

ECOLABELLING OF SEAFOODBruce Phillips¹ and Trevor J. Ward²¹ Department of Environmental and Aquatic Sciences, Curtin University of Technology, Perth, Western Australia. b.phillips@curtin.edu.au.² Institute for Regional Development, Faculty of Natural and Agricultural Sciences, University of Western Australia, Perth, Western Australia. tjward@bigpond.net.au.

ABSTRACT. Ecolabelling provides consumers with the opportunity to make informed choices about the seafood they purchase, at the fresh fish bar, in supermarkets, cafes and restaurants. A recent book *Seafood Ecolabelling: Principles and Practice* deals with seafood, both farmed and wild capture, and describes various forms of consumer programs such as ecolabelling, guides and rating systems, with a worldwide focus. The book presents ecolabelling concepts and issues from a broad perspective so that seafood consumers, resellers, processors and fishers can be better informed about the role and quality of individual seafood ecolabels they may encounter and enable them to make more meaningful decisions about the costs and benefits of ecolabelled seafood and certification systems. In particular, each chapter provides an analysis of the topic in terms of the history and development, and identifies aspects that are considered to have been keys to successes. The final theme provides perspectives from an analysis of what our short experience with seafood market-based incentives predicts for the future of sustainable seafood and the health of ocean ecosystems.

Artículo de revisión

ECO-ETIQUETADO DE ALIMENTOS MARINOS

RESUMEN. Las eco-etiquetas provén a los consumidores la oportunidad de tomar decisiones informadas acerca de los alimentos marinos que compran en las pescaderías, supermercados, cafeterías y restaurantes. El libro *Seafood Ecolabelling: Principles and Practice* trata de los alimentos provenientes del mar, tanto cultivados como capturados y describe los diversos programas para los consumidores, como las eco-etiquetas, sistemas de guía y popularidad, en un contexto global. El libro presenta, desde una perspectiva general, conceptos asociados al eco-etiquetado para que consumidores de alimento marino, revendedores, comercializadores y pescadores estén mejor informados acerca del papel y calidad de los alimentos que portan eco-etiquetas y tomen decisiones más significativas con respecto al costo-beneficio del eco-etiquetado de productos marinos y de los sistemas de certificación. En particular, en cada capítulo se analiza este tema en términos de su historia y desarrollo, y se identifican aspectos claves de su éxito. Al final se ofrece una perspectiva derivada de lo que nuestra poca experiencia con los incentivos de mercado para los alimentos marinos prevé para el futuro de la sustentabilidad de los alimentos marinos y la salud de los ecosistemas oceánicos.

Introduction

Ecolabelling to indicate 'environmentally-friendly' products began in 1977 with the establishment of the Blue Angel program by the government of Germany (Müller 2002). Since that time, worldwide concern about sustainability issues has led to the emergence of ecolabelling schemes for many products, including those from forests (Forest Stewardship Council) and the oceans (Marine Stewardship Council). The emergence of ecolabelling for natural resources, and particularly marine products, has been driven strongly by the involvement of non-government organisations (NGOs) (Sutton y Wimpee 2008). The ecolabelling of seafood has arisen in the last decade to become an important marketing tool in countries where consumers are sensitised to issues of environmental sustainability in food products. However, despite at least three decades of ecolabelling experience, the more recent ecolabelling of seafood presents a number of important issues, including the technical quality of criteria used to award ecolabels, the response of consumers to the rapid proliferation of different ecolabels that apply to similar products, and the potential for distortion of international trade in seafood to the detriment of developing countries (Deere 1999; Rotherham 2005).

In this article we describe seafood ecolabelling, with some examples of how it is being used in different fisheries around the world. We discuss the drivers behind the upsurge in ecolabelling for seafood, and how the related concept of certification is used as a tool to improve fishery management. As with all innovations in marketing, the decision to proceed to seek an ecolabel for a specific line of seafood products carries with it a number of potential business risks. In seafood, ecolabelling has brought with it a diversity of ecolabels and certification programs that demonstrate various strengths and weaknesses (Ward y Phillips 2008). In this chapter we also identify the motivations and outline some of the potential issues surrounding seafood ecolabelling so that fishers, fish processors, resellers and fishery managers may be able to better recognise and manage such risks if they wish to secure (or maintain) an ecolabel or an environmental certification for their product.

Ecolabelling programs

An ecolabelling program is a system used to create a market-based incentive to encourage products that can demonstrate they are produced in an ecologically

sustainable manner. The incentive is created in the marketplace through the selective purchasing power of consumers, who preferentially purchase products marked with the ecolabel, and possibly pay a higher price for the ecolabelled product. This provides the seller and the ecolabelled product with a market advantage over non ecolabelled products. The price increment, or possibly the increased volume of sales of the ecolabelled product, preferentially rewards the producers of the more ecologically sustainable products over those producing products without ecolabels. This possibly reduces the sales and returns to producers of less sustainable products, reduces the value or marketability of non-ecolabelled products and creates an incentive for producers to change harvesting or farming practices to be more ecologically sustainable and improve their environmental practices.

An ecolabel is a mark, a logo, a label or a product endorsement affixed to a seafood product at the point of sale that implies to a purchaser that the product has been produced through ecologically sustainable procedures, and is from a source that is well managed. Ecolabels are usually applied to each individual seafood product to provide a product endorsement that is visible at the point of retail sale. The product endorsement from an ecolabel is designed to convey to the consumer the simple message that they can confidently purchase the labeled product in preference to an unlabelled product if they wish to give their support to seafood produced in ways that have less ecological impact on fish stocks and the environment. The direct inference is that such products are more ecologically sustainable. An ecolabel may be applied to a product after it has been certified as being in compliance with the rules and criteria of an ecolabelling program.

Certification is the outcome of an assessment process that confirms (verifies) that a product complies with the sustainability standard and a set of criteria established by the incentive program. A certification of compliance may be used as part of an ecolabel program, and indeed a certificate may be issued, but not all certification systems lead to the award of an ecolabel. Some certification systems may not have any direct relationship to retail marketing issues, and may be used for purely industry or regulatory purposes (such as to demonstrate compliance with government requirements for safe food-processing procedures). So, while ecolabelling is normally based on some form of assessment process and a consequent certification, the process of assessment leading to a certification of compliance does not necessarily always lead to an ecolabel. The essential difference between certification and ecolabelling is the form of market-based incentive – influencing consumer purchases through the ecolabel at the point of retail sale and influencing purchasing patterns through the provision of other forms of product endorsement or buying recommendation.

