's international commercial advantage.

7.5: To Communicate the detailed, orderly and strongly regulated nature of State Government resource allocation procedures and environmental assessment and monitoring procedures to those in the community.

A range of different perceptions are held about aquaculture, by the various stakeholders. Unfortunately, because this industry is in its infancy, little data is presently available upon which to make informed decisions. Consequently, most of these perceptions are not based on scientific research in Australia.

The industry is keen to liaise with all stakeholders in the identification of R&D projects and to establish transparent world's best practice standards.

## **RESEARCH AND DEVELOPMENT PRIORITY AREAS for 2003/4**

1. On 7 February 2003 an FRDC funded industry R&D planning workshop was convened by SARDI in Whyalla. All stakeholders presented their issues relevant to the activities of the industry, research in progress, potential linkages related research and options for funding. Discussions were held to finalise research needs and priorities. Prior to this workshop SAMFFA had met to work out their collective R&D needs and priorities and these have been adopted within the this R&D plan. These priorities are encompassed under the following headings:

### **1. Fish Health.**

<b>Research Issue</b>	<b>Priority</b>	<b>Cost and Time Needed</b>	<b>Complexity of Research</b>
<b>1. FISH HEALTH</b>			
1.1 Risk identification and analysis <ul style="list-style-type: none"> <li>• Unprepared for fluke impacts</li> <li>• Numerous potential pathogens – Japan &amp; China</li> </ul>	Highest	Medium	Medium
1.2 Emergency response protocols <ul style="list-style-type: none"> <li>• Cage level, farm level, State level</li> <li>• Pathology, skills, resources</li> <li>• Emergency sites</li> </ul>	Highest	Medium	Medium
1.3 Developing “next generation” techniques <ul style="list-style-type: none"> <li>• Lights, electrocharging, filter feeders, attractants, organic in-feed agents</li> </ul>	Highest	High	High
1.4 Stress measurement & management <ul style="list-style-type: none"> <li>• Husbandry effects on disease susceptibility</li> <li>• Key impacts &amp; strategies</li> </ul>	High	Medium	Medium

To date the parasite infestations have been the most significant production problem confronting the Yellowtail Kingfish aquaculture industry and this is the field of research awarded the highest priority by industry at this time.

Since 2000, when the first significant stocking of sea-cages with hatchery reared fingerlings commenced, losses worth hundreds of thousands of dollars have been experienced attributed to infestations of the skin fluke *Benedenia seriola* and the gill fluke *Zeuxapta seriola*.

The industry has quickly adopted methods available for bath treatment of fish and has instigated rigorous parasite monitoring regimes to identify onset of infestations so these can be managed to minimise losses. These treatment and management procedures represent a considerable production cost. Collaborative Australian Research Council (ARC) funded research is being undertaken led by Dr Ingo Ernst (University of Adelaide) to develop an integrated parasite management strategy for the industry.

This involves developing an understanding of the life cycle of each parasite type and the infection dynamics between fish, parasite and the environment. Assessment of available and emerging treatments is also included in this research.

It is known that Yellowtail Kingfish are susceptible to range of potential disease causing organisms. The industry recognise the importance of risk assessment and regard preparation for the possible exposure to introduced diseases as a significant threat.

Three highest priority fish health related projects have been identified. These are:

#### 1.1 Risk identification and analysis.

Both parasites that currently afflict the industry are also major problems in the Japanese kingfish industry. Given the range of pathogens to which Yellowtail Kingfish are known to be susceptible in Japan and China there is a need to undertake a risk assessment to determine likely implications from any introduction.

#### 1.2 Emergency response protocols.

The industry believes that it should be prepared for the threat posed by introduced diseases. Strategies need to be developed that will allow immediate action in the event of their detection in Australia. These strategies need to encompass all procedures to be followed at the cage, farm, State and national level. All issues that may inhibit the ability of industry to respond immediately with remedial actions need to be identified and agreed processes established in advance.

#### 1.3 Development of “next generation” technologies.

Novel methods to combat parasites and diseases (eg. organic anti-parasitic feed agents, lights, electrocharging, filter feeders, attractants etc.) need to be assessed. Information required to gain approval for use for effective agents identified needs to be acquired through research. It is recognised that this approval process may require significant funding. Expanding the number of options available for treatment will be beneficial to the industry particularly if these reduce the cost of treatment and have marketing advantages.

#### 1.4 Stress monitoring and management.

Other fish health related research conferred a lower priority include studies to determine the relationship existing between, husbandry practices (eg. feeding strategies, net changing), levels of stress and susceptibility to disease.

