

ITQs - Fishing with a Future: A Strategy for Action

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Executive summary

ITQ systems of fisheries management are increasingly recognised as a practical alternative to regulation. Administration of fisheries as common property has failed to ensure sound resource management. Worldwide fisheries management systems are now changing to sustainable utilization. ITQs (Individual Transferable Quotas) are part of this transition. Fisheries management based on ITQs is the best way of ensuring a sustainable and profitable future for California's sea urchin fishery.

Problems with the present system

The fishery is currently managed through regulations that restrict access to the fishery. These controls do not overcome the incentive for overfishing that follows from lack of ownership in open access fisheries.

- Divers are expending more effort to maintain their catch.
- There is overcapitalization in the harvesting sector.
- Investment is being diverted away from management strategies that could enhance the fishery.
- Effort controls do not provide a long-term vision for the fishery. Future emphasis in management must be on quality production and consistent supply.

Benefits of ITQs

- An ITQ system would overcome the tendency for overfishing in the sea urchin fishery.
- ITQs limit the total catch from the fishery. All the evidence shows that this is the correct approach for fisheries management.
- The existing management can be readily altered to an ITQ system of management.
- An ITQ system can be designed to suit the sea urchin fishery.
- ITQs encourage increased responsibility and accountability by quota owners for management and enhancement of the fishery.

Report recommendations

- That the status quo is no longer an option for management of the fishery.
- That the sea urchin industry must make an informed choice about the future direction for the fishery.
- That ITQs are the logical option.
- That the preferred means for deciding initial allocations be on the basis of catch history for years already past.
- That the initial TAC be decided by the Department of Fish and Game.
- That divers receive a pro-rata allocation of proportional quota.
- That quota owners should be free to trade in quota.
- That future TAC setting decided as part of an overall contestable fisheries management service.
- That quota owners adopt voting rules and a company management structure as the means for structuring their involvement in management of the fishery.
- That action is needed now to bring ITQs into the fishery.

Foreword

This report outlines a strategy for bringing Individual Transferable Quotas (ITQs) into the Californian sea urchin fishery. The report has been commissioned by Mike Radon, who has been diving abalone and urchin for over 30 years. Mike spearheads a group of divers looking to ITQs to improve the management of their fishery.

New Zealand is the best place for information on ITQs. New Zealand was the first country to introduce a comprehensive ITQ system for management of its commercial fisheries. A wide variety of fisheries are now managed under ITQs to ensure long-term sustainability of the harvest. Mike and other Californian sea urchin divers have first hand knowledge of the management of the valuable New Zealand abalone (paua) fishery under ITQs.

The authors of this report have considerable experience in both the practical and theoretical aspects of ITQ fisheries management. Roger Beattie has 16 years experience in the business of harvesting, processing and enhancing New Zealand's abalone fishery. This experience covers both the pre and post ITQ periods in the fishery.

Roger is Managing Director of his own company, Sea-Right Investments Ltd, which owns and manages abalone quota, farms abalone, manufactures marine farming technology and provides fisheries consultancy services. Roger has a diving background; mainly in abalone but also sea urchin.

Roger also holds down positions of responsibility on industry groups. He has acted as President of the New Zealand Paua Quota Holders' Association and as Secretary of the Chatham Island's Shellfish Reseeding Association. Currently Roger is on the executive board of the New Zealand Abalone Farmers Association and is an industry representative on the New Zealand government's Paua Liaison Committee. Through this latter association Roger has an active role on decisions relating to the on-going review and reform of New Zealand's ITQ system.

Peter Ackroyd manages the consultancy arm of Sea-Right Investments. Peter has a background in natural resources management as a research officer with the Centre for Resource Management at Lincoln University (New Zealand). Peter has experience with a wide range of natural resource management issues; land management, water resources management, wildlife management, hazardous substances, minerals and fisheries.

Together with Rodney Hide, a prominent New Zealand economist, Roger addressed sea urchin ITQ workshops in California in June 1992. Also in collaboration with Rodney Hide, Peter has undertaken a series of co-operative studies that apply property rights theory to problems in resource management.

These studies include analysis of the Chatham Islands abalone fishery, general policy development for New Zealand's Ministry of Agriculture & Fisheries, and research related to a review of fisheries legislation for the Minister of Fisheries. This research has contributed to links with key policy and executive people involved in New Zealand's fishing industry as well as with experts in other countries.

Roger and Peter have a good understanding of the Californian sea urchin fishery. Through contact with Mike Radon and the ITQ Establishment Committee both Roger and Peter are conversant with the background of the fishery and the current situation. Roger also has first hand knowledge of the fishery gained during visits to California in 1990, 1991 and 1992.

The authors are convinced that the potential of the fishery would be vastly improved through the introduction of ITQs. In this report the authors show how ITQs can be used to improve the sustainability of the sea urchin harvest:

- **Chapters 1 and 2** provide an **overview** of where fisheries management is headed. Chapter 1 explains the consequences of lack of ownership of fisheries and Chapter 2 considers the pervasive influence that markets and decentralized decision-making now have on the use made of fisheries.
- **Chapters 3 and 4** outline the **existing situation** in the sea urchin fishery. Chapter 3 gives a brief overview of the current state of the fishery and who is involved. Chapter 4 looks at the current method of control through government regulation and the costs and benefits of that control.
- **Chapters 5, 6 and 7** develop an **alternative approach** to fisheries management. Chapter 5 considers the approaches and strategies sought for the fishery and shows how improved management is best achieved within a private property solution. Chapter 6 shows how ITQs create the right incentives to steer fisheries management in the right direction. Chapter 7 then considers the effect of ITQs in relation to the wider issues in fisheries management.
- **Chapter 8** provides a **framework** for a sea urchin ITQ fishery. The section includes consideration of key elements in the initial design, the operation of an ITQ system, and finally, a plan for ensuring flexibility in management.
- **Chapter 9** provides an overall **conclusion** to the report:
 - that management of the Californian sea urchin fishery is long overdue for reform
 - that ITQs strike directly at the root cause of overfishing - lack of ownership
 - that an ITQ scheme is ideally suited to the sea urchin fishery
 - that a successful ITQ system needs binding decisions by quota owners
 - that ITQs are fishing with a future.

Acknowledgements

The authors wish to acknowledge the assistance of Mike Radon, Steve Rebeck and members of the Californian sea urchin divers ITQ Establishment Committee in providing background information, data and comment on the sea urchin fishery. We also thank Tom McClurg (Treaty of Waitangi Fisheries Commission), Mike Arbuckle (Challenger Scallop Enhancement Company) and Pete Gaul (Lincoln University) for their critical review of the manuscript. Notwithstanding the above the authors alone remain responsible for the content of the report and for any errors of fact or omission.

Chapter 1

WHY NOT LEAVE FISHERMEN ALONE?

Nobody seems particularly happy with the way the Californian sea urchin fishery is going. Government and divers are concerned that the fishery is going downhill. Divers are also concerned that they are being hamstrung by rules and regulations. People agree that things should be better.

The origins of the current situation must be understood before a better alternative can be considered. More particularly it is important to understand that the way the fishery operates is a function of the rights that fishermen have to take fish.

Traditionally fisheries have not been owned in the sense that land is owned. Instead fisheries have been held in trust by government for the benefit of everyone. The best legal and philosophical opinions of the day held that common ownership suited marine resources:

"The moral reason why ownership is not suitable to the sea is drawn from the consideration that its use is inexhaustible and therefore sufficient for the general service of all, so that it is idle to wish to assign parts of it to individuals." ¹

Fishermen could be left alone to get on with the business of fishing as long as there were plenty of fish to catch. With plenty of fish to catch there was always enough for everybody.

The old rules no longer apply. Improved fishing technology and increased demand for seafood means that fisheries are easily overfished. Open access to fisheries is no longer a practical option for management.

Left to themselves, fishermen will go on fishing until the contents of the net are worth less than the cost of putting the net in the sea.

The Economist, March 19 - 25, 1994

Overfishing happens because under open access fishermen cannot stop other fishermen catching fish that they would otherwise leave in the sea. Fishermen only have rights to the fish they catch. Open fisheries result in fishermen catching more fish than they would if they owned the resource themselves. Sooner or later overfishing causes depletion of the resource far below the intention of any one fisherman.

The tendency for overfishing of commercial fisheries is caused by the lack of ownership in fisheries. Resources that are unowned are overused and abused. They are not treated as assets to be maintained and improved. Overfishing is not caused by the biological nature of fish, the characteristics of fishermen, or the location in which fish are found.

Lack of ownership is the reason why government steps in to regulate fishing and conserve fish stocks. Lack of ownership is the reason why numbers of divers are limited and why there are seasonal closures. Lack of ownership is the reason sea urchin divers are not left alone.

¹ - SAMUEL PUFFENDORF, *De jure nature et gentium libri octo*, bk iv ch v (C H OLDFATHER and W A OLDFATHER trans. 1934, 1688).

Chapter 2

RETHINKING THE FISHERY

2.1 *The consumer is king*

The sea urchin fishery is locked into a dynamic business environment. In this the sea urchin fishery is just like any other fishery. Changing technology and new market opportunities mean the operation of the sea urchin fishery must keep pace with these outside influences.

To stand still is to lose opportunities to other competitors. World-wide the trend is away from bulk harvesting of fish to enhanced fisheries management. The overall aim is delivery of seafood products of consistent quality and quantity. Ensuring catches are sustainable in the longer term will be important.

Growing environmental concerns will increasingly influence consumer preferences. Those fisheries that succeed in the long run will be those that are innovative and adaptive in meeting market requirements.¹

Just as sustainability is the life blood of the harvesting sector, the certainty which comes from it is the life blood of the marketing sector.

Seafood International, April 1995 (Peter Stevens)

The sea urchin fishery is at the forefront of this change. The fishery is based on the supply of a seafood delicacy to the highly discriminating Japanese market. To date the fishery has been developed through exploiting the natural advantages of the Californian sea urchin fishery in supplying this market, that is:

- the relative abundance of the red sea urchin fish stock, and

- the acceptability of red sea urchin product to the Japanese consumer.²

Maintaining that market and maximizing prices will increasingly depend on enhanced fishery management and quality control. The emphasis must be on quality production and consistent supply. Sea urchin are international species and other fishery entrepreneurs will be looking for opportunities to enter the market for sea urchin.

Government regulation of the fishery does not sit easily against the background of dynamic and competitive markets. Rules and regulations set out to conserve the fishery. Given high prices for the product and unrestricted access the likelihood is that without regulation the fishery would be severely depleted. The boom and bust example of the Californian sardine fishery is too close to home.³

Conservation is important. However, conservation alone does not provide for future growth and development. Rules and regulations for conserving the sea urchin fishery do not provide positive incentives for meeting consumer preferences for products of consistent quality and quantity. It's the market that says the consumer is king.

2.2 *The information problem*

Fishermen are somewhat wary about Government administration of fisheries. On the one hand fishermen accept the need for limits on catch. On the other hand, the regulation of fishing doesn't always please fishermen.

Government doesn't have the first-hand information on the fishery that fishermen have. Government needs good information about the fishery before it can act. This is why conventional approaches to fisheries management depend heavily on scientific research and information for management.

Scientific information about fishery resources is important. But so is information about the technology and economics of fishing. Resource management incorporates scientific, technical and economic matters. Without the necessary technical and economic information needed for production decisions the management of the resource is incomplete. And this technical and economic information does not lend itself to being centralized:

"The economic problem of society is . . . a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, it is a problem of utilization of knowledge not given to anyone in its totality."⁴

In other words the information necessary for management of the sea urchin fishery is dispersed amongst the many people involved in the sea urchin fishery. Chances are that some of this information is not of a specialist or scientific nature. Rather it is the everyday information that divers and others have about the state of the fishery.

Consider the situation on land. Constant changes in farming conditions make it imperative that commercial decisions be left to individual farmers. Rapid adaptation to new conditions cannot possibly be achieved if all relevant information has to be communicated to a central office which then issues its orders. When it comes to resource use, decision making must be decentralized so that information can be used effectively.

The need for management to take account of consumer preferences and all information about the fishery suggests there is a need for rethinking the direction for the sea urchin fishery.

¹ - For further comment see PERRY SMITH, DEBORAH BROWN and LISA MCKELVIE, "Asia Pacific markets for seafood". *ABARE Research Report 92.3*: 1-11 (1992)

² - SUSUMU KATO and STEPHEN C SCHROETER, "Biology of the red sea urchin *Strongylocentrotus franciscanus*, and its fishery in California". *Marine Fisheries Review 47* (3): 1-20 (1985)

³ - ARTHUR F MCEVOY, "Law, public policy, and industrialization in the California fisheries, 1900-1925". *Business History Review 57*(4): 494-521 (1983)

⁴ - F A HAYEK, "The use of knowledge in society". *The American Economic Review 35*(4): 519-530 (1945)

Chapter 3

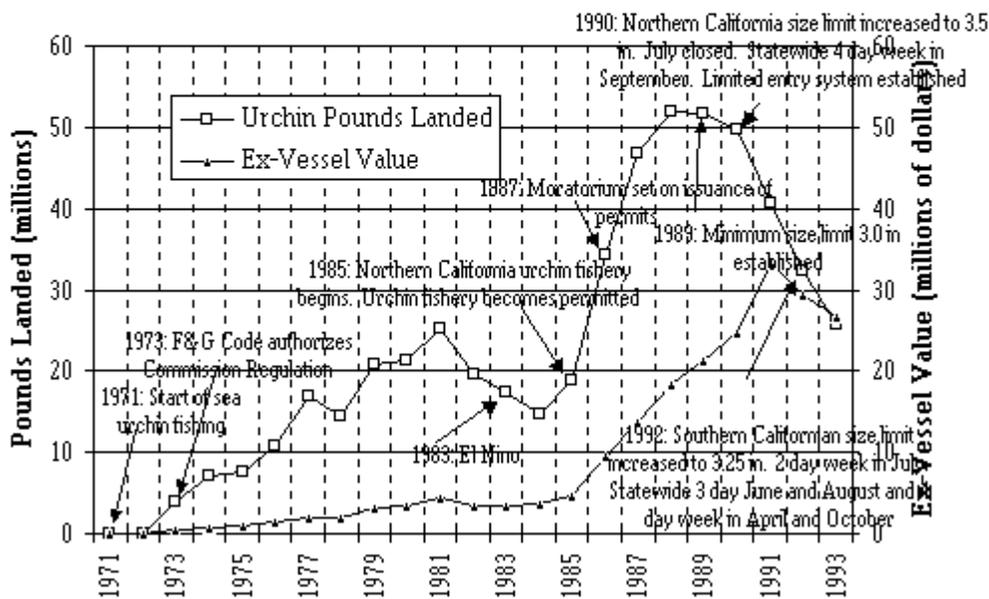
WHAT'S GOING ON IN THE FISHERY NOW?

