Chapter 9
Southern Bluefin Tuna: A Contested History

Sid Adams

Abstract Southern Bluefin Tuna (SBT) is a threatened species of tuna. Harvested from the early 1950s the fishery provides an interesting case study of the interplay of technology and science. On the one hand, fishing effort has expanded on the resource. This has resulted in the significant reduction in the size of the stock. Indeed, by the early 1980s scientists were warning that the reduction in stock size had reached dangerously low levels. Paradoxically the stock's demise has occurred alongside a growing body of scientific research into the fishery. Indeed, the fishery remains one of the most researched fisheries in the world today. There has also been a regional fishing organization (RFO) created to achieve a more sustainable level of harvest between the fishing nations. By 2012 both initiatives have however not produced a significant improvement in the stock's biomass. Indeed, agreeing on a sustainable quota level has been at the centre of significant and abiding tensions between the parties. This chapter thus seeks to explain this conundrum. It will argue that the institutional setting of the fishing parties involved in the fishery is critical to understanding the tensions that have underpinned international management of the stock, the dispute over science and in explaining the precarious condition of the fishery today.

Keywords Southern Bluefin Tuna · Japanese tuna fishing · Australian tuna fishing · CCSBT history · IUU history

Southern Bluefin Tuna (SBT; *Thunnus maccoyii*) is a highly migratory stock that swim the waters of the Atlantic, Indian and western Pacific Oceans. Spawning in the region south of Java off Christmas Island, offspring migrate south, through the waters of Western Australia, before entering the Great Australian Bight. From here the fish either swim east across the Great Southern Ocean as far as New Zealand's territorial waters or west across the Indian Ocean, to Africa and the Atlantic Ocean. Figure 9.1 provides an overview of the stocks migratory pattern. Scientists have categorized the growth and maturity of the stock into two phases, a juvenile and adult stage; fish reach sexual maturity between 8 and 15 years, and live up to 40 years of age (Caton 1991; CCSBT 2011; Clean Seas 2011). Historically Australian fishermen have targeted juvenile fish in near-shore waters. As juveniles the fish swim at shallower depths and in

S. Adams (✉)
Asia Research Centre, Murdoch University, 90 South Street,
6150, Murdoch, WA, Australia
e-mail: s.adams@murdoch.edu.au

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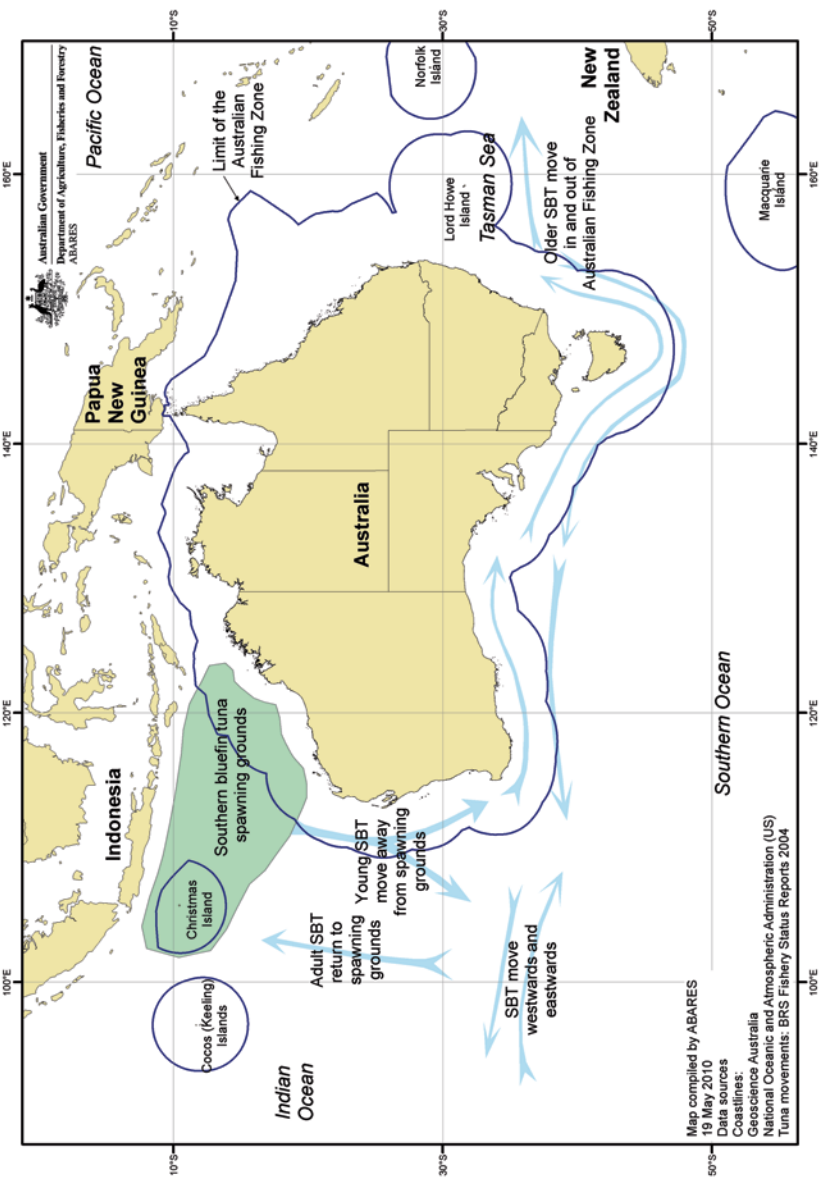