Buying guides and ratings are closely related to ecolabels, and while they constitute a different form of product endorsement, they also act to influence

consumer-purchasing patterns and are designed to create market-based incentives. Buying guides and ratings provide information about a product to consumers or to resellers through advertising and seafood awareness programs, using such tools as wallet/purse cards, brochures and websites, where ‘buy’ or ‘don’t buy’ advice is usually provided. In some systems the buying recommendation may be based on a formal and extensive underpinning decision process. Seafood recommendations for consumers based on environmental and ecological considerations were first developed in the mid-1990s, and the first seafood recommendation card for consumer use was issued in 1999 in the US Audubon Society’s magazine.

Ecolabelling programs are voluntary instruments – fisheries or aquaculture ventures can choose to submit their products for compliance assessment to determine if their products can carry the ecolabel. The voluntary nature of ecolabelling is an important aspect of consumer appeal, because this infers that products that do not meet the sustainability standard would not be submitted by the producers for assessment, and hence do not carry the ecolabel. Consumers may interpret this as meaning that only the ecolabelled seafood products available in their marketplace are indeed produced in a sustainable manner.

Voluntary submission of products for ecolabelling carries with it the responsibility for meeting the various costs of conducting the compliance assessment and meeting any conditions or corrective actions that may be required to keep the product certified. These costs include the cost of the certification companies in conducting the assessment, the cost of preparing and presenting data and information about the products that match the requirements of the ecolabel program and the ongoing costs of dealing with conditions and the costs of verification of continuing compliance. This matter of the cost of the assessment and verification system has often been raised (Deere 1999; Wessells et al. 2001) as a discriminatory factor that can be used to lock out both fisheries and aquaculture products from developing countries and small-scale ventures from the developed world. Indeed, some commentators consider that the expensive third-party assessment systems are verging on placement of national regulatory systems by imposing a more powerful (market-based) private sector set of management measures that are beyond the control of national governments, and transcend the more usual participatory and locally relevant management systems (Steinberg 1999; O’Rourke 2006). However, others consider that such private sector (so-called ‘non-state’) ecolabel systems can only succeed by working in partnership with government or community-led management measures, and so there is little risk of the ‘non-state’ systems replacing the ‘state’ systems (Janen 2007).

Ecolabels are designed and propagated to reduce ecological impacts and improve the ecological-friendliness of practices used in production, harvesting or growing of products, with a view to ultimately

increasing the sustainability of all products across all the market. To achieve this, they must create ‘market-pull’ through differential appeal to consumers who are sensitive to the impact on sustainability inferred by the product endorsement of the ecolabel. The market-pull is created through establishing the credibility of the product and its ecolabel endorsement with potentially sensitive consumers, and a credible differential from competing products in the same marketplace.

How ecolabelling works

Ecolabels are normally applied as labels or tags, such as a recognizable logo on a retail product pack. Where individual products are small or where they are normally marketed in a combined or processed pack (such as a canned product), the label may be applied to the pack rather than the individual product itself.

The basic approach to seafood certification and ecolabelling implemented by the MSC program has been derived from established practice in several other sectors (and specifically timber – the Forest Stewardship Council (FSC)) and adapted to suit the needs of the seafood sustainability issues and the industry. A number of subsequent certification systems have used the MSC as the model for a policy framework and implementation system (such as the Australian Sustainable Fisheries Guidelines; see below), and to that extent the MSC must be considered to have created a significant influence in seafood sustainability. The practical application of certification and ecolabelling in the MSC program is described in detail in the series of articles by Botsford 2003; Chaffee 2003; Chaffee et al. 2003; May et al. 2003; Phillips 2003; Ward 2003; Ward y Phillips 2008.

The benefits for fishery industries from participating in an ecolabelling program include the potential for:

- increased price, market share or market access, created by the market-pull for more sustainable products;
- increased industry standing for ecolabelled products and related products and industries;
- increased attractiveness for investment capital; and
- increased internal cohesion in the sector, responding to the common perception of benefits flowing from ecolabelling.

The costs of ecolabelling for an industry can be substantial and may apply at several different levels in the governance and labeling system, including the cost of:

- assembly and coordination of data and information specifically required for compliance assessment;
- initial certification and ongoing verification of compliance with the ecolabelling standard;
- protection against abuse of the labels to protect competing national or industry trade interests;
- organizing the industry into a cohesive group to be able to engage with the

ecolabelling program and to effectively maintain the compliance conditions;

- the costs of establishing a secure chain of custody for the product from the producer to the consumer; and
- the costs of advertising and awareness campaigns to specifically capitalize on the consumer appeal of the ecolabel.

Types of ecolabels

Generally speaking, ecolabels are one part of a family of environmental labeling systems, each of which may result in the certification of a product. The International Organization for Standardization (ISO) has defined three main types of environmental labeling, and ecolabels generally fall into the category of the ISO Type I labels.

The ISO classification system does not provide, or impose, specific performance standards, but rather provides a uniform framework within which a system of labeling can be developed and implemented within an industry sector. However, seafood ecolabelling programs are based on performance standards, and products can be classified based on compliance with the standard, as well as on the processes used for setting the performance standard and for determining compliance of products with that standard. This provides for a widely used classification of seafood ecolabelling programs into three main types (after Deere 1999) based on the characteristics of the sustainability standard and the compliance assessment process:

(a) First-party labeling schemes. These are typically established by individual producers or resellers based on their own product standards, and can cover criteria related to food quality and specific environmental and health issues. This form of ecolabelling is usually ‘self-declaration’, and can be considered to be an ISO Type II environmental labeling system.

(b) Second-party labeling schemes. These are typically established by industry associations for members’ products, and the criteria are determined by the organization. Verification of compliance is normally conducted by certification procedures internal to the industry or association, or by use of external certifiers, and may be either ISO Type I or Type III.

(c) Third-party labeling schemes. These are usually created by organizations external to the relevant industry sector, and therefore carry a perceived level of independence. The owner of the labeling scheme usually sets the criteria and awards a label to products that are independently verified (through a certification process) to comply with the criteria. Third-party schemes are typically considered to be the most robust form of ecolabelling, because of the independence of the criteria and the verification process from commercial influences, and are usually of the ISO Type I form.

The primary theme that these three ecolabelling systems hold in common is the expressed intention and the common purpose of creating market demand for

products that are, relative to other products, caught, grown or prepared for consumption in a more environmentally friendly way. The primary differences between the three types of schemes relate to the standards and criteria used to determine if a product complies, and the independence and robustness of the process of verification of compliance – determining that a product correctly complies with the standard and criteria.

There are increasing levels of independence from commercial influences in the standard setting and in the product verification from the first to the second and the third-party systems, but there is nothing in this classification of systems to infer that a third-party system of compliance assessment necessarily means that the environmental standard is higher than in a first-party system. Nonetheless, first party systems typically set low standards that are easily achieved, and for consumers, the gradation from first- to third-party schemes broadly infers increasing levels of sustainability, robustness of compliance assessment and reliability of the product endorsement as expressed in the product ecolabel or endorsement.