3.1 From boom to not so boom

The history and development of the Californian sea-urchin fishery have been well-described elsewhere.¹ Kalvass (1994) provides an excellent summary of the development of the fishery (see Figure 1).²

What is remarkable about the fishery is its spectacular growth. Before 1970 there was little commercial interest in sea-urchin. The animal was regarded as a pest because high population densities were preventing the re-establishment of kelp beds. Quicklime and physical destruction were used for control.³

Figure 1: Californian Sea Urchin Fishery - Catch and Value
(after Kalvass 1994)



In 1972 an alternative form of control was proposed by the Department of Commerce, National Marine Fisheries Service. The proposal was to establish a fishery based on the harvesting and processing of sea urchin and exporting the roe to Japan. The fishery boomed. By 1975 about 7 million pounds of sea urchins were being landed, in 1979 20 million pounds and in 1981 25 million pounds. Despite landings falling to under 15 million pounds in 1984 sea urchins had by now become California's most valuable fishery export.⁴

Since 1984 the harvest has skyrocketed. The harvest exceeded 30 million pounds in 1986 and 40 million pounds in 1987.⁵ The harvest peaked at 52 million pounds in 1988-89 before dropping to about 23 million pounds in 1993.⁶

Until recently the value of the sea urchin catch also showed remarkable growth. In 1983 the ex-vessel value of the catch was \$3.3 million, by 1987 it was \$13.7 million and by 1991 it was \$33.4 million. Since 1991 the value of the catch has dropped following the drop in overall take. In 1993 the value of sea urchin landings was \$26.8 million.⁷

Table 1 compares the poundage landed and the value of the catch over the 10year period from 1983 to 1993.

Table 1: Poundage and Value of Sea Urchin Landings
1983-1993

(after Department of Fish and Game, Marine Fisheries Statistical Unit)

Year	Poundage	Dollar Value
1983	15,807,971	\$3,338,277
1984	14,749,502	\$3,569,852
1985	18,941,166	\$4,574,674
1986	34,130,229	\$9,663,120
1987	46,061,664	\$13,697,438
1988	49,473,232	\$18,348,748
1989	51,188,812	\$21,346,513
1990	45,346,968	\$24,698,253
1991	41,835,747	\$33,401,081
1992	32,570,377	\$29,331,296
1993	27,012,132	\$26,788,100

The Californian sea urchin fishery is divided into two administrative areas; a northern fishery that includes the coastal area between the California-Oregon border and the Monterey-San Luis Obispo county line and a southern fishery that includes the coastal area south of the county line.

Both northern and southern fisheries target the red sea urchin (*Strongylocentrotus franciscanus*). There is also growing interest in the purple urchin (*S. purpuratus*). Recent resource assessments indicate that sea urchins are generally confined to intertidal and subtidal rocky habitat to depths of around 125 feet.⁸

Until 1984 the fishery was based almost exclusively in southern California. Much of the demand since 1984 was met by the expansion of the fishery into largely unfished grounds in northern California. Landings from the northern Californian fishery jumped from about 2 million pounds in 1985 to about 30 million pounds in 1988. Northern Californian landings exceeded those from southern California over the period 1987 through to 1989.⁹ Figure 2 shows the distribution of landings between northern and southern California over time.

... sea urchins sell as delicacies in Japan and now surpass salmon as California's most valuable commercial fishery. *National Geographic*, June 1995

The value of the urchin to divers is strongly correlated with the animals spawning cycle. Urchin roe is most valuable during a period of nutrient storage that precedes spawning and has its lowest value during a recovery period after spawning.

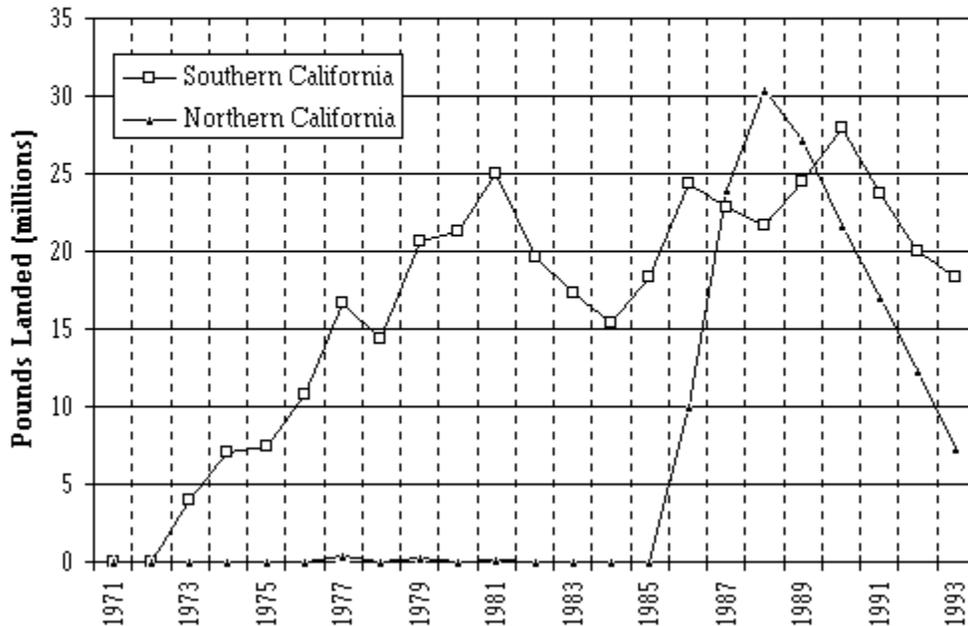
Easily accessible commercial quantities of sea urchin are fully exploited. Since the late 1980s landings of sea urchin from northern and southern California have been falling. Northern California has shown the greatest decline in catch. Between 1988 and 1993 the catch from northern California fell from the 1988 high (30 million pounds) to 6.6 million pounds; a 78.4% decline.¹⁰ Estimated landings for 1994 are around 5.7 million pounds for the northern fishery and 17.2 million pounds for the southern fishery.¹¹

CPUE data also shows a decline throughout the fishery since 1988. For northern California the decline in pounds per fishing hour from 1988 to 1993 is in the order of 64%.¹² The available evidence strongly suggests that sea urchin divers

are finding it tougher to make a living. The prospect is for a continuing reduction in the harvest and a contraction of the industry.

Figure 2: Northern and Southern California Catch

(after Kalvass 1994)



3.2 Who the players are

The sea urchin fishery supports a complex industry infrastructure. One estimate is that by 1992 the industry had an employment impact of 124,000 people.¹³ The main participants are sea urchin divers, processors, and government.

3.2.1 Sea urchin divers

At the front line are the divers themselves. Effectively divers operate as the harvesting arm of the industry. However, divers themselves have no control over the harvest. Initially divers were encouraged to enter the fishery to assist in its development. Entry to the fishery is now being discouraged to assist in its conservation.

Before 1985 anyone was allowed to harvest sea-urchin without a permit. At this time there was no problem getting divers to enter the fishery. Contributing to the rapid rise of the fishery was a ready pool of fishermen and boats involved in the similar but declining abalone fishery.¹⁴

Since 1986 divers have been required to hold a current sea urchin diving permit. Generally permits for the current year are issued only to holders of existing permits. To retain their permits divers have to make 20 landings of at least 300 pounds during one of the two preceding permit years.¹⁵ By 1992 a total of 985 licences were current in the fishery.¹⁶

Potential new entrants can apply for any reallocated permits that are issued under ballot. Currently the official policy is to issue 1 new permit for every 10 retirements.¹⁷ One report is that 87 divers exited the fishery during 1994 theoretically leaving space for just eight new entrants.¹⁸

The recent decline in the overall harvest coupled with the restrictive permit requirements are squeezing out the smaller operators. Less than 600 licences are believed to be current at the time of writing, about a 40% decline over the last three years.

Once in the industry, sea urchin permit holders operate as either boat owners or walk-on divers. Boat owners dive on their own behalf. Walk-on divers compensate boat owners with a percentage of their catch. Each urchin boat carries an average of two divers, usually the boat owner and a walk-on.¹⁹

Divers harvest sea urchin using conventional 'hookah' gear. Harvesting has traditionally taken place in depths of from 5-100 feet with most effort in the 20 to 60 foot range.²⁰ Over time effort has shifted towards deeper stocks. New technology including mixed gas is now allowing sea urchin to be harvested from virgin grounds in excess of 100 feet.²¹

Sea urchin are removed from the sea floor with a hand-held rake or hoe. The catch is then put into a hoop net bag which is winched onto the boat. Boats used for harvesting sea urchin are from 25 to 40 feet in length and capable of holding from one to three tons of sea urchins, the amount usually harvested in a day's fishing by one to three divers.²²

Divers generally operate their commercial activities as individual firms. They also organize themselves collectively for undertaking certain functions related to the use and management of the fishery. These activities are carried out under the auspices of the Sea Urchin Enhancement Program (SUEP) administered by the Department of Fish and Game.²³

Funding for SUEP and other resource investigations in the fishery comes from a state tax (0.5 c per lb) on urchin landings.²⁴ The tax is in effect a compulsory levy on the industry. Until 1995 the main sea urchin divers' organization involved in SUEP investigations was the Californian Urchin Producers Association (CUPA). CUPA was formally disbanded early in 1995 following financial problems leaving unclear the future involvement of divers in resource management activity.²⁵

3.2.2 Processors

Processing of sea urchin product occurs separately from its harvest. Divers sell their product fresh to processors either at auction or for a set price. At the processing plants urchin shell is split and the roe removed. This edible part of the of the urchin ('uni') is about 5 to 10 percent of the sea urchin's weight and virtually all of this product is air freighted to Japan.²⁶

Processing methods depend on the type of product - either fresh roe or processed as salted, steamed or baked roe. Product may also be frozen for later use. The best quality roe is reserved for the fresh product which brings the best prices. Secondary products are made from broken roe, or roe that is off colour, too large, or leaking fluids excessively. Particular attention has been paid to developing processing and packing systems that preserve the quality and appearance of the roe.²⁷

Processors deal with a valuable product. During the period 1990-1991 the price on the Japanese market for a large tray (8-9 oz) of Californian uni fluctuated between ¥3500 and ¥7500 (ie between \$25 and \$54 at the then current exchange rate). During 1990-1991 Californian prices were below prices for the Japanese product.²⁸ Improving quality is important to improving price.

Sea urchin processors have formed the Sea Urchin Processors Association of California (S.U.P.A.C.) to represent their interests. Members of this organization currently process about 75% of the total urchins harvested in California.²⁹

3.2.3 Government

Government agencies are charged with responsibility for management of the fishery. The State legislature formulates laws and policies regulating the management of fish and wildlife in California. The State's policy regarding aquatic resources is:

"To encourage the conservation, maintenance and utilization of the living resources of the ocean and other waters under the jurisdiction and influence of the state for the benefit of all citizens of the state and to promote the development of local fisheries and distant-water fisheries based in

California in harmony with international law respecting fishing and the conservation of the living resources of the oceans and other waters under the jurisdiction and influence of the state".³⁰

The policy includes the following objective related to commercial fishing:

"The growth of local commercial fisheries, consistent with aesthetic, educational, scientific, and recreational uses of such living resources, the utilization of unused resources, taking into consideration the necessity of regulating the catch within the limits of maximum sustainable yields, and the development of distant-water and overseas fishery enterprises".³¹

The legislature in turn delegates authority to a Fish and Game Commission who have the power to regulate the commercial harvest of sea urchins. The Commission is required to hold a series of public meetings to hear and consider the recommendations of interested citizens and groups before setting any fish and game regulation.³²

Administration and enforcement of regulations governing the sea urchin fishery are the responsibility of the Department of Fish and Game (DFG). The Department's Marine Resources Division monitors the patterns and magnitude of urchin landings, size frequency composition, and CPUE data and may make recommendations for management.³³

For matters related to administration of the sea urchin fishery the Department has established a Director's Sea Urchin Advisory Committee (DSUAC). This Committee is comprised of members of the California Department of Fish and Game, sea urchin divers, sea urchin processors, and a representative of the Sea Grant Program. Recommendations for possible changes in management are based on fishery data provided by the DFG, data and anecdotal evidence provided by divers and marketing information provided by the processors.³⁴

¹ - DAVID RUDIE and PETE HALMAY. "The Southern California red sea urchin fishery 1972-1992". Unpublished draft report 21 p plus figs. (1992?).

PETER KALVASS, "The Northern California commercial sea urchin fishery - a case study". State of California, Department of Fish and Game. 14p plus figs. (1992).

DENNIS D MURAOKA, "Managing the sea urchin fishery: an economic perspective". *Natural Resources Journal* 30(1):139-151 (1990).

SUSUMU KATO and STEPHEN C SCHROETER, "Biology of the red sea urchin *Strongylocentrotus franciscanus*, and its fishery in California". *Marine Fisheries Review* 47(3): 1-20 (1985).

² - PETER KALVASS, "Toward a new beginning in managing California's sea urchin fishery". *Outlook* (March) 7-8 (1994).

³ - WHEELER J NORTH and JOHN S PEARSE, "Sea urchin population explosion in southern California coastal waters". *Science* 167 (Jan) at 209 (1970).

KATO and SCHROETER. *supra* note 1.

⁴ - MURAOKA, *supra* note 1.

⁵ - *Ibid.*

⁶ - KALVASS, *supra* note 2.

⁷ - Department of Fish and Game, Marine Resources Division. Marine Fisheries Statistical Unit data, *Poundage and value of landings and shipments of commercial fish into California*.

⁸ - Department of Fish and Game. Draft environmental document - red sea urchin commercial fishing regulations. Department of Fish and Game at 3-18 (1992), State of California.

⁹ - KALVASS, *supra* note 1.

¹⁰ - KALVASS, *supra* note 2.

¹¹ - Department of Fish and Game, Marine Resources Division unpublished data.

¹² - KALVASS, *supra* note 2.

¹³ - RUDIE and HALMAY, *supra* note 1.