Fig. 9.1 Migratory movements of Southern Bluefin Tuna. (Courtesy ABARES)

larger schools before entering the high seas at between 3 and 4 years of age, while the majority of the adult stock is found in more remote offshore locations (Caton 1994).

The fishery has also attracted a diverse mix of fishing fleets both within Australia and across Asia (Hayes 1997). The Japanese were a pioneer in the harvesting of the resource. Beginning in the early 1950s, the fishing industry working in partnership with the Japanese government mapped the stock's distribution, discovered prized fishing grounds, and began to harvest the resource throughout the Indian and Great Southern Oceans through the development of a large scale distant water fleet targeting the stock with specialized longline vessels. An Australian SBT sector also developed during the 1950s. The Australian fleet concentrated on inshore catches, using a variety of surface gears to target the stock (Caton 1994). Despite these differences, both sectors did, however, rapidly expand their catch effort from the early 1950s. Indeed, evidence of overfishing soon became apparent, with declining hook rates in the Japanese catch by the early 1970s (Hayes 1997).

However, sustained fishing effort continued beyond the early 1970s. Fleets from New Zealand, Taiwan and Indonesia began targeting the stock from the 1970s and 1980s with South Korea emerging as an important player in the fishery by the early 1990s. More recently vessels from the Philippines, South Africa and the European Union have also begun to target the resource (CCSBT n.d.b). SBT has thus emerged as a genuinely international fishery that supports a range of international fleets. This reflects the prized commercial standing of the stock. SBT is one of the most lucrative commercial fisheries in the world today, able to attract premium prices as both fresh and frozen product on the sashimi market in Japan (Owen and Troedson 1993). Concerns that stock numbers are at dangerously low levels have, however, remained. Indeed, scientific estimates in 2009 and 2010 projected that the size of the stock was 5% or less (range 3–8%) of its virgin biomass (CCSBT Extended Scientific Committee 2009/2010).

The commercial and biological imperatives in the fishery are thus at the centre of management tensions in the fishery. Without question, fleet over-capitalization and illegal, unregulated and unreported (IUU) fishing effort has been central to the stock's demise. Technology has also been important in explaining the decline in stock numbers. The capacity to map and locate the stock, the vast distances and remote locations in which the fish are caught and brought to market and indeed the capacity to catch greater numbers of fish in often remote and inhospitable regions could not have been achieved without significant technological capability.

From today's perspective, however, the continued vulnerability of the stock requires explanation. During the early 1980s international efforts began with the purpose to move the fishery onto a more sustainable footing. Australia, Japan and New Zealand began informal tripartite negotiations in 1982 (Neave 1995). This resulted in significant restrictions on the catch during the 1980s.[1] By 1994 this more

[1] In 1983 Australia, Japan and New Zealand agree to a quotas of 21,000 t, 29,000 t and 1,000 t respectively. In 1985, Japan agree to further decrease its catch to 23,150 t. In 1988, major restrictions were introduced. A ceiling of 15,500 t was set for the fishery with 6.250 t to Australia, 8.800 t to Japan and 450 t to New Zealand. Global quotas were once again reduced in 1989. In that year global quota was set st 11.750–5,265 t (Australia) 6065 t (Japan) and New Zealand 420 t (Neave 1995).

informal arrangement evolved into the Commission for the Conservation of CCSBT (CCSBT) where the parties have continued to meet annually to decide quota levels between Commission members (Hayes 1997).