First-party certification systems involve the development of standards and criteria within a company, with a compliance assessment procedure carried out internally (such as by a company-appointed assessor). Such internal assessments are typically carried out to assess compliance to a standard and criteria that have been developed and internally agreed by the company as being relevant to the needs of an ecolabel for the products being assessed. Such internal standards may reflect specific issues of sustainability, but they would normally be set at a level of performance that would enable the venture to comply with the standard most of the time, since otherwise the application of the ecolabel would put some of the venture's products at an advantage, and possibly with significant commercial implications.

In the seafood industry, such internal standards, while meeting present-day commercial operational requirements and criteria, may not necessarily be in accord with either government or community expectations for the environmental impacts of the fisheries or the aquaculture operations. In addition, since the process of conducting the compliance assessment is not normally exposed to either peer review or public critique in first-party certification systems, the compliance assessment process is not exposed to independent verification. Such systems are usually considered to be self-assessment systems (ISO Type II labeling), and are not renowned for their robustness in terms of achieving major improvements in ecological sustainability. The main purpose and value of such systems is to provide an internal audit mechanism between the best- and worst-performing products/ventures in terms of sustainability, without drawing a lot of market attention to the issues, which may carry significant adverse implications for poorly

performing individual operators or aberrant ventures and for the sector as a whole.

Second-party certification systems typically adopt an industry-wide standard and criteria, with assessment procedures that may be either internal or independent, but are restricted to assessment of compliance of the venture or group of ventures with the industry-set standard. The owner of the standard (typically an industry association, a group of companies or sometimes a government) will determine the standard and the criteria, and arrange for (usually) independent assessments of compliance with the standard. These assessments are not often made public, and although the standard and criteria may be publicly available, the verification process for individual products may not be freely available. As with first-party systems, the standard and criteria in second-party systems may be established so that the majority of the members of the group that owns the standard will comply, for the same (usually commercial) reasons as in first-party systems.

Third-party certification systems are based on standards set external to the industry or ventures being assessed, and typically are derived from extensive industry, government and community consultation. The process of assessment of compliance of ventures/products with the standard is carried out by third-party certifiers who are independent of the standard owner and of the ventures being assessed, and usually are formally accredited to conduct the assessment of compliance by the standard owner. Third-party certification systems also normally have a well-developed chain-of-custody assessment processes to ensure that there is no mixing of certified and non-certified product in the supply chain or in the marketplace. The standard used in third-party systems will typically be a compromise between the best sustainability performance expected by the most discerning consumers and the capacity of a significant number of producers to meet the standard. In this case, the standard will normally be set so that at least some producers can meet the standard, otherwise very little ecolabelled product would be available in the marketplace, denying the opportunity for a market-based incentive to develop. The best example of a third-party certification in seafood ecolabelling is the MSC.

The Baja California Lobster Fishery

A good example of a third-party certification is the Baja, spiny lobster fishery. The spiny lobster (*Panulirus interruptus*) fishery in Baja California, Mexico was successful in obtaining Marine Stewardship Council (MSC) endorsement as a sustainable and well-managed fishery in 2005. The *P. interruptus* spiny lobster fishery in Baja California dates from the early 1900s (Ayala et al. 1988; Vega y Lluch-Cota 1992; Vega et al. 1996). Also known as red lobster or California lobster, *P. interruptus* is fished in small quantities both commercially and recreationally in California in the US, but in Mexico this species is fished only by commercial fishermen in the area from the US border to Margarita Island, near the tip of the Baja California Peninsula.

However, the main portion of the stock is between Cedros Island and Punta Abreojos along the Pacific coast of Mexico between 28.6 °N 115.5 °W to 26.6 °N 113.2 °W. Most of this marine area is part of the Vizcaíno Biosphere Reserve (except Cedros Island), and is contained within a 5 km band along the shore. The fishing grounds are delimited in exclusive fishing zones that are shown in Figure 1.

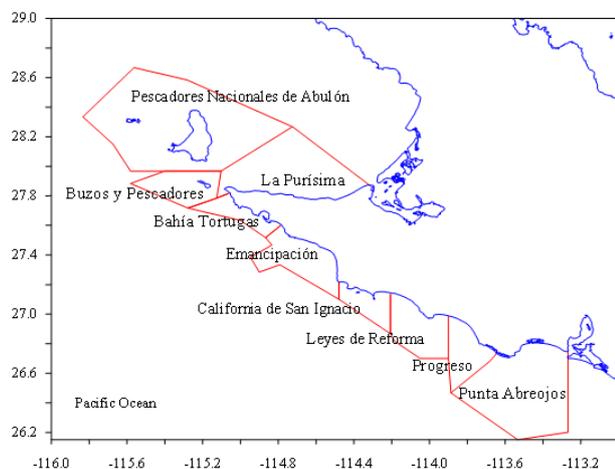


Figure 1. Spiny lobster Fishing Zones in Central Baja California, Mexico.

In Baja California, 26 Mexico fishing cooperatives exploit *P. interruptus*. However, nine of these cooperatives operating in the central region of the Peninsula, from Punta Abreojos to Isla Cedros, catch around 80% of the total catch of this species. These cooperatives are part of the Federación Regional de Sociedades Cooperativas de Baja California (FEDECOOP), who was the client for the MSC assessment on behalf of the cooperatives.

About 500 fishers are members of the nine fishing cooperatives distributed in ten villages along the coast of the fishing area, and they fish using fishing skiffs up to 7 m in length powered with outboard motors. Lobsters are caught by setting baited wire traps that are fitted with escape gaps to allow undersized lobsters to escape. Details of the number of members, boats and traps at the time of the MSC assessment are given in Table 1.

Live lobsters are transported by boat to reception centres distributed along the coast. About 90% of the catch is sold alive; but some are steam-cooked whole, fresh whole-packed in boxes and frozen or processed as frozen lobster tails. The main market for live Baja California lobster is in Asia. The lobsters are taken under bond to San Diego and Los Angeles, and then trans-shipped by air mainly to Taiwan. The remaining 10% of the catch is sold domestically, mainly to restaurants in Ensenada, Baja California, Mexico.