¹⁴ - Department of Fish and Game, *supra* note 8.

¹⁵ - Title 14: California Code of Regulations §120.7.

¹⁶ - Department of Fish and Game, *California sea urchin catch ranked by total for fisherman's license number*.

¹⁷ - MIKE RADON, pers. comm.

- ¹⁸ - STEVE REBUCK, "Arguments for ITQs in the sea urchin fishery". *Sea Urchin Industry News* (January) at 8 (1995).
- ¹⁹ - SAM LANG, "Gross income and ITQs: the impact on walk-on divers". *Sea Urchin Industry News* (January) at 9 (1995).
- ²⁰ - Department of Fish and Game, *supra* note 8.
- ²¹ - MIKE RADON, pers. comm.
- ²² - Department of Fish and Game, *supra* note 8.
- ²³ - Fish and Game Code §8051.2
- ²⁴ - Fish and Game Code §8051.1
- ²⁵ - *Sea Urchin Industry News* (January) at 2 (1995).
- ²⁶ - Department of Fish and Game, *supra* note 8 at 3-36.
- MURAOKA, *supra* note 1 at 144.
- ²⁷ - For further comment see KATO and SCHROETER, *supra* note 1.
- ²⁸ - Data after RUDIE
- ²⁹ - Sea Urchin Processors Association of California. Submission to Fish and Game Commission, February 2 (1995).
- ³⁰ - Department of Fish and Game, *supra* note 8 at 1-5 to 1-6.
- ³¹ - *Ibid.* 1-6 to 1-7.
- ³² - *Ibid.* 1-7 to 1-8.
- ³³ - *Ibid.* at 2-7.
- ³⁴ - RUDIE and HALMAY, *supra* note 1 at 3.

Chapter 4

MANAGEMENT BY REGULATION

4.1 *The public interest*

Government regulation of open access fisheries is based on the legal tradition favouring fisheries as common property resources.¹ As guardians of the public interest the first priority of governments world-wide has always been to protect fish stocks. Limits on the number of fishermen, the size of boats, and the period of fishing have protected fisheries that would otherwise become uneconomic to fish.²

Unfortunately restrictions on fishing effort make fishing less efficient than it could be. Seasonal closures coupled with improved fishing technology have often resulted in overcapitalization and wasteful racing for fish.³

Even more important than making fishermen pay is restricting their right to fish. That may mean limiting the number of fish they can catch, or the number of boats they can put to sea. Both approaches are tricky. Boats are easier to count than fish, but the size of the catch is what matters most.

The Economist, March 19 - 25 1994

Since World War II the general trend has been towards higher real prices of landed fish and increasing scarcity of commercially valuable stocks. These trends along with dramatic improvements in fishing technology have made governments keen not only to protect fish stocks but also to improve the economics of fisheries.⁴ These good intentions have not been matched by actual improvement.

Regulations in the sea urchin fishery focus almost exclusively on access and harvest. These regulations have developed in hotch-potch fashion. Different fluctuations have been applied at different times, and in different places. The growth in regulation has been such that they now specify:

- who can take sea urchin (permit requirements, types),
- how they can fish (permit qualifications and limitations),
- where and when they can fish (fishing seasons and area closures), and
- what fish they can take (sea urchin have to be above legal size).

Appendix 1 reproduces relevant regulations for the northern and southern Californian fisheries as current at 1 January 1992.

Considerable emphasis has been placed by the Department of Fish and Game on the value of regulations in protecting the fish stock.⁵ Ever increasing regulation has been necessary to ensure a harvest.

Regulations governing the sea urchin fishery cannot be evaluated simply by whether or not they ensure a harvest. Another objective for management is getting the best return from the fishery. To this end the various layers of regulations have proved counter-productive.

Shortened fishing weeks and the like, when coupled with improvements in boat and dive technology, contribute to too much capital being tied up in the catching sector and wasteful racing for the available fish stock. Regulations thereby increase the cost to divers of taking their catch.

Any closures also assist other competitors in gaining access to the international market for sea urchin. Because the Californian product is not available during closures competitors are handed a golden opportunity to develop and maintain a market position that might not otherwise exist. Regulations thereby lead to a loss of market share for the Californian product.

In short, the end results of regulation in the sea urchin fishery are:

- not everybody has access to the fishery,
- the hotch-potch of regulation has failed to stop overfishing,
- the regulations in themselves have proved costly,
- the Californian product is losing market share, and
- there is no clear direction for the fishery.

In principle the political ideal of managing fisheries as common property for the benefit of all is laudable. As fish stocks decrease in abundance the political ideal is difficult to achieve in practice.

4.2 Wealth creation versus wealth dissipation

Essentially the regulations applied to the sea urchin fishery set out to achieve fishery management objectives for the protection and utilization of the sea urchin fishery by:

- restricting or reducing the number of divers
- setting a minimum size limit to maintain the sea-urchin standing stock
- restricting the period of harvesting

The value of the regulations in terms of fishery management can best be considered by evaluating the three core areas in turn.

4.2.1 Restricting divers

The introduction in 1985 of the requirement for a non-transferable sea urchin permit (valid from 1 April to 31 March of the following year) was the first step to restricting access. Initially the permit was issued at the nominal fee of \$25. In 1986 the fee was increased to \$250 and in 1991 increased again to \$330.⁶

As well as putting a price on entry to the fishery the regulations sought to limit entry directly. In 1987 a moratorium was set on the issue of new licences and in 1989 a limited entry program put in place.⁷

The limited entry system works by restricting applicants for permits to those who have held a permit in the immediately preceding permit year. Those who are eligible must also have made the required number of landings during that year (see Section 3.2.1).⁸

When limited entry was introduced the plan was that no new permits were to be issued if the number of permits issued to prior permit holders was more than 400.⁹ Given that over 900 permits were current during 1987-88 the prospects for potential new entrants were not good.

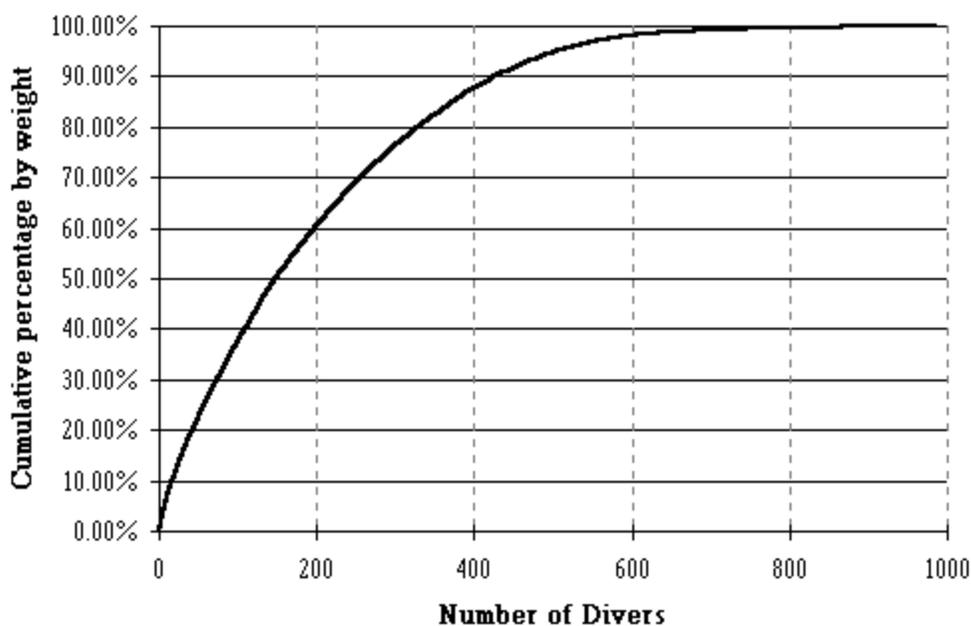
Under the current rules, entry into the fishery is by lottery of new permits. One new permit is allocated for every 10 losses from the fishery.¹⁰

Restrictions on the issue of licences have the effect of locking in existing licence holders and locking out non-licence holders. There is no mechanism for the current divers to leave the fishery by selling their business to new divers.

Also, restricting the number of licences restricts the number of divers but it does not restrict their individual catch. In the absence of other regulations holders of sea urchin permits remain free to take as many sea urchin as they like. Given the right price and the right technology the sea urchin fishery could be wiped out by a few divers.

A relatively small number of divers already contribute to the major share of the harvest. In 1989 50% of the catch in the northern California fishery was landed by 17% of the vessels.¹¹ For the 1992 year similar percentages applied throughout the entire fishery (see Figure 3 - based on unpublished DFG data).

Figure 3: Cumulative Percentage Catch v Numbers of Divers (1992)



4.2.2 Setting minimum size limits

The next move was to provide some overall protection to the resource. This was to be achieved by setting minimum size limit for sea urchin. In 1989 a minimum size limit of 3.0 inches was established. In 1990 the northern Californian size limit was increased to 3.5 inches and in 1992 the southern Californian limit was increased to 3.25 inches.¹²

Minimum size limits are set above the size at which the sea urchin spawn and hence offer some protection to the resource. The evidence in this case is that size limits have not worked as expected.

4.2.3 Restricting effort

Moves to restrict effort in the fishery started with the moratorium on the issue of new permits in 1987 (Section 4.2.1). The following year the fishing season was made contingent on landings for the previous calendar year.

If commercial landings exceed specified quantities (10 million pounds for northern California or 18 million pounds for southern California) one week is closed in each month from May through September.¹³

Further reductions in allowable fishing days came in 1990 when July was declared a closed month in northern California with a state wide 4-day week from May to September. In 1992 southern California became subject to a 2-day week in July with state wide 3-day weeks in June and August and 4-day weeks in April and October.¹⁴

The cumulative effect of restrictions on fishing season makes the current rules complicated:

"Red sea urchins may not be taken in the second full calendar week of each month from May through September if previous years landings exceed specified amounts. Red sea urchins may be taken only on Monday, Tuesday, Wednesday, and Thursday in April, May, September, and October and on Monday, Tuesday, and Wednesday in June and August. During the month of July, red sea urchins may not be taken anytime north of the San Luis Obispo, Monterey County Line and south of such line, they may be taken only on Mondays and Tuesdays. Vessel operator is required to keep log of fishing activities."¹⁵

If the situation wasn't so serious it would be amusing. One has only to imagine the outcry that would result if farmers on land could only plow their fields on Monday, Tuesday and Wednesday and not in July. Few would argue in favour of such regulation.

What is administratively convenient is not always convenient to fishermen. The business of fishing is always subject to the vagaries of weather, sea conditions and so on. Optimum fishing conditions are unlikely to dovetail neatly with administrative rulings on when the fishery is open. The fishery is less efficient and less safe than it should be.

Quite apart from these considerations, restrictions on fishing season are not good practice. In the first instance fishermen invariably respond to limitations on the length of season by more intensive fishing.

It is inevitable given greater intensity of fishing that the trigger limits for the northern and southern Californian fisheries will be exceeded. There is no overall limit on the catch. The likely result is a vicious downward spiral as government places more restrictions on access and sea urchin divers expend ever more effort in catching sea urchin.

Secondly, divers have simply shifted their effort (ie from southern to northern California and back again) or adopted other strategies to maximise their returns.¹⁶ New technologies and systems are aimed at maximising the harvest in the shortest possible time. Included here are:

- improved hookah technologies that allow divers to stay down deeper and longer,
- dive scooters for rapid survey,
- GPS and color sounders for fast and accurate positioning, and
- bigger, faster and more seaworthy boats for getting to and from the fishing grounds in all weathers.

In 1965, Francis T Christy, Jr., estimated that the over-capitalization and over-use of labor in American fisheries cost \$300 million per year or, at a 6 percent interest rate, \$5 billion in perpetuity.

Free Market Environmentalism, 1991 (Terry L Anderson and Donald R Leal)

The net result is that divers are pushing themselves and their technology. Muraoka (1990) refers to typical dive times of three to four hours per day.¹⁷ Currently dive time of between five and seven hours per day are common.¹⁸ Kalvass (1992)

reports the fishery as being centred between 10 and 70 feet.¹⁹The new dive technologies now allow a lot of harvesting from depths in excess of 100 feet.²⁰

Limitations on open days also contribute to over-capacity in a fishery. As indicated above, dive boats have become bigger, better and faster. Originally the boats used in developing the fishery were those brought in from the abalone fishery. These were typically between 24 and 30 feet in length, up to 300 hp and costing somewhere between \$10,000 and \$20,000.²¹

Boats now used in the sea urchin fishery are state of art, purpose-designed dive boats, typically between 32 and 40 feet in length, up to 800 hp, and costing anywhere from \$100,000 to \$250,000.²² Boats, equipment, and other technology that are used in the fishery and left idle during closed days are wasted investments.

The worst feature of the regulations is that they never countered the tendency for overfishing in the fishery. The effectiveness of the sea urchin regulations in consequence has varied:

- restrictions on entry limit numbers but lock permit holders in and lock non-permit holders out,
- size limits conserve the fish stock but fail to control the overall catch, and
- restrictions on season allow a harvest to continue but contribute to over-capitalization and inefficiency in the fishery.

Regulation has saved the fishery from complete collapse in the face of rising prices. On the debit side the costs of taking sea urchin have increased and investment has been dissipated away. That investment could otherwise have been available for enhancing the fishery.

Management by regulation does not provide a sound basis for sustainable use. Sea urchin divers compete for the available fish and the total catch is not directly constrained. The more sea urchin an individual diver can harvest the more he or she benefits. Given the competition for the resource and infinite capacity for technical innovation the prospect is for more effort for less fish.

¹ - PHILLIP A. NEHER, RAGNAR ARNASON and NINA MOLLETT. (eds). "Rights Based Fishing". NATO ASI series, *Series E applied Science No.169* at 7 (1989).

² - *Ibid.*

³ - *Ibid.* at 8

⁴ - *Ibid.* at 5

⁵ - Department of Fish and Game, "Draft environmental document - red sea urchin commercial fishing regulations. State of California". *Department of Fish and Game 2-6 to 2.7* (1992).

⁶ - DENNIS D MURAOKA, "Managing the sea urchin fishery: an economic perspective". *Natural Resources Journal 30(1)* at 145 (1990).Sea Urchin Regulations §9055.

⁷ - Department of Fish and Game, *supra* note 5 at 3-38.

⁸ - Title 14: California Coded Regulations §120.7.