## 2. Industry Sustainability

Research Issue	Priority	Cost and Time Needed	Complexity of Research
<b>2. INDUSTRY SUSTAINABILITY</b> <b>2.1 Food Safety</b> <ul style="list-style-type: none"> <li>Levels of heavy metals, PCB's etc in cultured fish.</li> <li>Determine potential fish diseases, which may be contracted by humans. (Such as Coccidia)</li> </ul>	High	Low – Medium	Low
<b>2.2 Processing &amp; packaging technologies</b> <ul style="list-style-type: none"> <li>USFDA requirements for imports</li> </ul>	High		
<b>2.3 Nutrient Impacts &amp; Carrying Capacity</b> <ul style="list-style-type: none"> <li>Industry monitoring methodologies</li> <li>Modeling tidal flows</li> <li>Seasonal Algal Patterns &amp; indicator species</li> </ul>	Medium	High	High
<b>2.4 Sea Floor Impact Analysis</b> <ul style="list-style-type: none"> <li>Ecology of different benthic systems</li> <li>Environmental certification</li> <li>Impact of Seafloor on Disease Management</li> </ul>	Medium	Medium	Medium
<b>2.5 Broodstock Bloodline Development</b> <ul style="list-style-type: none"> <li>Stock growth, disease resistance &amp; quality</li> <li>Tracing desirable traits through markers</li> </ul>	Low	High	High

### 2.4 Seafloor Impact Analysis

- Ecology of different benthic systems beneath and surrounding farms.
- Interaction between parasite life cycle (eg. fluke eggs on sea floor) and benthic systems; and implications to parasite management.
- Farm management across tide rather than with tide (to avoid spread of disease).

### 2.5 Broodstock bloodline development.

- Stock growth, disease resistance, meat quality, tracing desirable traits for the market.

### 3. Stock Security

Research Issue	Priority	Cost and Time Needed	Complexity of Research
<b><i>STOCK SECURITY</i></b> Containment Technology <ul style="list-style-type: none"> <li>• Use of antifoulants to reduce net changes</li> <li>• Steel cages?</li> <li>• Wire trace predator resistant nets</li> <li>• Electronic predator repellants</li> </ul>	High	High	High
<b><i>Predator Ecology</i></b> <ul style="list-style-type: none"> <li>• Shark ecology &amp; relationships to farming</li> </ul>	High	High	High
Recapture methods <ul style="list-style-type: none"> <li>• Escapee behaviour and capture strategy</li> <li>• Fish trap technology – size variation, specificity</li> </ul>	High	Medium – Low	Medium
Study Tour for Farm Management <ul style="list-style-type: none"> <li>• Containment technology</li> <li>• Predator control</li> <li>• Fouling control</li> <li>• Escapee management</li> </ul>	High	Medium	Low

#### 3.1 Containment Technology

- Use of anti - foulants to reduce net changes.
- Development of steel cages, predator resistant nets.

#### 3.2 Understanding of predator ecology

- Shark ecology and relationship to farming, danger periods etc.

#### 3.3 Recapture methods

- Escapee behaviour and capture strategy.
- Fish trap technology, size, variation, specificity.

#### 3.4 Technology Transfer (need to ascertain overseas best practice)

- Containment technology
- Predator control
- Fouling control
- Escape management

Over time direction will shift from short term “tactical” research addressing immediate needs, to longer term “strategic” research as industry consolidates. At this time it is expected that production efficiencies and cost reduction methods will become increasingly important.



## **LINKAGES TO OTHER R&D PLANS AND RESEARCH PROGRAMS**

This strategic R&D plan interfaces and supports action plans prepared by Aquaculture Industry representative bodies at the State and national level. This plan identifies areas of research specifically required for the Yellowtail Kingfish industry sector, but it supports overarching aquaculture industry directions for development as outlined in various plans.

Examples are:

**1. The Australian Aquaculture Industry Action Agenda (Dec. 2002) based upon recommendation from the National Aquaculture Development Committee.**

- Implementing an industry driven action agenda, ensuring that research and innovation is industry driven.
- Growing the industry within an ecologically sustainable framework.
- Investing for growth
- Promoting aquaculture products in Australia and globally
- Maximise the benefits of research and innovation

**2. The State Action Plan - South Australian Aquaculture Council (November 2002)**

- Ensure that the future of South Australia's aquaculture industry is optimised.
- Improve industry / government interaction while minimising impacts on the environment.
- Improve access to resources, streamline the current licensing and approvals system.
- Minimise the risks of disease.
- Optimise investment and enhance marketing capabilities.
- Develop a culture within the industry which that ensures a common focus.

**South Australia's Fisheries and Aquaculture Research and Development Strategy 2002-2007**

**Key Goals are:**

**1. Natural resources are utilised in a way that can be maintained indefinitely**

**Priorities:**

Define resources and create objective measures of the health of resources.  
Define threats to resources  
Develop ways to manage threats  
Predict how changing a threat affects the health of the resource  
Enhance governance arrangements

**2. Ensure that the seafood industry is efficient, profitable and environmentally responsible.**

**Priorities:**

Eliminate technical barriers to improved social, economic and environmental efficiency.  
Evaluate the non biological implications of regulation.  
Identify the best use and highest economic value for seafood production.  
Promote the true value of fisheries and aquaculture to the community at large.

### **3. Increase the professionalism and effectiveness of people in the industry and those providing support services to the industry.**

#### **Priorities:**

Increase communication among and between industry participants and service providers.

Develop leadership and communication skills in industry participants.

Enable participatory co management of resources at the decision making level.

## **REVIEW PROCESS**

### **The Future**

The success of this Strategic R&D Plan will depend on the ability of the industry, stakeholders and research providers to undertake projects that address the priorities identified. Any research pertaining to the Yellowtail Kingfish aquaculture industry must be completed in close collaboration with the industry who will primarily be responsible for implementation of outcomes.

Research management, monitoring and review will be important to the success of this Strategic R&D Plan and will be a core role of the industry R&D Steering Committee. The industry is constantly evolving and it is recognised that the plan will need to be adjusted to accommodate changes in R&D priorities as these arise.

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