Management system

The management structure for the Baja California lobster fishery is based on the Fishing Law, a Federal Mexico law, which considers all the aquatic resources including several other species of spiny lobster along the Mexican Pacific and Atlantic coasts. The Ministry of SAGARPA (Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación), through the National Fisheries and Aquaculture Commission (CONAPESCA), is responsible for the management of fisheries in the whole of Mexico. SAGARPA considers the scientific advice from the National Institute of Fisheries (Instituto Nacional de la Pesca – INP) based on the information generated by the different Regional Centers in the country. The decision making office (CONAPESCA) is in charge of issuing policies, permits, management regulations and the enforcement of rules. The management of fishing resources is also considered within the National Fisheries and Aquaculture Program (NFAP) for the period 2000-2006, in which the main objective is the sustainable management of all the resources being exploited within the Mexican Exclusive Economic Zone and for aquaculture. Following the policies of the NFAP there is a Norms Committee for the elaboration and changes in the management regulations. There is also a Fisheries Committee at State level where all fishing issues are treated and recommendations are presented to the corresponding authorities of CONAPESCA.

The management of the different spiny lobster fisheries exploited in Mexican waters is regulated by decree in the Mexican Official Norm (NOM-006-PESC-1993). This

Table 1. Cooperatives in operation (2002) in the central zone in Baja California

Name of the cooperative	Members	Boats authorised	Boats worked	Traps authorised	Traps worked
Pescadores Nacionales de Abulón	167	22	19	1,480	1,480
Buzos y Pescadores	86	24	18	1,440	1,170
La Purísima	96	36	30	2,500	1,950
Bahía Tortugas	87	22	21	1,320	1,260
Emancipación	77	33	29	1,760	1,595
California de San Ignacio	195	20	16	1,040	960
Leyes de Reforma	185	18	18	1,045	900
Progreso	210	40	28	2,600	1,960
Punta Abreojos	191	45	41	2,700	2,665
Total	1,294	260	228	15,885	13,940

encompasses the management regulations for the species in the Mexican Caribbean and Gulf of Mexico and those in the Baja California Peninsula as well as in the Gulf of California.

The Baja California lobster fishery does not have a separate formal management plan but it is specifically included in the overall plan for all Mexican resources. Management involves a combination of limited entry, strict delineation of co-operative's exclusive fishing areas and community-based self-regulatory measures. Regulatory measures in place include area closures, minimum legal size, fishing gear restriction and protection of gravid female lobsters.

It should be noted that the fisheries in this area are part of a co-management system of collaboration of the organisation of the cooperatives, the FEDECOOP, enforcement agencies and the fishers. The presence of CONAPESCA officials is very limited on this isolated coastline. In fact, it is only due to local surveillance by the cooperatives (paid for with their own funds) on a permanent basis during all the days/nights of the year, that illegal fishing of the resources of the area is controlled (Agnew et al. 2006). Abalone grounds in the lobster fishing areas are very attractive for poachers. In addition, the strong internal regulations and control that cooperatives have over their members ensures that rules are respected and these internal regulations can exceed the government restrictions on the fishery. For example, all cooperatives use less than the authorised number of boats and traps (see Table 1), therefore fishing effort on the lobster resource is kept below the level authorised by the government. The same situation occurs with quotas for abalone—to better protect the stocks the cooperatives set quotas that are below the government-authorised level. A special feature of the cooperatives is that there is a biologist or technician employed at each of the 9 cooperatives to assist with data collection and to provide advice and assistance to the cooperative, to the Federation and to government agencies.

Status of the stock

In the 1970s and 1980s the total catches of *P. interruptus* from the Pacific coast of Mexico was around 1300 t, except for the period 1980-1982, when a peak in catches occurred. Catches of individual cooperatives vary considerably (data are available but not illustrated here), but the total is relatively stable across the whole area. Moreover, the catches do vary with lobster availability and oceanographic conditions. Catches during the 2000/2001 season in most cooperatives were at the highest level ever recorded.

Catches by commercial fishers in Mexico and the US have been monitored for long periods and usable data on catches and the number of traps are available since 1928 for Mexico, and since 1916 for the US. Catches over 14 years available at the time of the assessment are shown in Figure 2.

The Mexican government regulations established a management goal to consolidate the sustainability of this fishery by optimising its regulatory mechanisms. These mechanisms include: reviewing and adjusting periodically the seasonal scheme by zone and species; constantly monitoring and modifying the restrictions on fishing gear (traps, escape windows, etc.); and increased surveillance to prevent illegal fishing. With these mechanisms, it is expected that the fishery will see an increase in recruitment and consequent production without an increase in fishing effort. The dynamic management model used to monitor this fishery has reference points to maintain biomass of the stock at levels above 50% B_0 (above half of its original condition). This model provides alternative management strategies that depend on the state of the stock of the fishery, including levels of uncertainty and climate variability (Vega et al. 2000).

Why MSC certification was sought?

In early 2000 the staff of Comunidad y Biodiversidad (COBI) became aware of the existence of the MSC program and decided to promote fisheries certification of small-scale fisheries in Mexico as a strategy to make new social and economic incentives available to the best managed fisheries in the country. A rapid participatory survey of all fisheries in Mexico's northwest was conducted to select the best fishery to start the certification process. This survey followed ecological, economic, social political and feasibility criteria, and used a multi-criteria analysis to find the best solution (COBI 2000). The candidate fishery selected was the Baja California lobster fishery in the central area of the Peninsula.

As the FEDECOOP was one of the participants in the rapid survey, the idea of pursuing certification was analysed in detail by all the membership, and it was decided to enter into pre-assessment immediately. Their reasons to pursue certification were threefold:

- Certification was considered to be an important tool to maintain global competitiveness and to negotiate for governmental support. The Western Australian rock lobster fishery had achieved MSC certification in 2000, and the cooperatives decided to have the same certification to compete in the market of certified lobster products.
- Perhaps more strategically important, being certified would give the FEDECOOP and the cooperatives an international recognition of their good stewardship, and allow them to exert more political pressure to lobby for more support to maintain the high levels of management being used in the fishery.
- Finally, some cooperatives saw a competitive advantage in being certified, allowing exploration of new markets in Europe and the US. Price premium was not an important consideration (discussed further below).

The MSC assessment

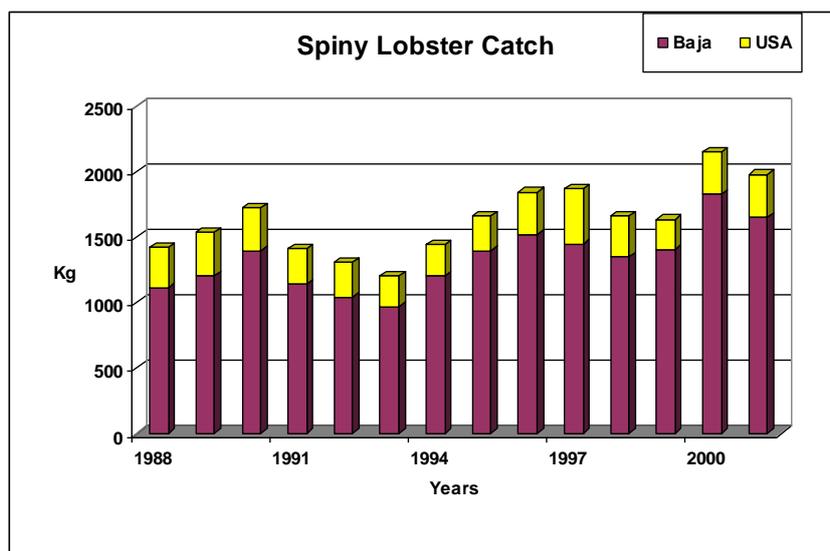


Figure 2. Commercial catches of the spiny lobster *Panulirus interruptus* in Baja California, Mexico and in California, USA.