⁹ - *Ibid.*

¹⁰ - MIKE RADON. pers. comm.

¹¹ - PETER KALVASS. "The northern California commercial sea urchin fishery - a case study". Department of Fish and Game. 14p plus figs at 3 (1992), State of California.

¹² - PETER KALVASS, "Toward a new beginning in managing California's sea urchin fishery". *Outlook* (March) at 7 (1994).

¹³ - PETER KALVASS, *supra* note 12. DENNIS D MURAOKA, *supra* note 6.

¹⁴ - DAVID RUDIE and PETE HALMAY, "The southern California red sea urchin fishery 1972-1992". Unpublished draft report 21p plus figs. (1992?). KALVASS, *supra* note 11. KALVASS, *supra* note 12. Title 14 : California Code of Regulations §120.7 (m).

¹⁵ - Department of Fish and Game, *Digest of California Commercial Fish Laws* Department of Fish and Game at 53 (1995), State of California.

¹⁶ - Department of Fish and Game, *supra* note 5 2-7 to 2-8.

¹⁷ - MURAOKA, *supra* note 6 at 144.

¹⁸ - MIKE RADON, pers. comm.

¹⁹ - KALVASS, *supra* note 11 at 2.

²⁰ - MIKE RADON, pers. comm.

²¹ - MIKE RADON. pers. comm. Department of Fish and Game, *supra* note 5 at 3-34.

²² MIKE RADON, pers. Comm.

Chapter 5

PROBLEMS, PROSPECTS, OPTIONS

5.1 No shortage of ideas

The future direction for the sea urchin fishery is now a hot topic. Over the last 10 years both formal publications and informal newsletters and circulars have raised debate about management options for the fishery.

Kato and Schroeter (1985)¹ point to the susceptibility of the sea urchin to overfishing and advised the need for state-mandated controls or self-regulation by the industry to ensure the future of the fishery.

Tegner (1989)² investigates the feasibility of enhancing Californian red sea urchin stocks. Tegner compares the trends in the Californian wild stock fishery (full exploitation and falling landings) with Japanese experience in maintaining stability of harvest through a combination of traditional fishery management measures and enhancement activities. Tegner proposes scenarios including landing taxes and sea floor leases that would allow implementation of enhancement strategies in California.

Muraoka (1990)³ presents an economic analysis of the fishery. From this perspective the regulations put in place are inefficient because they do not achieve their harvest reductions at minimum cost. Muraoka advocates consideration of a transferable permit/quota system under which divers have rights to a defined share of an annual urchin take. In this concept, the transferable permit protects the resource while enhancing the value of the fishery.

The Department of Fish and Game (1992)⁴ provides analysis of the fishery for the State's Fish and Game Commission in regulating the commercial harvest of urchins. The document outlines a series of measures considered necessary to compensate for recent increases in southern California harvesting effort. Included in the proposal is consideration of such measures as:

- further restrictions on the open fishing season (three days per week during the period May 1 to October 31,
- increased minimum size limits (to 3.25" in 1992 and 3.5" in 1993),
- closed seasons,
- accelerated permit reduction.

Rudie and Halmap (1992)⁵ describe the management of the southern California sea urchin fishery and future implications. They put forward a techno-fix solution. They advocate more research into the resource and the use of that information to develop a comprehensive management plan including a long range enhancement program.

Kalvass (1992)⁶ describes the condition of the northern Californian sea urchin fishery. The particular concern with the northern fishery is the apparent low rates of recruitment compared with the southern fishery. Low rates of recruitment are seen as compromising the success of regulatory controls designed to reduce harvest pressure and the achievement of a sustainable yield from the fishery.

In 1994 the DFG refined its management goals for the sea urchin fishery in a Draft Fishery Management Plan for the 1994 California Commercial Red Sea Urchin Fishery. Kalvass (1994)⁷ summarizes the key points of this management plan and presents statistical information on catch rates, fishable biomass, CPUE, natural mortality, and relative abundance. The key points from this information are:

- that the red sea urchin catch has declined 56.5% in 5 years
- that the northern California red sea urchin fishable biomass has been reduced to 32.9% of the pre-1988 level
- that average annual mortality rates are estimated at about 7.4%
- that average relative northern California red sea urchin abundance was less than 1 per sq m with a 68% decline in abundance of legal sized urchins between 1988 and 1991

On the basis of this evidence Kalvass (1994) puts forward the proposition that the sea urchin fishery, particularly in northern California, has reached crisis stage.⁸ Furthermore Kalvass (1994) also suggests on the basis of this evidence that existing management utilizing size limit manipulation and fewer fishing days has apparently not been successful in reducing fishing rates to a level that will allow fishery and stock recovery.⁹

The idea behind the Department's proposed management plan is to provide for a 'new beginning' in the management of the fishery through a series of measures including:

- establishment of a TAC for 1994
- (northern California = 2.137 million pounds)
- (southern California) = 16.000 million pounds)
- establishment of an October 1 to May 31 fishing season state wide
- implementation of exclusive north or south sea urchin permit
- establishment of a maximum size limit of 4.75"
- an area closure for resource recovery studies.

Individual Transferable Quotas (ITQs) have been proposed as an alternative to the existing system of regulation. Dewees *et al.* (1991) ¹⁰ in a paper for the sea urchin industry outline the theory of ITQs and review experience. Sea urchin divers have also taken the initiative in arguing the case for ITQs to the Fish and Game Commission.

Among sea urchin divers themselves there is concern over the impact of ITQs on the industry. These concerns include:

- implications for current management,
- uncertainties of a new system,
- costs of enforcement,
- effect on walk-on divers,
- setting the Total Allowable Catch,
- administrative hurdles,
- initial allocation process, and
- potential for monopolization of the resource.¹¹

These concerns are all about uncertainty. Not surprisingly the future direction for the fishery has become clouded. The DFG Draft Management Plan has been put on hold pending a scientific peer review of the Department's base data and population assessments. Within the industry debate continues over the merits or otherwise of ITQs versus the existing management controls.

With confusion and uncertainty now emerging over the way forward, perhaps the time is ripe to argue the case that:

- a sustainable and prosperous future for the fishery is not possible without management, and
- management is not possible without a matching set of incentives for achieving the desired outcome.¹²

Incentives are all important to sound resource management. So far management has not provided the right signals.

5.2 Back to first principles

The concerns in the sea urchin fishery are mostly to do with overfishing. The reason why fisheries get overfished must be understood before the direction for future management is charted. To recap from Chapter 1, overfishing has nothing to do with the nature of the resource, the characteristics of fishermen, or the localities in which fish are found. What matters is the way property rights in the fishery are defined and enforced.

The sea urchin fishery has been troubled by overfishing because it is unowned. In unowned fisheries fishermen only own what they catch. Now the problem of overuse is made all the worse. The pressure on highly valued fisheries is so great they are in danger of being wiped out as commercial fisheries.

Sea urchin divers are not unaware of the problem of overuse. As individuals they can take steps to conserve the resource by not diving but they cannot ensure that all others will not dive. Other divers can still harvest sea urchin and reduce individual attempts at conservation to self-sacrifice.

Neither is there any means available for fishermen in unowned fisheries to get together to conserve and manage the resource. The end result is that everybody fishes as hard as they can while they can.

Only when fishermen believe that they are assured a long-term and exclusive right to a fishery are they likely to manage it in the same far-sighted way as good farmers manage their land.

The Economist, March 19 - 25, 1994

Things would be different if the resource was privately owned. If fishermen overfish to boost immediate income they do so at the expense of future income. If they reduce fishing effort to conserve the resource they capture the future benefit. Likewise they would have every incentive to invest in maintaining their fishery because they would capture the benefit of any improvements.

With private ownership of fisheries, fishermen would be no different to farmers on land. Farmers often invest in maintaining their resource; fishermen seldom do.

The key difference between a farmer maintaining his property and fishermen getting in while the going is good is exclusive use. The farmer's use of his or her land is exclusive; the farmer can prevent other people from using his or her property. Farmers control the use of their resources and because their resources are their assets they have every incentive to care for them.

The use made of unowned resources is non-exclusive; entry to the resource is open. No-one has exclusive control of the resource. When entry is open resources are overused, used too quickly, and the ability of natural systems to replenish themselves is destroyed. Open entry is only ever sustainable when demand is very low or the resource is very large.¹³

5.3 The private property solution

Conceptually the solution to overfishing in the Californian sea urchin fishery is simple. The coastline should be carved up and private owners allowed to take exclusive possession of sea urchin in their area.

With exclusive ownership of sea urchin areas regulation to protect the fishery would no longer be needed. The private owners of the resource would have the authority to prevent overfishing in their area. Because the sea urchins would now be their asset they would have every incentive to exercise their authority responsibly. No doubt with exclusive rights private owners would be interested not only in conservation but also in the prospects for improving and enhancing their fish stocks.

Rights to fisheries could be shared out in several ways, varying with the habits of the fish. Where they stay put, as shellfish do, the best course may be to auction off chunks of the seabed, like licences to drill for oil.

The Economist, March 19 - 25, 1994

The sea urchin fishery can easily be managed under private ownership. Exclusive rights are easy to define for a species that remains in close contact with the sea floor.¹⁴ Worldwide many sedentary species are successfully raised under private culture.¹⁵ Some oyster fisheries on the east coast of the United States are managed under a system of private property rights.¹⁶

California didn't adopt a private property solution for the sea urchin fishery. Regulation was used to open up the fishery and then control fishing effort. The intention was that government administration of the fishery could provide both for conservation of the fish stocks while realising the economic potential of the fishery.

Managing the fishery through layers of regulation is a road to nowhere. Regulation to protect the resource is too blunt an instrument for managing sophisticated fisheries. Modern fisheries management is all about countering the perverse incentive to overfish that results from the lack of ownership.

In looking at the future direction for the sea urchin fishery the focus must be on arrangements that get the incentives right. This is where ITQs come in. ITQs allow the opportunity for creating exclusive rights in the sea urchin fishery. In so doing they usher in true fisheries management as a substitute for fisheries administration.

- ¹ - SUSUMO KATO and STEPHEN C SCHROETER, "Biology of the red sea urchin *Strongylocentrotus franciscanus*, and its fishery in California". *Marine Fisheries Review* 47(3): 1-20(1985).
- ² - MIA J TEGNER, "The feasibility of enhancing red sea urchin, *Strongylocentrotus franciscanus*, stocks in California: an analysis of the options". *Marine Fisheries Review* 51(2): 1-22 (1989).
- ³ - DENNIS D MURAOKA. "Managing the sea urchin fishery. an economic perspective". *Natural Resources Journal* 30(1): 139-151 (1990).
- ⁴ - Department of Fish and Game, *Draft environmental document - red sea urchin commercial fishing regulations*. Department of Fish and Game, State of California. 26 to 27 (1992).
- ⁵ - DAVID RUDIE and PETE HALMAY. *The southern California red sea urchin fishery 1972-1992*. Unpublished draft report. 21p plus figs. (1992?).
- ⁶ - PETER KALVASS, "The northern California commercial sea urchin fishery - a case study". Department of Fish and Game, State of California. 14p plus figs at 3 (1992),.
- ⁷ - PETER KALVASS, "Toward a new beginning in managing California's sea urchin fishery". *Outlook* (March) 7-8 (1994).
- ⁸ - *Ibid.* at 7.
- ⁹ - *Ibid.* at 8.
- ¹⁰ - CHRISTOPHER M DEWEES, "Individual transferable quotas (ITQs) and California's sea urchin fishery". Unpublished paper to sea urchin industry (July) 3p. (1991).
- ¹¹ - See for example: *Sea Urchin industry News*, Jan (1985).
- ¹² - Adapted from KENNETH D FREDRICK & ROGER A SEDJO (eds), "America's Renewable Resources". Washington D.C., Resources for the Future, xiii-xiv (1991).
- ¹³ - The problem lack of exclusive ownership poses for sound resource management of fisheries is described by H SCOTT GORDON, "The economic theory of a common property resource: the fishery". *Journal of Political Economy* 62: 124-142 (1954).
- ¹⁴ - R BRUCE RETTIG. "Is fishery management at a turning point" In: NEHER *et al.* (eds), "Rights Based Fishing". NATO ASI Series, Series E, *Applied Sciences* No.69 at 51 (1989).
- ¹⁵ - *Ibid.*
- ¹⁶ - RICHARD J AGNELLO and LAWRENCE P DONNELLY, "Prices and property rights in the fisheries". *Southern Economics Journal* 42: 253-262 (1979).

Chapter 6

ITQS BEAT REGULATION

6.1 Getting the incentives right

Given the ideal of carving up the coast and creating exclusive rights to sea urchin in a given area, an Individual Transferable Quota (ITQ) system is a step in the right direction. The benefit of ITQs is that they provide a practical and politically achievable means of reforming existing systems of fisheries administration.

Incentives matter to all human behavior

Free Market Environmentalism, 1991 (Terry L Anderson & Donald R Leal)

What ITQs do is to change the incentive structure under which fisheries are used and managed. Overfishing is now universally recognised as the result of fishermen not having exclusive rights in their fisheries. The effects are twofold:

- open-access rules create an incentive for excessive effort, and
- the lack of ownership of the resource is in itself the root cause of depletion of fish stocks.

The theory behind an ITQ system is a simple one and has been explained elsewhere. ¹ To prevent overfishing the ITQ system establishes a Total Allowable Catch (TAC) that sets a limit to the amount of fish that may be taken from the fishery in any one year.

If the fishery were simply closed once the TAC was caught, fishermen would race against each other to get as large a share of the TAC as they could. To prevent this race the TAC is allocated as individual catch quotas to fishermen and fishing firms. The individual catch quota give individual fishermen and fishing firms the right to a specified part of the TAC.

Under an ITQ scheme, quota is made tradeable to avoid the locking in of quota owners, and the locking out of non-quota owners. Trade allows fishermen and fishing firms to enter and exit the fishery freely by buying or selling quota. Quota thereby has a value as directly measured in its market price.

The value placed on quota forces both existing and would-be fishermen to calculate the most profitable use of their resources and act accordingly. An ITQ system thereby controls the total catch while leaving fishermen and fishing firms free to catch their quota as they best see fit.

ITQs and rights of ownership are central to getting the incentives right for sustainable fisheries management. Under ITQs sea urchin divers would have a right to a specified part of a harvest. With divers having security over their harvest the wealth in the fishery would no longer be needlessly dissipated by fishermen competing amongst themselves for a greater share of the catch.