The critical question, then, is not the cause of stock decline, but why the stock continues to be in such a precarious condition after 30 years plus of international negotiations? More puzzling still is the situation wherein agreeing to sustainable quota levels has been at the centre of considerable conflict since the beginning of trilateral discussions. Failure to agree on quota levels has seen Japanese fishing vessels banned from accessing the Australian Fishing Zone (AFZ) and Australian ports. There have also been long periods of stalemate in the CCSBT where Commission members have been unable to agree on a Total Allowable Catch (TAC) with the dispute going outside the CCSBT in order arrive at a resolution between the parties. Revelations of illegal fishing by some Commission members further raises questions about the legitimacy of regulatory attempts amongst some CCSBT members. Clearly, this history requires explanation. Science, rather than the source of convergence around which management prescriptions proceed, is not only failing to arrest the stock's decline but critically has been at the centre of considerable conflict.

The Argument

It will be argued that the CCSBT is the intersection of actors who hold competing interests and agendas. Indeed, reduction in fish numbers has mobilized deeply conflicting priorities that have remained resolute on the international stage. The focus of the chapter will be on Japan and Australia. Both nations have historically been the main players harvesting the resource, and since the beginning of international negotiations the key interlocutors at both the trilateral and CCSBT meetings.

A first task then will be to account for the actors represented in the Australian and Japanese delegations. This will take us to consider the domestic contexts of the two protagonists in question as it is here the key players from both nations in the CCSBT have their origins. It will be suggested that while fishing policy is the purview of the state in both settings, management goals and priorities cannot be separated from the relationship between the state and key stakeholders in the development and formation of policy.

The relationship between the state and the fishing industry is, however, critical. Japan's position at the CCSBT reflects a corporatist alliance between the state and fishing industry while in Australia the national agenda (in direct contrast) has been forged independently of industry. Both positions reflect a distinct historical trajectory which will be explored in the next section of the chapter. Discussion of fishing technology will be central to this discussion. In response to the reduction in fish numbers technology has assumed a very different purpose and function within Australia and Japan. It will be argued that this not only reflects the structural relationship between state and fishing industry in the policy debate but an institutional setting where management goals and priorities have achieved a consensus amongst participants.

This chapter is also concerned with international negotiations since the early 1980s. Important to this discussion will be a summary of the CCSBT and its main institutional features. The discussion includes an overview of the controversies that have been a feature of international negotiations. This will be followed by consideration of the scientific debate. Science has been at the centre of the tensions that has characterized international meetings since the early 1980s. Explaining these tensions reveals the intersection of the very different institutional environments described in the pages that follow. The dispute, in the view of this chapter, is thus seen as having political origins rather than representing a dispute that can be understood purely in technical terms. A final section will then consider some broader implications from this argument.

Japan

Japan's SBT fleet has its origins in the 1940s (Caton 1994). The fleet did not, however, rapidly expand until the early 1950s. By the late 1950s fishing grounds had been discovered in the offshore waters of New Zealand and as far west as South Africa (Caton 1991); by the late 1960s the geographical range of the catch extended from the South Pacific west to the centre of the South Atlantic Ocean (Fig. 9.2 shows a statistical breakdown of the key fishing locations that been established by this time). Not surprisingly, the volume of catch rapidly increased with the expansion in geographical range. From 562 t harvested in 1952, the catch rose to 22,908 t in 1957 with a peak catch of 77,927 t in 1961 (Caton 1991).

The expansion of the SBT fleet was part of a broader opening up of Japan's distant water sector. Indeed, the 1950s and 1960s was a golden period for Japan's distant water fleet. With the lifting of the Macarthur Lines imposed at the end of the Second World War (WWII), Japan's distant water sector spread throughout the world's oceans in search of new catches for its fleet. Journalist Michael Wigan captures the energy, drive and resolve of the fleet during this period when he states,

> Japan …is the name the world's fish fear. It is the country that has caught more fish in the twentieth century than any other in more places, with the keenest and most dynamic, some would say the most unscrupulous pugnacity. The Japanese state has looked to the world's oceans as a whole and set about harvesting them with a single mindedness which was unprecedented. (Wigan 1998)

This passage underscores that for many decades Japan was the world's premier fishing nation. Wigan's observation also highlights the critical role of the state in the development of the fleet. Whether in partnership with industry or assuming responsibility for the sector, state support was critical in providing the infrastructure for the expanding fleet. Government scientific research is a case in point. It was vital in the search and discovery of fishing grounds as the distant water fleet expanded its reach during the 1950s and 1960s (Borgstrom 1964). State support was also crucial in finding new and innovative solutions to the myriad of challenges