The Baja California Lobster fishery was assessed by the US-based certification body Scientific Certification Systems (SCS), and certified in April 2004. The fishery assessment was conducted by SCS following all MSC-required processes and protocols (see http://www.msc.org/html/content_465.htm for details) to determine if the fishery complied with the MSC standard. The assessment process was spread over about 18 months, because it was difficult to get access to all the relevant and important information on the fishery that was held in the government, academic, and industry sources. The assessment process itself involved:

- An expert team of 4 people, all Ph.D. scientists with more than a decade each of fisheries experience;
- Development and dissemination of performance measures for fishery and public comment;
- Public and stakeholder comment on fishery management;
- Public and Peer review of draft report and certification recommendations.

The certification body, in finding that the fishery did comply with the MSC standard, set a number of conditions, including:

- The requirement to conduct a review of ecological risks in the fishery, such as an ecological risk assessment;
- The requirement to provide a strategic research plan that shows how the research for the fishery is planned and conducted over the short term and long term.

There are many indicators that show the Baja California lobster fishery is a strongly managed and sustainable fishery. Many of these points come from the fact that this is a small fishery where the fishers in the cooperatives can, on their own, develop and enforce management of the resource and the fishing grounds. The fishers mostly use small 2-3 m fishing boats and set and pull the traps by hand (Figure 3, Figure 4). Legislative/regulatory changes are developed after a public discussion process with all stakeholders and only

then are any such changes recommended to government with the support of the community.

The fishery and the market for products since certification

The fishery has maintained its performance level since certification, and has successfully completed two annual audits to maintain its MSC certification status. The price of the products has remained stable, with no premium price reported, and sales have behaved in a similar fashion to those before certification. The price stability is explained by the fact that Baja California lobster captured by FEDECOOP affiliated cooperatives already had secured very high prices before certification, because it is sold live to Asian markets in Hong Kong and Taiwan. Cooperatives were not as interested in a price premium as they were in opportunities for diversifying their markets. Since Asian markets are not greatly interested in certified lobster, it is not sold as certified product, and therefore MSC certification did not provide any additional commercial value within their current marketing strategy. The high demand for live lobster in Asian markets during Chinese New Year and other festivities make it possible for the majority of the anticipated lobster production to be pre-sold, sometimes months before it is caught.

After the certification was achieved, the FEDECOOP marketing department in collaboration with COBI, WWF and MSC staff worked to open new marketing opportunities in the US, Mexico and in Europe, in markets that are more interested in the certified product. Although there was a lot of interest in all of these markets, including from Slow Food members, no purchase arrangements materialised. The main constraints were:

- not enough production that could be made available to new buyers;

- price too high for new buyers, because their interest was mostly in product forms other than live lobsters (such as frozen tails);
- a desire only to purchase small volumes of product, making it uneconomical to divert production destined for Asian buyers;
- logistics for distribution channels for retail sales were not available at FEDECOOP, resulting in increasing distribution costs and either increased sales price or diminished returns.

Even though MSC certification was not able to either change or modify the current markets, it was very useful to the FEDECOOP and the cooperatives to lobby the Mexican government authorities for increased support. The argument they used was that in order to maintain the management performance needed for continued MSC certification the cooperatives needed to receive at least

requests of FEDECOOP on behalf of affiliated cooperatives since the fishery was certified in 2004. Several pending community development and fisheries projects were approved after that date, including bringing electricity to all coastal communities, modernisation of processing plants, the construction of new holding facilities for live lobsters in Ensenada owned by FEDECOOP, and modernisation of fishing equipment. This support has exceeded US\$21.2 million dollars (Ramade y García 2005).

Benefits to the community and the environment

The main changes that the fishery has experienced since certification relate to the increased support by government entities to the cooperatives and associated communities. So far there have been two types of advantages. The first involves achieving a better image



Figure 3. Baja California spiny lobster fishing boat.

the same level of support from the government. As it was explained, the performance levels are in great part due to the exemplary stewardship and the strict property rights arrangements these cooperatives have implemented. However, they need the continued support from authorities to control illegal fishing from poachers (fishers that do not belong to the cooperatives), to authorise the fishing quotas for lobster and other marine resources and the research needed for ongoing management decisions, to provide for the renewal of fishing concessions, and to provide economic support for community services and improved lobster processing for increased marketing opportunities.

A direct result of the MSC certification is that government is paying more attention to the demands and

and reputation within the country and internationally (Agnew et al. 2006). The fisheries social and community characteristics makes this international recognition for the current co-management arrangement an incentive for producers and fishing authorities to strive to continually improve the management. As the first fishery in México and Latin America to obtain MSC certification, and as a small-scale fishery, the social organisations (the cooperatives) have secured enhanced political empowerment for their negotiations, both with fishing and environmental authorities (Agnew et al. 2006). FEDECOOP is the only organisation of regional representation to hold a position in the influential Technical Advisory Committee of the CONAPESCA. The fishery has also received acknowledgement both from government authorities as well as from the civil

society, especially from non-governmental organisations devoted to preserving the environment, strengthening the producer's organisational culture, as well as preserving the fishery resources. The certification carries a lot of weight in justifying the re-issuing of fishing concessions to keep exclusive access to the lobster grounds for two more decades to the cooperatives, because it recognises the good handling and care provided during the period assigned for its commercial exploitation.



Figure 4. Baja California spiny lobster Fisher.

In the political and financial arena, the certification has strengthened the political management capacity of the cooperatives and FEDECOOP by allowing them to demand government support in order to compete in similar circumstances with the rest of the fisheries worldwide. This has translated in the fulfilment of long-held demands for electricity services for the fishing communities, the beginning of an access rural road improvements program, and a strong burst of federal support toward the fishery organisation in the form of projects to improve the infrastructure of processing plants, docks, dredging of navigation channels and fleet modernisation.