ITQs shift a large part of the responsibility for fisheries management onto quota owners. This is as it should be. Quota owners are in the best position to know the health of their fishery and it is they who bear the costs of bad decisions or capture the gains of good management decisions.

ITQs remove in one hit the very basis for overfishing. If the resource is overfished divers will find it harder to fill their quota. The price of quota will fall accordingly. On the other hand should the health of the fishery improve, the quota will become easier to fill and its price will rise. As quota owners, sea urchin divers have a shared interest in the health of their fishery. ITQs and exclusive rights to part of the sea urchin resource would convert Californian sea urchin divers from potential plunders of the resource to custodians of the resource.

With increased responsibility for management, sea urchin divers would be primarily interested in strategies for enhancing the value of the fishery. There are various enhancement options for the sea urchin fishery.² Under the existing system there is little chance of these options being put into practice. Government administration is fully occupied in the thankless tasks of finding out what divers already know and administering regulations.

Bringing in ITQs would make the present system of rule-bound regulations redundant. This state of affairs would be to everyone's benefit. Future development of the fishery would no longer be constrained by restrictive regulations previously intended to protect the resource.

6.2 Will ITQs work for me?

ITQs are all about improving the fishery in general. It follows that ITQs benefit everyone who has an interest in the long-term sustainable use of fisheries. In this sense ITQs serve the interests of divers, processors and government.

Furthermore ITQs can be readily adapted to changes in the fishery. They allow for further reforms to be made in the future.

The sole motive behind New Zealand's bold move towards privatisation of fish harvesting rights was to save its fisheries from depletion, and the likely closure and ruination of both commercial and recreational resources. Every other consideration was secondary.

Seafood International, April 1995 (Peter Stevens)

6.2.1 Sea urchin divers

The key feature affecting divers under in an ITQ sea urchin fishery is the introduction of set limits on their harvest.

Under ITQs the harvest from the fishery would be constrained by the Total Allowable Catch (TAC). Limits on the catch should not pose a problem. Farmers on land manage production according to stock or crop limits. The principle of managing fisheries through direct limits on the harvest is the correct path for long-term fisheries management.

Divers would be allocated a share of the TAC as ITQ. Whereas the TAC controls overall harvest, the allocation of a share of that TAC as ITQ leaves divers free to decide how, when and where to harvest their share of the TAC. The shift is from maximising a harvest to maximising returns from a set harvest.

Much needed flexibility is brought into the business of harvesting sea urchin. Under ITQs divers have the freedom to 'customize' their operations to suit their skills, their budget, the nature of the resource, and market conditions.³

The importance of flexibility and other advantages of ITQs has been well argued by the ITQ-Establishment Committee (1995):

"Flexibility of one's schedule is enhanced. Under ITQs, fishermen don't have to wait around to fish those days allocated to them by regulatory agencies. Instead, fishermen can harvest their quota when it is more convenient and profitable for them. They won't be flooding the market with product just because the season is open or weather is good. With ITQs nobody else will be catching their quota while a quota holder is not fishing."⁴

Although divers have greater flexibility over the harvest of sea urchin they must consider the consequences of their actions. ITQs confer on divers the responsibilities of ownership. Their share of the TAC, their quota, is a commodity that can be bought and sold like other assets.

The market value of quota forces divers as quota owners into a process of continuous adjustment as they weigh up the business of fishing. Market values and trade in quota shifts divers away from competing for fish to improving the profitability of their fishery.

6.2.2 Processors

Processors want to maintain markets for sea urchin product. However maintaining markets should not be the sole long-term option. Just as the catching of sea urchin has evolved over time so the markets for sea urchin will continue to evolve. For the Californian processors to maintain their markets they will have to do more than maintain the *status quo*. To tread water over time is to drown.

The argument that the current regulatory framework governing the harvest of sea urchin should be continued because it suits current market conditions is unsound.⁵ California's product is already losing market share (section 4.1). The key to the Californian product maintaining its market position is in stabilising the harvest and ensuring the best quality product at the best price.

ITQs benefit marketing by bringing stability to the industry. The stability that a set catch brings to the catching sector has the effect of stabilizing supply. Stability of supply encourages greater co-ordination between divers and processors. Because processors know at the start of the year how much product will be available they can plan accordingly. In this way ITQs will allow the introduction of more forward planning into the processing sector. Processors will be working with divers to keep supply responsive to market conditions.

The privatisation of harvesting rights through a transferable Quota Management System triggers innumerable and unprecedented follow-on activities. These serve to cement all sectors into a more effective and cohesive industry. *Seafood International*, April 1995 (Peter Stevens)

ITQs also ensure that quality of the Californian product is not only maintained but enhanced. Under ITQs divers seek to maximise their income by landing the best quality sea urchin. Divers will no longer be able to maximise their income simply by catching extra sea urchin. A set catch ensures a quality catch.

Improving the quality of the sea urchin will be the overall goal. With improvement in quality the overall income accruing to the fishery will go up. ITQs thereby help to maximise the returns from product.

The catching, processing and marketing of sea urchin product makes for a complex and sophisticated industry. That industry can further expand. The wealth in the fishery is limited only by people's imagination.

At present the wealth in the fishery is artificially constrained. The current regulations work by making the catching sector less efficient than would otherwise be the case. Processors do not gain by making the catching sector less efficient. The potential wealth in the fishery is not being realised and there are fewer resources available for investment in the industry.

What all sectors in the sea urchin industry must realise is that the sea urchin pie can grow. Above all else the interests of the sea urchin processing sector are best served by a healthy and prosperous fishery. ITQ systems with their focus on improving conservation and economic returns are best suited to providing the right sort of environment for growth across the industry.

6.2.3 Government

The State of California wants the conservation, maintenance and utilization of the sea urchin resource to benefit all citizens of the state. These multiple objectives have proved difficult to achieve under regulation. ITQs allow government to meet both its conservation and economic objectives.

Government policies for the sea urchin fishery have sought to achieve the twin goals of conservation and economic benefits by regulating the harvest of sea urchin within the limits of a Maximum Sustainable Yield (MSY). Maximum Sustainable Yields are a biological ideal. A level of catch is said to represent a sustainable yield whenever it equals the growth rate of the population. The MSY is that population size which yields the maximum growth.

Worldwide the use of the biological ideal as the sole criterion for management has proved impractical. The size of a fish stock is determined jointly by biological considerations and the use made of the resource.⁶ There is a cause and effect relationship between the biological characteristics of a fish stock and the harvesting of that fish stock.

"The quota system - based on tradeable access rights, and the economic incentives that accompany them - is proving to be an effective way of managing fisheries, and much better than the traditional approach of government intervention and increasing regulation."

Hon. Doug Kidd, New Zealand Minister of Fisheries, July 1995

The ideal of the MSY does not mesh with an efficient fishery.⁷ Management of the fishery on the basis of MSY exclusive of the costs of harvesting is not to the benefit of the citizens of California. Indeed the over-investment in the fishery is a waste of resources, pure and simple.

Controlling boom and bust cycles in the fishery is a thankless task. Fishermen are well known for their dislike of regulations that restrict their business operations and government agents are unlikely to achieve their management potential while being forced to act as rule-bound administrators.

Regulations handicap government agencies as much as they handicap sea urchin divers. Research into such enhanced management strategies as population dynamics and reseeding is limited by regulations controlling the funds available for resource investigations.⁸

Administration of fisheries regulations forces government into short-term management strategies. The day-to-day battle is to restrict fishing effort. ITQs hold out the prospect of getting management of the fishery back on track. With ITQs the emphasis is on long-term sustainability through controls on the total catch and economic incentives for maximizing the return from that harvest.

"The Draft Sea Urchin Management Plan currently under consideration offers little in the way of options other than more restrictions, fewer work days, longer closures, north-south permits and larger size limits."

ITQ Establishment Committee, September 1994

There is no doubt that the introduction of ITQs will change the role of government in managing the sea urchin fishery. Change in the direction for fisheries management need not be to the disadvantage of government agents and bodies. Those interested in the management of sea urchin have more to gain from a prosperous and expanding fishery.

A prosperous fishery creates its own climate for investment. With more investment there will be increased opportunity for undertaking management that increases long-term wealth in the fishery. The security and stability provided by ITQs will create that climate for investment; the *status quo* will not.

ITQs also free fishery managers from the need to administer the economics of the fishery and decide the welfare of sea urchin divers. In regulating access to the fishery, government took on profound economic responsibilities. Government agents are administering the distribution of income from the fishery and in effect deciding such weighty matters as the appropriate level of economic efficiency in the fishery.

Nobody is qualified to make the sorts of economic decisions that by default have fallen to fishery managers. The correct place for deciding distribution of income and economic efficiency is in a normal business setting.

¹ - See for example FRANCIS T CHRISTY JR., "Fisherman quotas: a tentative suggestion for domestic management". *Occasional paper No.19*, Law of the Sea Institute. 7p (1973). DAVID G MOLONEY and PETER H PEARSE, "Quantitative rights as an instrument for regulating commercial fisheries". *Journal of The Fisheries Res. Board (Canada)* 36: 859-866 (1979). See also: CHRISTOPHER M DEWEES. "Individual transferable quotas (ITQs) and California's sea urchin fishery". Unpublished paper to sea urchin industry (July). 3p. (1991). RICK O BOYD and CHRISTOPHER M DEWEES, "Putting theory into practice: individual transferable quotas in New Zealand's fisheries". *Society and Natural Resources* 5: 179-198 (1992).

² - As discussed by MIA J TEGNER, "The feasibility of enhancing red sea urchin, *Strongylocentrotus franciscanus*, stocks in California: an analysis of the options". *Marine Fisheries Review* 51(2): 1-22 (1989).

³ - The merits of customised ITQ Systems in other North American fisheries are described by DARYL SYKES Following New Zealand's lead - Boston ITQ workshop". *Seafood New Zealand* 3(5): 93-98 (1995).

⁴ - ITQ Establishment Committee, "ITQs and the sea urchin fishery: sound management for the future". *ITQ Establishment Committee Newsletter*, Sept. (1994).

⁵ - Cf: Sea Urchin Processors Association of California. Submission to Fish and Game Commission Sept. (1994).

⁶ - TOM TIETENBERG, *Environmental and Natural Resource Economics*, United States. Harper Collins: 257-279 (1988).

⁷ - *Ibid.* at 260.

⁸ - PETER KALVASS, "Toward a new beginning in managing California's sea urchin fishery". *Outlook* (March) at 7 (1994).

Chapter 7

WHERE TO WITH ITQs?

The theory behind ITQs is one thing. How ITQs work in practice is another. Sea urchin divers need to know how ITQs stack up compared with any existing arrangement. That is, they need to know how well ITQs will perform.

7.1 Controlling the catch

Ultimately any management regime attempts to limit the harvest from a fishery. The debate is over whether the limits on harvest should be implicit (as in restrictions on fishermen's efforts) or explicit (as in a Total Allowable Catch).

There is good evidence that explicit controls on harvest are the preferred option. Precedent from other areas of renewable resource use supports this approach. Sustainable forest management for example is based on achieving a sustained yield forest in which harvest equals net growth. ¹

Generally the TAC is based on the concept of sustainable yield adjusted for environmental conditions, stock interdependencies, and other uses. Sustainable yield is a long run concept. The immediate requirement is an estimate of the number of fish to be caught. Invariably catch data and stock assessment data are the principal sources of information.

If either the process for calculating the TAC is contentious or there is seen to be insufficient data then the introduction of ITQs may prove difficult.

An important point to remember is that fisheries management is as much an art as a science. A scientifically impeccable TAC is not a necessary precondition for introducing ITQs. An ITQ system is not an end-point in itself but rather the beginning of an on-going process of continuous adjustment. ² That continuous adjustment is necessary because of the inherent biological variability in fisheries and their ecological inter-relationships.

Knowledge of TAC setting will improve over time. Fisheries managers need the best possible estimation of TAC within the constraints of their resources, budget and so on. There must also be a process for changing the TAC to reflect changes in the fishery.

In the New Zealand ITQ system most of the initial TACs were based on one of two methods of estimation:

- they were equated to landings in the most recent years for which information was available, or
- they were calculated from a survey of biomass times a stock productivity value.³

Catch history overestimated sustainable yields (recent landings tended to be high) while biomass estimates tended to be conservative. Other methods used to estimate some TACs included use of tagging data, yields per recruit analysis, and stock reduction analysis. Whatever the method chosen, most fisheries have been able to move forward and further refine the TAC in the light of experience.

The Department of Fish and Game has the skills and the information base needed for setting an initial TAC for the sea urchin fishery. The Department has good information on:

- sea urchin landings,
- impact of sea urchin harvest on fishery biomass,
- average annual mortality, and
- surveys of the fishery.

Few dispute that the Department's scientific knowledge of the fishery is the best available. The Department probably has a better base for setting TACs for the sea urchin fishery than was the case for most New Zealand fisheries at the time ITQs were introduced.

Indeed the Department has already proposed TACs for the northern (2.137 million pounds) and southern Californian fisheries (16.0 million pounds) within its proposed 1994 Draft Management Plan.⁴ Criticism of the process for setting the Department's proposed TACs may or may not be justified but all calculations of initial TACs will prove contentious from one or another perspective.

All journeys have to begin somewhere. The Department of Fish and Game's expertise and estimates make a good place to start when it comes to setting initial TACs. In the long-run what matters is the process for adjusting the TAC as knowledge of the fishery grows and as management enhances the productivity of the fishery.

7.2 Benefits for all

Fisheries management does not reduce simply to a matter of setting a TAC. The TAC limits the amount of fish that can be taken but it does nothing to build a sustainable fishery. Just setting a TAC gives rise to a 'race for fish.'⁵ Fishermen wastefully race against one another to get as large a share of the TAC as they can.

The Department of Fish and Game has probably gone as far as its jurisdiction allows in proposing TACs for the Californian sea urchin fishery. However leaving the reform process half completed is no solution. The next step is the allocation of a specified share of the TAC to fishermen as individual quota.

Fish quota world-wide are typically allocated in perpetuity. Perpetual quota give fishermen long-term security and in so doing get the incentives right. Fishermen now have a permanent right to a share of the harvest. Having a right to a share of the harvest is not as good as a right to all the sea urchin in a defined area of the coast but it is a whole lot better than having rights only to the fish that are taken.