Some reflections on the certification

MSC certification of the fishery has produced mixed results. Very positive outcomes were related to the improved social recognition for the hard work and professional management that the cooperatives and FEDECOOP built over more than 60 years to manage this and other fisheries in a sustainable fashion. Their stewardship over the fishing resources vested in their responsibility inside their fishing concession is demonstrated by the MSC certification achieved, and by

the profitability of their fisheries amidst the problems that other cooperatives in Mexico are facing. Nevertheless, several aspects could have been improved in the process. One important matter was that more involvement of the membership of the cooperatives would have been preferable because throughout the whole assessment process the certification team and COBI only dealt with the administration boards and the FEDECOOP officials. Those people in turn transferred little information on the details and the potential of certification to their constituencies. As a result fishers knew this was a good thing, but they knew little about what benefits they could expect. The celebration of the certification locally, in the fishing communities, was never undertaken, due to a lack of sponsorship, although there was a petition for this by the fishers. Even in these cooperatives that have good organisation and representative boards, the flow of information could have been improved and stronger support from the fishers themselves would have been secured.

It is hard to evaluate how this reflected on the support for better commercialisation of the lobster products within new markets but the inability to commercialise certified lobster into the market was one of the most frustrating aspects of the process that followed the MSC certification. All groups involved, including the cooperatives and FEDECOOP initially considered that certification would make it easier to finalise purchasing agreements. But in reality, the current marketing system provides very good returns and this precluded the development of new markets. While there is a risk of over-dependency on Asian markets and their economy, the existing market synergy is hard to break without enough new clients and sufficient additional volume of certified product. Only in this situation will there be an opportunity for new markets to be developed that pay more for the certified product than for the non-certified lobsters. If there is no price increment, then there is no incentive to develop new markets, particularly when there is no capacity to provide them with certified product that is already selling well into established markets.

1.6 Ecolabelling governance

Ecolabels, ratings and buying guides for seafood are voluntary market-based incentive systems, and there is no overall global governance system in place to manage such systems or to provide frameworks leading to uniformity of structure, function or probity and accountability. There are several umbrella systems that have been designed to set the overall parameters for ecolabelling and certification systems more generally for a range of products and services outside seafood, which individual seafood certification programs may choose to be consistent with. But the more general umbrella systems provide only superficial overall structure with limited relevance to seafood and the specific issues of natural resource management.

The three main institutions contributing to governance structures for ecolabelling are ISO, GEN and ISEAL,

and in addition, the FAO has established a set of guidelines directly relevant to seafood ecolabelling.

The International Organization for Standardization (ISO) is the largest standard setting body and its technical committee (TC 207) has helped to develop principles and environmental standards (the so-called 14 000 series – or revised as the 14 020 environmental management series; ISO 1998). However, there has been some criticism that ‘in the design of some schemes either governments, some sectors of the industry or environmental interest groups have not had the opportunity to express their interests’ (FAO 1998, Deere 1999). It is worth noting that the standards are largely process oriented and do not provide individual performance measures against which environmental changes could be estimated.

The International Social and Environmental Accreditation and Labelling Alliance (ISEAL) and the Global Ecolabelling Network (GEN) are representative institutions, similar to industry associations, for the main private sector labeling organizations. They develop policies and frameworks of interest to their members on the various aspects of ecolabelling, and maintain a communications network amongst the various private sector entities. For example, ISEAL has recently completed an analysis of the likely effectiveness of evaluation systems used to assess the effect of certification, and has proposed an ISEAL approach to this notoriously difficult problem (Hassell 2005).

These various governance systems discussed above provide only limited specific guidance for the development and implementation of seafood ecolabelling systems. Therefore, seafood ecolabels, ratings and guides are probably best considered as creatures of the marketplace, where the various pressures of stakeholders, governments, the industry and consumers are interpreted into functional ecolabelling systems. However, without any clear form of strict global governance that may reassure consumers of a consistency of approach and outcomes, the success or failure of any specific ecolabel program will be determined by the ability of each program to create benefits for seafood producers, markets and, most importantly, for consumers. Although they may choose to adhere to various aspects of one or more of the general ecolabelling frameworks, this alone is unlikely to have a big impact on consumer acceptance of any specific ecolabelling program.

Adherence to the basic properties of one of the widely accepted frameworks (such as the ISO, ISEAL and FAO frameworks) will probably assist with acceptance of individual ecolabelling programs by governments and by the private sector, but this will confer only limited additional credibility in the eyes of consumers. In the final analysis, market acceptance and impact of an ecolabel program will probably determine the success of any specific ecolabelling program. Thus, consumers will have the final say in how such program should be

designed and implemented through the balancing forces applied in the marketplace.

Just as there is no overall global governance or framework system for seafood ecolabelling, there is little or no coordination or consistency of terminology and concepts amongst the various ecolabelling, rating or guide programs. For example, probably the most basic issue – sustainability – is not an agreed and well-defined concept and it is interpreted in many different ways by the various programs. This is compounded to a large extent by the different interpretations of sustainability by different cultures, countries and governments. This also leads to a more practical problem – even the basic concepts may be difficult to translate into other languages, reflecting different cultural perspectives. This diversity of interpretation of the basic concepts has created the situation where the product endorsements of some programs have a different meaning from very similar endorsements applied in other programs. This may easily confuse consumers, and ultimately degrade the value of the product endorsement system through lack of acceptance of the truth of the claims about products (see below). In recognition of this problem, the MSC is engaged in public discussion and input to the definition of a ‘sustainable fishery’ through its Quality and Consistency Project.

Owners of ecolabel programs each have a responsibility to design, develop and maintain a program that has sufficient credibility and resourcing to be self sustaining. For this to occur, the programs must have independent sources of funding and staffing resources to underpin their governance systems, or to have a resourcing support system related to sales of seafood products, or be linked to organizations prepared to fund ecolabelling programs for the purpose of improving the sustainability of fisheries and aquaculture operations.

A comprehensive and effective ecolabelling program addressing sustainability issues in aquaculture and wild-capture fisheries should be accountable and include at least these basic elements:

- a clearly defined scope and set of rules, practices and operational interpretations for the conduct of the assessment and certification process;
- a clearly defined and public sustainability standard against which the fishery or aquaculture venture is assessed against, including both the parameters and a measurable benchmark level encoded into the standard;
- a consultation standard for the involvement of stakeholders and public reporting of the processes and procedures used by the certifier to assess and determine compliance with the sustainability standard;
- a clear and well-defined process for determining the security of the chain of custody of the certified and labeled product;
- a clear and well-defined process for public reporting on the accountability of the certifier and the assessment process, and the accreditation/verification of certifiers;

- indicative estimates about the likely costs of certification, including the preparatory processes, the compliance assessments and maintenance costs;
- procedures to ensure consistency with international, national and community standards and legal requirements; and
- procedures to account for illegal, unreported and unregulated (IUU) fishing and other illegal activities that may affect achievement of sustainability as expressed in the standard.