Two areas of concern are often raised regarding the allocation of individual rights in fisheries:

- the matter of privatizing the common property in fisheries, and
- the responsibilities that flow from ownership of property rights.

ITQ systems are one of the great institutional changes of our times; the enclosure and privatisation of the common resources of the ocean.⁶ In this sense it is analogous to the land enclosure movement in British history or the fencing of the range land in the American west in the latter half of the nineteenth century.

As with the enclosure of common land resources the establishment of property rights in fisheries is expressly to provide for the conservation of the resource. Both land enclosures and ITQs remove the threat of the over-exploitation of resources that follows from open access; a phenomenon known as the 'Tragedy of the Commons'.⁷

The perception that closing the commons excludes others from access to resources is a sensitive issue. However, as long as people can trade rights nobody is excluded.

The argument that ITQs allow the use of fisheries by some people to the exclusion of others is really an argument against the institution of private property full stop. Suffice it to say that the long and bitter experience with public ownership of resource use in eastern Europe suggests that in truth the argument should be put the other way; that lack of private ownership allows the exploitation of resources by some to the detriment of others.

Privatization of fisheries would be a non-starter if the process reduced the general welfare. Far from diminishing the general welfare, ITQs are a reform that specifically improves the general welfare. ITQs do this by creating rights in the fishery that have value and that are maintained.

ITQs are a right of access that is marketable. A market price for sea urchin ITQ is an argument in favour of the fishery having a value to the wider public as well as value to private persons. Rights that are valued show that the resource is generating economic benefits.⁸

Rights of ownership impose a discipline on resource users. Land owners for example seldom run down their properties. They want to protect the long-term value of their asset. The responsibilities or duties of ownership are at the cornerstone of good stewardship in fisheries.

"The scallop industry has willingly accepted responsibilities that go with their quota rights, making strong moves to manage those assets, and to maintain and improve their future quality."

Seafood New Zealand, May 1995 (Mike Arbuckle)

With ITQs there is no escape from the responsibilities of ownership. Quota will now be regarded as an asset. For some in the industry the worry is that ITQ will be considered the property of sea urchin divers and "could potentially be seized by government or courts to satisfy debts, lawsuits, or other judgements against quota holders."⁹ As with other classes of assets, quota in other countries is split in divorce settlements.

The wider interest in sound management of the resource far outweighs these individual concerns. This is as it should be. If a quota owner runs up debts he or she may well be obliged to sell quota. Concerns that have nothing to do with the use made of a fishery should not determine how that fishery is managed.

Improved management of the fishery requires exclusive rights and exclusive rights require that someone be responsible. This lack of responsibility is the very reason the current permit system is not providing for sound resource use.

7.3 Toeing the line

To be effective any fisheries management scheme must be able to be monitored and enforced. One view is that ITQ schemes tend to be more expensive than traditional types of schemes to administer and enforce.¹⁰

All types of fisheries management have costs. The advantage of an ITQ scheme is that it focuses attention on the explicit costs of management versus the economic benefits. Improvements to management are more likely to be initiated if the costs of management are transparent.

Experience with the costs of administering other ITQ schemes may not be all that relevant to the sea urchin fishery. In New Zealand the ITQ scheme was instituted in 1986 as a comprehensive scheme covering some 26 species including ground fish, pelagic species, and sedentary species and covers a range of fishing methods.

There is general agreement that overall the scheme is working well. However, the costs of administering and monitoring the system have proved greater than expected. Industry is now pushing for reforms that will ensure administration and monitoring at least cost.

The costs of administering and enforcing an ITQ scheme for a single-species fishery will be significantly less than for a comprehensive scheme. Complicated systems for dealing with by-catch in mixed trawl fisheries need not apply in the sea urchin fishery. Moreover, the basic elements needed for monitoring and enforcing an ITQ system in California are already present.

"From industry's perspective there was a need to simplify the complexities of the catch reporting and quota balancing systems."

Vaughan Wilkinson, President New Zealand Fishing Industry Association, April 1995

First, the Department of Fish and Game collects as a matter of routine the very information required for a TAC setting process (Section 7.1). Second, the Department and industry should have no trouble coming up with initial TACs for the northern and southern Californian fisheries. On-going information requirements related to setting TACs for the sea urchin fishery need be no greater than the existing information base.

Similarly the procedures for monitoring individual catches and verifying individual catches against quota held are straightforward. Sea urchin permit holders are already required to keep and complete a daily log book of their fishing activities and to forward that logbook to the Department of Fish and Game on a monthly basis.¹¹ Included in the logbook is information on the amount of sea urchin taken, how long the harvest took and the location of the harvest.

The Department also maintains a market receipt data base that provides landings data by port, species, vessel and time period as well as ex-vessel value.¹² The market receipt data base is a diver's landing weight as certified by a weigh master at the port of landing. The landing receipt is completed in triplicate; one copy to the diver (the 'fish ticket'), a second to the processor, and the third to the Department of Fish and Game.

Together the divers logbook and the landing receipt provides exactly the sort of information needed for monitoring and verifying catch against quota. The records and reporting procedures needed for monitoring and verifying the daily operation of an ITQ system in the sea urchin fishery are already in place.

No doubt some people will try and cheat the system. However, people will try and cheat any fisheries management system. The monitoring and enforcement requirements for an ITQ fishery should cause no more problem than is required for monitoring and enforcing the current rules and regulations.

"I would have to say from my perspective that I believe all operators in the industry are now well aware of the compliance requirements of the Quota Management System [ITQ] and do their best to ensure they comply with it."

Eric Barratt, President New Zealand Fishing Industry Association, April 1994

Monitoring and enforcement need not be entirely a government responsibility. Indeed there is considerable scope for self-policing a sea urchin ITQ fishery. Large numbers of sea urchin divers spend time on the water harvesting their catch. They can and should be enlisted in policing the resource.

The incentive for self-policing follows directly from the ownership of quota. Although it can profit individuals if they go over their quota and steal sea urchin it costs them if other quota owners do likewise. If everyone exceeds their quota the fishery will be overfished, divers incomes will fall and the price of quota will fall. No longer is enforcement simply a matter of government controlling fishermen. Fishermen themselves will want to protect their property rights just like landowners.

7.4 Fishermen as resource custodians

An additional benefit of ITQs is the long term view that quota owners take of their fishery. A long-term view of fisheries management in turn creates a climate for investment back into the fishery. Investment in fisheries is needed for enhanced fisheries management to become a reality.

Within ITQ fisheries quota owners are in effect a club with the exclusive right to take fish species commercially. Their property right in the fishery, in the form of their ITQ, will reflect the overall value of the fishery. The situation is exactly the same as what happens with property rights in land. If a property owner doesn't maintain and improve his or her property then its value will fall. If the property is looked after then its value will rise.

It is in the club's interest to maintain and if possible enhance fish stocks to improve the income stream generated from the fishery and hence quota prices. The incentive therefore is for club owners to investigate and encourage those fisheries management strategies that improve the health of the fishery.

In New Zealand quota owners are now involved in enhancing a wide range of fisheries. In the deep water orange roughy fishery, quota owners have formed a joint management company, The Exploratory Fishing Company (ORH3B) Limited, for the purpose undertaking exploratory research into orange roughy fish stocks and facilitating other management strategies.¹³

The Tasman scallop fishery was only brought into the ITQ system in 1992. An experimental government enhancement program had earlier been initiated for the fishery based on spat collection on longlines and reseeding onto the sea bed. The government program had trouble attracting adequate industry investment given the uncertainties over investment security and direction.

Since the allocation of ITQ in the fishery quota owners have formed the Challenger Scallop Enhancement Company. The purpose of the Company is to give industry a greater role in enhancing the fishery.

"The exclusive right to harvest part of the resource as secured by the ITQ system has converted Chatham Islands' paua divers from potential plunderers of the resource to custodians of the resource. The transition is as significant as that from hunter-gatherer to farmer.

Depoliticising Fisheries Management March 1990 (Rodney P Hide and Peter Ackroyd)

The performance of the Company in improving the fishery is exceeding expectations. The Company now has its own Chief Executive Officer who manages 10 staff and oversees scallop enhancement operations. The company carries out its own research in the scallop fishery, implements its own compliance regime, and develops its own management plans in conjunction with other users.

A major achievement for the company has been the commissioning and building of a purpose-built 26 metre (85 feet) barge for undertaking the various activities associated with the reseeding program.¹⁴ In 1995 the Company reseeded 800 million scallop spat over 85 sq miles of seabed. Following reseeding, harvesting is carried out on a rotational basis within designated fishing zones .

ITQs have also resulted in paua (New Zealand abalone) fishermen taking an active role in the management of their fishery. On the Chatham Islands (500 miles to the east of mainland New Zealand) quota owners formed the Chatham Islands Shellfish Reseeding Association which had amongst its objectives, 'to foster and promote the enhancement of the fishery stock in the Chatham Islands' and 'to foster and promote scientific research into shellfish programs in the Chatham Islands.'

The Association contracted the Ministry of Agriculture and Fisheries to conduct a trial seeding program in the Chathams for the year ending 1 October 1990. The contract involved the rearing of 100,000 paua to about 7 mm size class, seeding and monitoring these juvenile paua and reporting on the success or otherwise of the trial. The trial was funded through a 1% levy on Association members' sales for the year.¹⁵ As a result of this research New Zealand paua quota owners are now looking at larger scale reseeding.

The benefits of the ITQs are such that fishermen are keen to see the integrity of the ITQ system preserved. On mainland New Zealand, paua quota owners have been concerned that TACs have been set too high for a sustainable fishery. Paua quota owners in the South-East Management Area voted in 1992 for a 10% reduction in the TAC. This industry led initiative resulted in the government formally reducing the TAC for the area from 492 tonnes to 443 tonnes.¹⁶

The exclusive right to harvest the resource guaranteed by the ITQ system has provided for the first time the incentive for New Zealand fishermen to treat fisheries as an asset. Overall the change has been from a system of short-term fisheries administration to long-term fisheries management.

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- ¹ - ROGER A SEDJO, "Forest resources: resilient and serviceable. In: KENNETH D FREDERICK and ROGER A SEDJO (eds). "America's Renewable Resources". Washington D.C., Resources for the Future, at 103(1991).
 - ² - In New Zealand the argument has been put that ITQs should be viewed as a step toward the evolution of sole ownership corporations for the purposes of fisheries management. See: PETER ACKROYD, RODNEY P HIDE and BASIL M H SHARP, "New Zealand's ITQ system: prospects for the evolution of sole ownership corporations". Report to MAF Fisheries. 86p (1990).
 - ³ - MICHAEL P SISSEWINE and PAMELA M MACE, "ITQs in New Zealand: the era of fixed quota in perpetuity". *Fishery Bulletin(U.S.)* 90 at 149 (1992).
 - ⁴ - PETER KALVASS, "Toward a beginning in managing California's sea urchin fishery". *Oulook* (March) 7-8 (1994).
 - ⁵ - Imposing a TAC on a fishery in the absence of individual quota leads to the phenomenon known internationally as the 'race for fish' or a 'fishing derby.' See: *Sea Urchin Industry News (Jan.)* at 8 (1995).
 - ⁶ - PHILLIP A NEHER, RAGNAR ARNASON and NINA MOLLETT (eds). "Rights Based Fishing". NATO ASI series, Series E, *Applied Science No.169* at 3 (1989).
 - ⁷ - GARRETT HARDIN, "The tragedy of the commons". *Science* 162: 1243-1248 (1968).
 - ⁸ - *Ibid.*
 - ⁹ - *Sea Urchin industry News (Jan.)* at 9 (1995).
 - ¹⁰ - GERRY GREEN and MARK NAYAR. "Individual transferable quotas in the southern Bluefin Tuna fishery: an economic appraisal". In: NEHER et al. (eds). *supra* note 6 at 358.
 - ¹¹ - Tide 14: California Code of Regulations §4120.7.
 - ¹² - PETER KALVASS, "The northern California commercial sea urchin fishery - a case study". Department of Fish and Game, State of California 14p plus figs at 6 (1992).
 - ¹³ - For further comment on the operation of The Exploratory Fishing Company (ORH 3B) Limited see *New Zealand Professional Fisherman* 6(6): 25-29 (1992).
 - ¹⁴ - SEAFOOD NEW ZEALAND, "Model fishery setting the pace: the southern scallop enhancement success story". *Seafood New Zealand* 3(4): 8-13 (1995).
 - ¹⁵ - RODNEY P HIDE and PETER ACKROYD. "Depoliticising fisheries management: Chatham Islands' paua (abalone) as a case study". Report to R D Beattie Limited. 43-44 (1990). DAVID R SCHIEL and STEPHEN P MERCER, "Commercial-scale seeding of paua, *Haliotis iris*, into natural habitats at the Chatham Islands". Report to Chatham Islands Shellfish Reseeding Association and MAF Fisheries. 2Op plus figs.
 - ¹⁶ - The Fisheries (Quota Management Areas, Total Allowable Catches and Catch Histories) Notice 1986. Amendment No.10 s.6 (S.R. 1992/252).

Chapter 8

THE WAY FORWARD

The future direction for the sea urchin fishery is now squarely in the hands of sea urchin divers. This is not to say that the interests of sea urchin divers should be favored over another group. However, sea urchin divers are the ones who bear the major costs and capture the major benefits of management. They know their fishery and they must decide what suits their interests. More to the point, if sea urchin divers don't push for ITQs it's difficult to see who will.

The purpose of this report is to enable an informed choice about future direction. The report is not impartial. The report confirms the tremendous potential in the fishery. The benefits of ITQs to the fishery far outweigh the results that are likely to be achieved by continuing along the present path. An ITQ system is not radical; it is common sense. What is radical is fishing with one hand tied behind your back.

As I have said time and time again, the Quota Management System is the most effective means yet found for the sustainable management and development of fisheries.

Hon. Doug Kidd, New Zealand Minister
of Fisheries, April 1993

There are legitimate concerns about the transition to ITQs. A decision to go with ITQs should accompany a plan to minimise any adverse effects and keep the system on track. In themselves ITQs are only a tool; it is people who decide management.

As Figure 4 shows, a course for bringing in ITQs has already been charted.¹ The following sections describe an ITQ action plan for the sea urchin fishery based on this idealized model. In particular section 8.1 deals with the design of a viable ITQ system while the later sections consider how the scheme would operate in practice.