One of the most pervasive and intractable governance issues relates to the matter of state versus non-state control of seafood ecolabelling systems. When governments apply marketing controls and set the rules within which private sector systems must operate, then they usually do so to reflect the best interest of the nation concerned. However, where systems are established that transcend national boundaries and create rules that have no direct parallels within national or international jurisdictions, concerns may arise about the motives behind such systems and the potential lack of accountability created by such private transnational control and management of natural resources (Constance y Bonanno 1999, Gulbrandsen 2006). This set of concerns relates to the motives behind the ‘gatekeeper’ – the controller of the markets and the health of the related seafood and the ecosystems.

Sustainability standards

Behind the program and the right for the product to carry an ecolabel, is the concept that the rating and guide systems have determined that ecological sustainability is being achieved by the fishery. If a product is assessed as achieving the desired standard of performance, it will be permitted to carry the label (in the case of an ecolabelling program), rated as a good choice for environmentally aware consumers, or given a ‘buy with confidence’ recommendation in a guide program. If the product meets, or closely approaches, the standard, it may be given a conditional approval to carry the label or be given a ‘buy with caution’ recommendation, and be required to carry out remedial actions within a specified timeframe to rectify any ecological issues that are determined to be important but non-critical. All decisions about whether a product meets or approaches the sustainability standard depend on two key attributes of the program concerned: first, the form and content of the sustainability standard and second, the way in which compliance of a product with the standard is assessed and verified.

In addition to the matters covered in the standard, the level of performance of achievement can vary between programs. So for example, the MSC program permits the bycatch of protected species, provided these are assessed as being of an acceptably low in number or impact and leading to minimal ecological effects on the population (Ward 2003). However, other programs use a different approach to the problem of unintended catch of protected species. For example, the Blue Ocean Institute program (blueocean.org/Seafood) specifies that a fishery bycatch

should not ‘regularly include a threatened, endangered or protected species’ and if it does, then the fishery is highly penalized within the scoring system. Both systems assign scores, but the MSC system assigns a score on the ecological impact of the bycatch, whereas the Blue Ocean system assigns a score simply based on whether any such species are caught in the fishery.

The way in which compliance with the sustainability standard is assessed also varies widely across ecolabelling programs. The MSC program requires third-party independent assessment of compliance, carried out by an accredited certification company. In direct contrast, other programs promote less rigorous assessment of sustainability and a product endorsement may be secured without an external evaluation or compliance assessment.

Irrespective of how a program determines its sustainability standard or verifies compliance, for the market that it expects to influence, each program must seek to achieve a balance between these three key factors within the structure and content of their sustainability standard and assessment process:

- market appeal to consumers to drive their preferential purchases (although such appeal must be credible, easily recognizable and robust);
- a credible, rigorous and high-level sustainability standard that can be verified and demonstrated (although few fisheries or aquaculture ventures can meet a
- very high level standard); and
- a low-cost system for assessment and verification of compliance with the standard (to promote the extent of uptake of the voluntary label to drive the improvements in environmental performance sought by the program).

Despite the different standards applied, and the various forms of governance, a recent analysis comparing the seafood recommendations of a broad range of institutions found that there was a large measure of agreement between the many types of labels and recommendations (A Consensus Seafood Guide Developed by Michelle Armsby and Cathy A. Roheim 2009 the URI report <https://www.intrafish.no/global/news/article> 241265). So to a large extent, it seems that the same outcome (a recommendation to purchase) can be achieved from a wide range of institutions, including some that deliver ecolabels for a very low price (such as Friend of the Sea). To this extent, it is therefore not clear why producers would seek the expensive MSC ecolabelling in preference to very cost-effective alternatives. Of course, the sustainability standards may well be very different, but this is usually not evident to consumers/purchasers and the distinction probably has little impact in the retail marketplace.

Uptake by business

In 2006 and 2007, the MSC certification and ecolabelling program has been recognized, after a decade

of efforts, as finally reaching (and possibly passing over) the ‘tipping point’. This refers to the point where the market demand for ecolabelled seafood product is great enough to convince enough producers and resellers to join the program, and the inertia of securing enough ecolabelled products to offer to consumers has been simultaneously overcome. Key to achieving this is the acceptance by major markets and business sectors of both the concept of seafood ecolabelling and certification as well as the competitive value of having such product lines available for consumers. Apart from the progressive entrance of major European players (such as Tesco, Sainsbury’s and Ahold), the major change in the business environment has been the commitment by Wal-Mart in the US to purchase certified and ecolabelled seafood. With this came a following raft of resellers and supplier commitments to certify and ecolabel seafood in the race to ensure market parity or even advantage.

With the very rapid rise in reseller acceptance of certified and ecolabelled seafood in the last 2 years comes the need to find enough product to supply the demand. In the short term, the limited supply may create a shortage-driven price increment favoring the existing producers, but with much less than 10% of the world’s wild caught fish likely to be certified in the short term, this will generate a marketplace response that may be counterproductive in the medium term. The pattern in other sectors indicates that there will be a rapid growth in competing products that may claim to have environmental friendliness (to capitalize on the widespread occurrence of certified product), a growth in new forms of certification and ecolabelling and a growth in reseller–producer bilateral relationships (to maximize profit and returns). Some of this will be positive, but there are aspects of competition, such as the use of weak sustainability standards, that will be likely to be counterproductive to both certification programs and ocean ecosystems. Existing producers and certification programs will be under intense pressure to rapidly increase the supply of certified seafood to match the demand and avoid the possible adverse impacts, without weakening standards. Amongst other issues, this implies that there will need to be a rapid change in fishery management practices to encourage many more fisheries to meet sustainability standards that would permit them to be certified – a barrier that many fisheries managers will find hard to surmount.

The authoritative chapters we have assembled in the book by Ward and Phillips (2008) provide considerable coverage of the contemporary issues, the principles and the practice as a point of entry for the interested consumer, fishery or aquaculture professional or student into the unique field of seafood certification and ecolabelling.

References

- Agnew D, Grieve C, Orr P, Parkes G and Barker N (2006) Environmental Benefits Resulting from Certification Against
- MSC’s Principles and Criteria for Sustainable Fishing. Marine Stewardship Council, London.
- Armsby M and Roheim CA (2009) A consensus seafood guide, <https://www.intrafish.no/global/news/article> 241265
- Ayala Y, González-Avilés JG and Espinoza-Castro G (1988) Biología y pesca de langosta en el Pacífico Mexicano. In: Los Recursos Pesqueros del País, pp. 251-286. Secretaría de Pesca, México.
- Botsford L (2003) (ed. by B. Phillips, T. Ward and C. Chaffee), pp. 36–40. Ecolabelling in Fisheries: What Is It All About?. Blackwell Science, Oxford.
- Chaffee C (2003) The process of certification (ed. by B. Phillips, T. Ward and C. Chaffee), pp. 34-35. Ecolabelling in Fisheries: What Is It All About? Blackwell Science, Oxford.
- Chaffee C, Leadbitter D and Aalders E (2003) Seafood evaluation, certification and consumer information (ed. B. Phillips, T. Ward and C. Chaffee), pp. 4-13. Ecolabelling in Fisheries: What Is It All About?. Blackwell Science, Oxford.
- COBI 2000 (Comunidad y Biodiversidad, A.C.) Community-Based Sustainable Fisheries in Baja California: A Pre-investment Analysis to Start a Fisheries Certification Program. Final Report submitted to World Wildlife Fund-US, Endangered Seas Campaign, Community Fisheries Program and World Wildlife Fund-México, Gulf of California Program in Fulfilment of Grants LM98 and SO42. Available at COBI <http://www.cobi.org.mx/>.
- Constance DH and Bonanno A (1999) Contested terrain of the global fisheries: ‘Dolphin-safe’ tuna, the Panama Declaration, and the Marine Stewardship Council. *Rural Sociology*, 64, 597–623.
- Deere C (1999) Ecolabelling and Sustainable Fisheries. IUCN – The World Conservation Union and the Food and Agriculture Organization of the United Nations (FAO), Washington and Rome.
- FAO (1998) Report of the technical consultation on the feasibility of developing nondiscriminatory technical guidelines for ecolabelling of products from marine capture fisheries, pp. 29. FAO Fisheries Report 594, Rome, Italy.
- Gulbrandsen LH (2006) Creating markets for eco-labelling: are consumers insignificant? *International Journal of Consumer Studies*, 30, 477–489.
- Hassell J (2005) A review of existing certification impact evaluation methodologies. A report of the ISEAL Alliance R049 Public Report. Available at: <https://www.gtz.de/de/dokumente/en-impact-evaluation-methodologies.pdf> [accessed on 19 February 2008].
- ISO (1998) Environmental labels and declarations – general principles. ISO 14020. International Organization for Standardization, Geneva.
- Janen U (2007) Global Environmental Governance –The Case of the Marine Stewardship Council, Master Thesis. M.Sc. Business, Language, Culture, Business and Development

- Studies, Department of Intercultural Communication and Management, Copenhagen Business School, Denmark.
- May B, Leadbitter D, Sutton M and Weber M (2003) The Marine Stewardship Council (MSC) background, rationale and challenges. (ed. By B. Phillips, T. Ward and C. Chaffee), pp. 14–33. *Ecolabelling in Fisheries: What Is It All About?*. Blackwell Science, Oxford.
- Muller E (2002) Environmental Labelling, Innovation and the Toolbox of Environmental Policy, Lessons Learned from the German Blue Angel Program, pp. 38. Federation of German Consumer Organisations, Berlin, Germany. Available at: <http://www.blauerengel.de/downloads/EDDA-Mueller-Papier.pdf> [accessed on 19 February 2008].
- O'Rourke D (2006) Multi-stakeholder regulation: privatizing or socializing global labour standards? *World Development*, 34, 899–918.
- Phillips B (2003) Management systems (ed. By B. Phillips, T. Ward and C. Chaffee), pp. 57-62. *Ecolabelling in Fisheries: What Is It All About?*. Blackwell Science, Oxford.
- Ramade M and García R (2005) A report on market characteristics of the Baja California spiny lobster (*Panulirus interruptus*). Fisheries and Commercialization Departments, Federación Regional de Sociedades Cooperativas de la Industria Pesquera Baja California, F.C.L. (FEDECOOP).
- Rotherham T (2005) The Trade and Environmental Effects of Ecolabels: Assessment and Response. Geneva:United Nations Environment Program (UNEP). Available at: <http://www.unep.ch/etb/publications/Ecolabelpap141005f.pdf> [accessed on 28 February 2008].
- Steinberg PE (1999) Fish or Foul: Investigating the Politics of the Marine Stewardship Council. *Marine Environmental Politics in the 21st Century*, Conference Papers. Available at: globetrotter.berkeley.edu/macarthur/marine/papers/steinberg-1.html [accessed on 19 February 2008].
- Sutton M and Wimpee L. (2008) Towards Sustainable Seafood: The evolution of a conservation movement. In: *Seafood Ecolabelling Principles and Practice*, ed Trevor Ward and Bruce Phillips, 403-415. Oxford: Wiley Blackwell
- Vega VA, Espinoza CG y Gómez RC (1996) Pesquería de la langosta (*Panulirus* spp.). In: *Estudio del Potencial Pesquero y Acuícola de Baja California Sur*. Vol. II. (ed. V.M. Casas and G. Ponce), pp. 227-261. SEMARNAP, Gobierno del Estado de Baja California Sur, FAO, UABCS, CIBNOR, CICIMAR, Inst. Nal. de la Pesca y CETMAR.
- Vega VA, Espinoza CG, Gómez RC y Sierra RP (2000) Estado actual de la Pesquería de langosta de la península de Baja California California. Capítulo de libro "Sustentabilidad y Pesca Responsable en México: Evaluación y manejo 1997-1998" (ed. P.F. Fuentes y A. Díaz de León). Instituto Nacional de la Pesca. SEMARNAP, México.
- Vega VA y DB Lluch C. (1992) Análisis de las fluctuaciones en los volúmenes de langostas (*Panulirus* spp.), del litoral oeste de la Península de Baja California, en relación con el desarrollo histórico de la pesquería y la variabilidad del marco ambiental. En-. Guzmán del Prío (Ed.). Mem. Taller Intern. México-Australia sobre reclutamiento de recursos marinos bentónicos de Baja California 191-212.
- Ward TJ (2003) Effects of fishing on the ecosystem (ed. by B. Phillips, T. Ward and C. Chaffee), pp. 41-56. *Ecolabelling in Fisheries: What Is It All About?*. Blackwell Science, Oxford.
- Ward TJ and Phillips BF (2008) Ecolabelling of seafood: the basic concepts. In: *Seafood Ecolabelling Principles and Practice* (ed. T. Ward and B. Phillips), pp. 1-37. Wiley Blackwell, Oxford.
- Wessells CR, Cochrane K, Deere C, Wallis P and Willmann R (2001) Report of the technical consultation on the product certification and ecolabelling for fisheries sustainability, pp. 83 *FAO Fisheries Report 422*, Rome, Italy.