Figure 4: A Generalized Scheme for Implementing ITQs (after Dewees 1991)

- Agency and industry design management system including record keeping
- Catch histories and/or other methods used to determine initial allocations
- Regional or statewide total allowable catches (TAC) determined
- Individual quotas allocated and/or auctioned to participants
- Participants adjust quota holdings between themselves (buy, sell, lease) within aggregation limits and adjust their fishings operations
- Agency monitors and adjusts TAC as needed. Change in TAC changes each participant's quota holdings (eg a 10% increase or decrease in TAC = 10% increase or decrease in individual quotas)
- ITQ System is adjusted over time to deal with unanticipated problems

8.1 Designing a scheme

An ITQ system for the urchin fishery should build on existing management structures and operations. Government agencies and industry both have a role to play.² No one group has all the pieces needed to put an ITQ system in place. The following sections (8.1.1 to 8.1.8) outline the key elements needed for success.

8.1.1 Rights to urchin and quota rights

Existing rights to take urchin need not change except that permits are no longer a means for restricting entry. To the extent that permits are deemed necessary all that is required is that the existing registration and permitting system be linked into an ITQ system.

The right to **take** sea urchin should be separate from the right to **own** quota. Quota must be absolutely secure to encourage the incentives needed for long-term decision making and investment back into the fishery. Quota rights must be owned in perpetuity and able to be freely traded or leased as for any other asset.

The quota should be specified as proportional quota. In other words quota owners have rights to a certain proportion (rather than a set share) of an overall harvest. Reductions in the harvest will lead to a corresponding reduction in proportional quota. Similarly, increases in the overall harvest will lead to corresponding increases in proportional quota. It is proportional quota that create the incentive for quota owners to invest in their fishery as an asset.

There should be no resource royalty applying to sea urchin quota. Resource royalties act counter to the securing of quota. Farmers on land don't pay a royalty for the right to use their resources; neither should sea urchin quota owners.

The logic behind the move to tax quota follows from the notion that ITQs allow fishermen to gain an economic advantage at someone else's expense; that:

"with the implementation of ITQs and the associated property rights, the fishing industry will be expected to pay for its privileged access to harvest fishery resources commercially. This will probably be by way of a fee per tonne of fish quota or a levy on fish caught."³

The argument that quota owners somehow have privileged access is ridiculous. The implication is that fisheries were once open to everyone but are now closed to but a few and that the many should be compensated for their loss. The argument is completely the wrong way round. ITQ systems don't close fisheries, instead they open them up.

What closes fisheries are restrictive regulations on entry and effort of the sort that now apply in the Californian sea urchin fishery. An ITQ system would open up the sea urchin fishery because would-be divers can simply buy or lease quota and go diving.

The most telling argument against resource royalties is that they block efforts to improve the fishery. Under a proportional ITQ scheme it is in the interests of quota owners to maximise the value of their quota by investing in enhancing the sea urchin resource.

Few fishermen will invest in enhancing their resource if the value of that enhancement is going to be taxed away. They will also be less interested in taking responsibility for managing the resource. The better option for government is to encourage improvement in the fishery which contributes to growth in the industry.

8.1.2 Maximum and minimum holdings

There are no hard and fast rules about minimum or maximum holdings. Certainly the requirement for a minimum holding should not prevent existing permit holders from receiving quota. All eligible permit holders should be grandfathered into an ITQ fishery (i.e. the existing commitment to the fishery is recognised by an allocation of ITQ).

For the sake of simplicity future entrants could be required to hold a minimum parcel of quota. To allay fears over aggregation a maximum quota holding limit could also apply. The decision on maximum or minimum holdings is one best decided and voted upon by quota owners themselves.

8.1.3 Quota Management Areas

An ITQ system operates within a given Quota Management Area (QMA). The Department of Fish and Game and industry both recognise the geographical split between northern and southern California. That split requires separate management areas. Logically the starting point for ITQ management is a northern Californian QMA (i.e. SUR 1) and a southern Californian QMA (i.e. SUR 2). Separate quota should apply in each management area.

QMAs are likely to need adjusting or manipulating. For example a QMA could contain two fish populations for which one TAC is set. The population closest to port will prove more financially attractive to fishermen. The result would be overfishing of the population close to port and underfishing of the population further out. The solution is to split the QMA and set a TAC (or sub-TAC) for each population.

An alternative scenario that could well apply in the sea urchin fishery under an enhanced management system is the adoption of a rotational fishing strategy within a QMA. Under this arrangement a QMA would be divided into a number of designated fishing zones which could be harvested, left fallow, or enhanced on a rotational basis.

The way QMAs are defined must allow for flexibility in management. However, the security of the ITQ in a fishery would be undermined if QMAs were adjusted irrespective of the common interest of individual fishermen and fishing firms in the fishery. Quota owners must have a collective say in adjusting QMAs.

8.1.4 Title to quota and quota trading

Quota trading is inextricably linked with arrangements conferring title to quota. Central to the success of trade in quota are:

- a quota register (showing who owns what),
- transfer or lease documents (showing who is selling what to whom), and
- a process for exchanging rights in quota (that is, a market).

In New Zealand, ownership of quota is established by a Ministry of Agriculture and Fisheries database called the Quota Register. Adjustments to the register are by documents issued by the Ministry allowing for the transfer (sale) or lease of quota. The Department of Fish and Game is the obvious agency for establishing a Sea Urchin Register available for public inspection and for issuing and recording the associated sale or lease documents.

Although trade in quota is central to the effectiveness of an ITQ system it is administratively difficult. Rights to quota are ownership rights and must conform to procedures appropriate to that class of right. You don't buy rights to land over a shop counter. Hence the potential for complexity in administering everyday transactions involving the buying, selling and leasing of quota.

A variation to a pure ITQ system that avoids top-heavy administration should be considered for the sea urchin fishery. A recent proposal in New Zealand is to separate an Annual Catch Entitlement (ACE) from title to quota (ITQ). The ITQ held by the quota owner is matched by an equivalent quantity of ACE.⁴

Under an ITQ-ACE split a quota owner is free to use ACE to balance against his or her own catch, or to sell, without affecting ITQ holdings.

The split between quota rights and catching rights enables annual rights to be traded freely without affecting fishermen's property in the fishery. After all, you can both buy and rent apartments and renting is generally more straightforward than buying.

An ITQ and ACE combination is an administratively simple means for coping with all possible transactions involving sea urchin quota. If the quota owner wishes to sell the ITQ as well as the ACE then two transfers would be involved.

The ownership of ITQ would not in itself confer the right to take fish. Only ACE could be used to balance catch. Equally it is not necessary to own ITQ to fish; it is sufficient only to hold or own ACE - subject to any other conditions that may apply to quota ownership (or rights to take fish). Table 2 shows a range of sea urchin quota transactions under an ITQ-ACE system.

Trading in ACE can be more straightforward than is possible for ITQ (the perpetuity right). Trade in ACE could for example be carried out by mail, fax or electronically. Trade in ACE can be real time; trade in ITQ can be accommodated within a longer and more formalised time frame as befits title to property.

Above all there must be a clear title to quota. A weakness in the New Zealand system is that there is no 'Certificate of Title' or any single document evidencing ownership of the quota.⁵ The New Zealand Quota Register is currently an administrative not a legal entity.⁶

"Parliament would be well advised to look closely at the Land Transfer system as the basis for the mechanics of a workable Quota Management System."

Lawlink, Nov/Dec 1988(Bryan Henderson)

Historically fishermen have been disadvantaged vis a vis other businesses by their inability to raise capital. Common law rights to fisheries do not provide collateral. Rights to fish quotas should be a fisherman's single most valuable asset. The situation is analogous to a farmer on land being unable to use his property as security for raising investment capital. All that is required to put fishing on the same basis as other industries is a title to quota that is as secure as title to land.

With security of title, trade in quota (and ACE) will follow as a matter of course. Trade can be directly between a willing buyer and a willing seller or can be handled through a quota broker. Quota broking is now a substantial business in countries that have adopted ITQ systems.

Table 2: Options for ITQ and ACE in the Sea Urchin Fishery

- A** Rex, an older diver, owns 100,000 lbs quota and catches the corresponding ACE himself. He retires completely from the fishery in year 2000

	1996	1997	1998	1999	2000
ITQ	100,000	100,000	100,000	100,000	SOLD
ACE	100,000	100,000	100,000	100,000	0

- B** Chuck, a new diver, doesn't own any quota. Each year from 1996 to 1999 he buys 100,000 lbs ACE to go fishing. In year 2000 he buys 100,000 lbs ITQ and fishes his own ACE.

	1996	1997	1998	1999	2000
ITQ	0	0	0	0	100,000
ACE	100,000	100,000	100,000	100,000	100,000

- C** Jim owns quota and catches his own ACE of 100,000 lbs. He breaks his leg in 1998 and that year sold the ACE he was unable to fish himself.

	1996	1997	1998	1999	2000
ITQ	100,000	100,000	100,000	100,000	100,000
ACE	100,000	100,000	SOLD	100,000	100,000

- D** Donna's husband Brad owns ITQ and dives his own 100,000 lbs ACE. Brad gets killed in a car accident in 1997. Brad caught ACE in 1996. After his death Donna retained ownership of ITQ and sold the corresponding ACE each year.

	1996	1997	1998	1999	2000
ITQ	100,000	100,000	100,000	100,000	100,000
ACE	100,000	SOLD	SOLD	SOLD	SOLD

8.1.5 Setting and adjusting TACs

The starting point for initial TACs should be with the Department of Fish and Game. Setting an initial TAC should use the best information available. Equally important is setting up a process to adjust the TAC over time.

Quota owners must have a say in changes to TACs. With quota giving them a stake in the fishery quota owners have every incentive to see that TACs are adjusted if the fishery is being either over-fished or under-fished.

What quota owners lack is expert scientific knowledge of fishery resources. However, they will have every incentive to ensure that the best scientific knowledge is used to advise on the setting of TACs. Fishery scientists would then work advising quota owners who have a direct financial stake in the fishery. There must be some measure of accountability between those who set TACs and those who capture the benefits, or bear the costs, of those decisions.

8.1.6 Record keeping and enforcement

The rule in record keeping is to keep it simple and beware the bureaucrats (whether in government or industry). The New Zealand experience with record keeping has proved instructive in this regard. Initially the government proposed relatively simple documentation. This proved not to be the case. The demand from bureaucrats for ever more information, and the difficulty of monitoring a multi-species ITQ system, meant records became more complex, timeconsuming, and unwieldy.

Sea urchin quota owners need a system of record keeping that suits their fishery. The preferred option is a combination of:

- the existing divers logbook and market receipt records, and
- contestability of management services and accountability for performance to ensure that administration does not get top-heavy.

Record keeping is necessary to the integrity of an ITQ system. Also needed is a credible system of enforcement. Quota owners have a direct interest in ensuring that those who cheat the system pay the price. They also have an interest in ensuring that the security of quota is not undermined.

The rule to follow is the fine should fit the crime. Minor misdemeanours should be treated as such. Major breaches of the ITQ system should on the other hand attract substantial penalties. To preserve the security of quota and the climate for investment, quota should be as secure as property in land. The use of sliding scale of fines allows the security of quota to be protected while protecting the integrity of the whole ITQ system. If a quota owner has to sell quota to pay fines so be it.

Quota owners should not have to pay for government's policing of quota. ITQ are property rights much as rights to land. The enforcement of ITQ rights is properly a function of the state and should be through police provision and taxpayer funding. However, there is nothing to stop quota owners paying for additional enforcement. This would be no different to arrangements for protecting any other commercial property.

8.1.7 Who manages the fishery and who pays?

The best people available should run the fishery. The way to get these people on the job is through contestability of management. Fishery managers who can give good advice and lift the returns from the fishery or provide more efficient services will be keenly sought.

The argument in favour of contestability in fisheries management and administration is not an argument against government involvement in the fishery. Government will remain responsible for management oversight. The argument is strictly one against a monopoly in fisheries management and administration. Increased efficiency in the fishery demands value for money from fisheries management services.

The importance of contestability in fisheries management suggests that the fishery should be run on a 'user pays-user says' basis. Sea urchin divers already fund resource management through the state levy on their landings. The only change will be increased flexibility over the amount and direction of expenditure in the fishery.

The user pays approach, other than for policing, would encourage quota owners to monitor existing management performance as to whether the service provided was value for money and to seek alternatives where necessary.

8.1.8 Organization

Effective organization is needed for quota owners to represent their common interest in managing an ITQ fishery. The New Zealand ITQ system was initially set up without any means for enabling quota owners to act collectively. A sharp divide separated the profit-directed harvesting sector from the government directed management agency.⁷ The split created an unnecessary tension between government's need for management flexibility and quota owners' need for security of quota.

Quota owners must participate in management for an ITQ system to be effective. Quota owners have the information needed for decisions on QMAs, TACs and maximum and minimum holdings. Quota owners also provide the investment needed for fisheries enhancement. Without the participation of quota owners the ITQ system will become just another set of rules and regulations.

The key to effective participation is organization. But organization without a means for action is pointless. Management decisions must be decided and agreed upon collectively by quota owners. If quota owners have rights to harvest fishery resources collectively they are obliged to act collectively in the management of that resource.

The need for action by quota owners requires voting rules as part and parcel of an ITQ system. Voting rules allow decisions to be made in a business-like manner. There is nothing unusual in this arrangement. Multiple owner companies invariably operate on the basis of voting rules. In making decisions through voting rules quota owners will be following tried and proven practice.

In simple terms there are two ways to go. Industry could adopt the current MAF model whereby one central body or authority makes those [management] decisions.... Alternatively industry organises itself into distinct sector groups based on common interest....

Seafood New Zealand Aug. 1993 (Peter Stevens)

To protect the interests of smaller quota owners a 66% or 75% rule (based on percentage of quota owned) should constitute a majority for deciding management. The majority rule avoids the possibility of hold-outs stalling management decisions.

It is difficult to see why a decision that is good for 66% or 75% of quota owners would be bad for the remainder.⁸ Ideally voting rights should reflect a quota owners' stake in the fishery. In other words voting rights should be proportional to the amount of quota owned.

8.2 Initial allocations

Existing holders of sea urchin diving permits receive an initial allocation of quota. Only sea urchin divers can legally take sea urchin and they have ownership rights to the fish they take. Existing sea urchin divers are the only group that have title to the fishery.

The allocation of quota should be based on the basis of catch history for fishing years already past. Other means of allocating quota are theoretically possible:

- allocation by tender,
- allocation on the basis of investment in the fishery, or
- allocation on the basis of income from the fishery.

The advantage of using catch history in an established fishery is that it is the mechanism favoured by precedent, it is unambiguous, and it is recognised by existing participants in the fishery.

In New Zealand the allocation of ITQ was based on the best two out of three years.⁹ The average of the two best years formed the basis for an ITQ allotment. The logical basis for deciding an allocation for the sea urchin fishery could be on the basis of an individual diver's two best years from say 1993, 1994 or 1995.

One thing is clear, the years for deciding quota allocation are years already past. The prospect of sea urchin divers 'fishing for quota' is equally as damaging as the actual racing for fish.

One concern with catch history is that it fails to distinguish between quantity and quality of harvest. Currently divers can target large numbers of poorer quality urchin or relatively smaller quantities of high quality urchin.

Gross income from the fishery has been proposed as a way of allocating quota that recognises this difference in fishing method.¹⁰ For example under this model a harvest of 100,000 pounds at \$0.50 per pound could be considered equivalent to a harvest of 50,000 pounds at \$1.00 per pound.

All allocation schemes have good and bad features. The preferred course of action must be to base the allocation on simplest method available.

Under the existing rules it's equally valid for a fisherman to harvest on the basis of quantity or quality. It will prove extremely contentious if fishermen end up making value judgements on one another's operations. The likelihood is that the search for a fair allocation of quota will prevent fishermen reaching a consensus on the introduction of ITQs.

The less players involved the greater the chance of progress. Catch history as the basis of allocation need only involve two parties; sea urchin divers themselves and the Department of Fish and Game.

Allocations based on gross income or some investment criterion necessarily involve a third party, potentially even the Internal Revenue Service. The danger here is that the attempt to create a more just allocation system will create even greater injustice or ill-feeling once the outside experts make their decisions.

For new entrants (ie those with less than three years landing record) the allocation should be decided on the basis of their actual catch for any of the eligible years.

Whatever method of allocation is chosen the important point is that everyone eligible receives quota; nobody loses and nobody needs compensating. The responsibility for adjusting their operations to suit the fishery is left with quota owners themselves.

8.3 Setting the TAC(s)

Setting the TAC is easy. The Department of Fish and Game have already done it. This is not to say that TAC limits should be accepted uncritically. The process should be open and when necessary subject to peer review.

Contestability of management services will help ensure that quota owners have access to the best scientific knowledge for future adjustments to TACs.

8.4 Allocating quota

For the initial ITQ year, divers could receive a pro-rata allocation of quota based on their average catch (as per section 8.2) and adjusted to match the TAC set for the fishery. The process should be relatively straightforward. For example assume:

that Diver X has an average catch from his or her two best years of 70,000 pounds,

that the total of the averages for all divers comes to 25,000,000 pounds, and

that the total TAC for the new Californian sea urchin ITQ fishery is the same as proposed by the DFG: 18.137 million pounds (2.137 million pounds for northern California and 16 million pounds for southern California).

In this example the TAC set for the ITQ fishery equals 72.55% of the harvest under the preITQ selection period. The approximate initial allocation of proportional ITQ to Diver X will be calculated accordingly:

$$\frac{\text{Diver's Average}}{\text{Total of Averages}} \times \text{TAC} = \frac{70,000}{25,000,000} \times 18,137,000 = 50,783.6 \text{ pounds}$$

The Department of Fish and Game's suggestion for separate TACs for northern and southern California is a good one. The trend will be towards smaller QMAs. At the moment divers can take sea urchin anywhere within Californian waters. For the sake of consistency divers should receive a pro-rated allocation within the two areas according to the landings returned on their fish tickets. A diver who landed only in one area would receive quota only within that area.

Provision must be made for appeal on quota allocation decisions. No allocation process is going to get things right first time round and the allocation process must be seen to be transparent. However, the appeal process must not be open ended. The longer an appeal period the more likely the implementation of an ITQ scheme will become stalled.

The period open for appeals should extend no longer than, say, three months from the declaring of the initial individual transferable quota. Appeals should only be allowed on the basis of technical recording inaccuracies.

Those who make decisions on quota appeals need to be chosen carefully. Questions of who should be allocated potentially valuable property rights will be contentious. The Fish and Game Commission may be a good place to start.

8.5 Quota trading

Once quota are allocated quota owners should be free to trade subject to any prior agreement relating to minimum or maximum holdings. The theory behind quota trading is that it allows for economic rationalisation and fine-tuning of the industry. For the theory to become a reality quota trading must work in practice. The more efficient the trading the greater the benefits.

Separation of ITQ rights from catching rights (ACE) will help ensure that efficiency.

8.6 Monitoring and adjusting the TAC

Monitoring and adjusting the TAC is part and parcel of an ITQ system. Quota should be allocated as proportional quota. Proportionate changes in the TAC will then translate into proportionate changes in each individual's quota holdings (see Figure 4).¹¹ With ACE built into an ITQ system the catching rights spawned by the ITQ are adjusted in similar fashion.

The TAC setting process will not be contentious if quota owners themselves are involved. A TAC that is too high or too low will result in overfishing or underfishing. Either way quota owners have every incentive to make sure that the TAC is right.

In New Zealand quota owners are taking an increasing interest in the process for adjusting the TACs. The fishing industry has criticised TAC determinations by the MAF that it believes are too conservative. Equally, industry has been quick to advise the Minister on the need for TAC reductions when it believes TACs are too high. On occasion, industry calls for TAC reductions have been at odds with the recommendations of government administrators.

The enlightened industry view to recommend the retention of existing quota levels rather than respond to the scientific advice suggesting an increased catch, bodes very well indeed for the future of this critical [hoki] fishery.
Hon. Doug Kidd, New Zealand Minister of Fisheries, April 1994

The need to take account of quota owners' interests in TAC monitoring and setting means that TAC setting should be considered as part and parcel of an overall contestable fisheries management service.

8.7 Adjustments over time

An ITQ system should match the requirements of a particular fishery. The greater the mis-match between an ITQ system and the actual conditions in the fishery, the greater the difficulty in providing for sound resource management.

Fisheries management is difficult when systems are rule-bound and government administered. Government administration has its place but it should not operate to the detriment of adaptive management. Management should reflect that fisheries are dynamic natural systems.

Adjustments to an ITQ system should be handled at the level of management best suited for the task. On the one hand quota owners need to make decisions on the day-to-day operation of an ITQ system. On the other hand quota owners need to present a united front when adjustments involve legislative or regulatory change.

Flexibility in management follows from quota owners being able to make policy and operational decisions and act accordingly. To the extent that quota owners use a collective resource they must decide collectively on its management.

Voting rules are an important part of deciding management. Making decisions is one matter; putting them into practice is another. In New Zealand those ITQ fisheries that are moving forward most rapidly are those that are managed by Quota Management Companies that are in turn owned directly by the quota owners themselves (section 7.4).

"The day is not too distant when all that the Government will have to do in respect of the management and operation of this fishery [southern scallop] is sign off on the annual TACC recommendation."

Hon. Doug Kidd, New Zealand Minister of Fisheries, August 1994

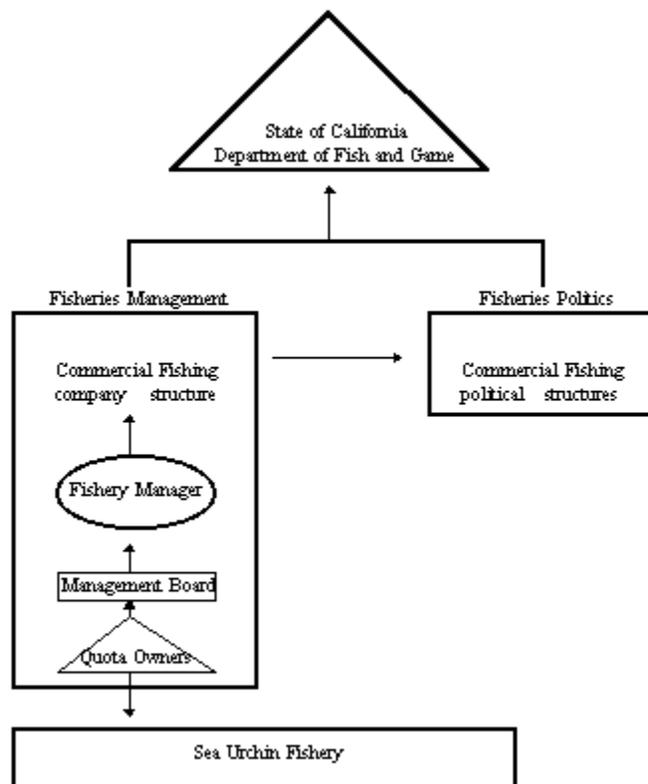
The flexibility and responsiveness of these companies to quota owner interests strongly suggests that sea urchin quota owners should exercise their voting rights through a company structure.

Figure 6 shows the layout of a possible company structure appropriate to the sea urchin fishery.

Under a company structure quota owners would elect a Management Board who would in turn appoint a Fishery Manager to run the fishery. An important feature of this structure is that the Fishery Manager is accountable to the Board who are in turn accountable to the quota owners.

The explicit lines of responsibility and accountability in this company structure support, and add to, the incentives for improved fisheries management under an ITQ system.

Figure 6: Proposed Fisheries Management Company Structure



¹ - CHRISTOPHER M DEWEES, "Individual transferable quotas ITQs) and California's sea urchin fishery". Unpublished paper to sea urchin industry (July) 3p. (1991).

² - *Ibid.*

³ - Ministry of Agriculture and Fisheries. "Inshore finfish fisheries: proposed policy for future management" Ministry of Agriculture and Fisheries, Fisheries Management at 14 (1984).

⁴ - CHAPMAN TRIPP SHEFFIELD YOUNG, "The A.C.E. trading system". Policy paper for discussion at 1994 NZFIA and NZFCP conferences. 3Op (1994)

⁵ - BRYAN HENDERSON, "Living with the quota management system". *Lawlink* 3(4): 9-11.

⁶ - Proposed new fisheries legislation in New Zealand provides for the establishment of a quota register as a legal entity and provides that any ITQ may be given as security for a mortgage; Fisheries Bill No. 63-1 ss. 118-124(1994).

⁷ - PETER ACKROYD, RODNEY P HIDE and BASIL M SHARP, "New Zealand's ITQ system: prospects for the evolution of sole ownership corporations". Report to MAF Fisheries at 66(1990).

⁸ - In New Zealand a 75% rule based on quota held has been identified as the legislative means for allowing quota owners to decide collective management agreements. Fisheries Bill No.63-I s.81 (1994).

⁹ - IAN N CLARK, PHILIP J MAJOR and NINA MOLLETT, "The development and implementation of New Zealand's ITQ management system". In: Neher et al. (eds), "Rights Based Fishing." NATO ASI series. *Series E Applied Science No.169* at 128 (1989).

¹⁰ - *Sea Urchin industry News (Jan.)* at 9 (1995).

¹¹ - DEWEES, *supra* note 1.

Chapter 9

CONCLUSION

Change is inevitable in the sea urchin fishery. Concern over overfishing and the inefficiencies of regulatory controls on access mean new directions for management must be found. Retaining the status quo is not an option.

ITQ systems of fisheries management are increasingly recognised as a practical alternative to the inefficiencies of regulation. ITQs strike directly at the root cause of overfishing - lack of ownership. No longer are ITQ systems viewed as radical approaches to fisheries management. The gains from combining conservation and enhancement with improved economic performance promise a new and exciting future for ITQ fisheries.

Sedentary species like sea urchin are ideally suited to management under ITQs. Moreover many of the management rules and procedures already in place can be readily incorporated into an ITQ system. The costs of introducing an ITQ system into the Californian sea urchin fishery should be minimal.

This report sorts the problems from the non-problems. The report also shows how an ITQ system can be designed and implemented in a way that meets the State's objectives for fisheries management while securing the interests of all those involved in the fishery. The key to the success of ITQs lies in quota owners participating in management. Voting rules and company structures are the best way for quota owners to carry out that participation.

The Californian sea urchin fishery is long overdue for change. Consider the situation; a high-tech fishery in the world's most advanced country supplies high quality seafood products to a sophisticated export market and yet is run under the same sorts of rules that would apply to a subsistence fishery.

The vicious spiral created by ever more restrictions on access and ever more increases in effort benefits nobody. Bringing in ITQs and encouraging quota owners to take increased responsibility for the sea urchin fishery will ensure a prosperous future for all:

- Without ITQs the future will be what nobody wants it to be.
- With ITQs the future will be what everybody wants it to be.

ITQs -fishing with a future.

Glossary of terms

CPUE - Catch Per Unit Effort. A measure of the amount of effort (time) required for harvesting a given quantity of fish. The standard measure of fishing effort.

SUEP - Sea Urchin Enhancement Program.

CUPA - Californian Urchin Producers Association (disestablished January 1995).

S.U.P.A.C. - Sea Urchin Processors Association of California.

DFG - Department of Fish and Game (California).

DSUAC - Director's Sea Urchin Advisory Committee.

TAC - Total Allowable Catch. The total quantity of a species of fish allowed to be harvested from a defined area in a given period of time (usually 1 year).

ITQ - Individual Transferable Quota. A transferable (sale or lease) share of a TAC allocated to individual fishermen or fishing firms.

QMA - Quota Management Area. A defined management area for a quota fishery.

QMS - Quota Management System. In New Zealand the official designation of the system for administering ITQ fisheries.

MSY - Maximum Sustainable Yield. An economic concept that defines the largest catch of fish that can be perpetually sustained.

ACE - Annual Catch Entitlement. A plan for quota trading that separates the annual catching rights from the perpetual ITQ (ACE is the fishing right; ITQ is the ownership right).

By-catch - Additional fish species taken as a consequence of harvesting a target species.

Catch history - A record of individual fishermen's catch or landings over time.

Contestable - In fisheries management a contestable service is one that consultants and agencies compete for.

Grandfathering - The carrying forward in substantially the same form or type the existing rights and privileges held by individuals and/or groups.

Proportional quota - Quota that is designated as a proportion of a TAC.

Pro-rata - In proportion to the value or extent of an existing interest.

Quota - A fisheries quota refers to an entitlement to a share of the harvest.

Transparent - In fisheries management a transparent process or procedure is one that is open to public knowledge.