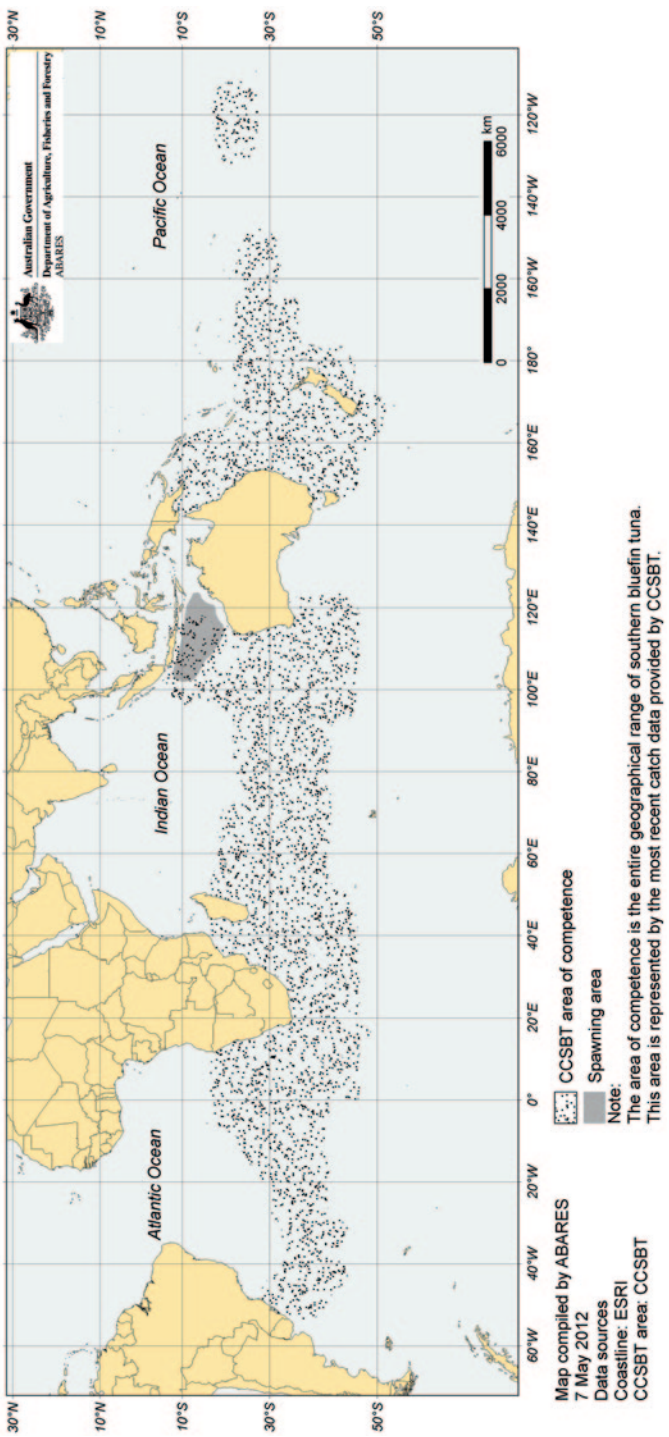

Fig. 9.2 Distribution Southern Bluefin Tuna. (Courtesy ABARES)

confronting industry[2] and was critical in providing technical solutions that would open up new markets and sources of income for industry. The development of ultra-low-temperature (ULT) freezing in the mid-1960s is a case in point. It allowed the reorientation of the SBT catch from canning markets to becoming a prime sashimi grade catch due to the longer storage time afforded to the catch without significant loss in the quality of the fish (Owen and Troedson 1993). Arguably the size and scale of Japanese fishing vessels was the most overt manifestation of the state's support of industry—Japanese fishing vessels were without peer in both size and sophistication in the two decades after WWII (Borgstrom 1964).

From the 1970s the activist role of the state in its SBT and its distant water fleet would continue. It would, however, take a somewhat different hue in response to the range of challenges confronting Japan's SBT fleet and more generally its distant water sector from this time. This included declining catch rates. In the SBT fishery global catch levels were contracting from a global peak of 81,750 t in 1961. Indeed during the 1970s and 1980s, the decline in catch levels was 50,000 and 45,000 t respectively, with reduction in catch effort continuing in subsequent decades (Caton 1991; CCSBT data 2011). This was in part a consequence of sustained fishing pressure on the resource. It was also, however, the consequence of the more complex international environment to which Japan was having to adjust from the mid-1970s (Bergin and Haward 1996). Indeed, the SBT fishery was indicative of Japan's distant water fleet where its fishing activities were becoming increasingly tied to rival coastal and distant water fleets resulting (as we saw) in formal reduction in catch effort from the early 1980s. There were, however, significant domestic challenges also confronting the sector from the early 1980s. These included rising labour and fuel costs and access fees to coastal waters all of which challenged the viability of the distant water tuna fleet from the early 1980s (Caton and Ward 1996). In response the state once again assumed responsibility for the sector. Critically, technology was to prove (once more) a central part of the government's response. A suite of government programs were implemented to address these challenges—subsidies to improve vessel design, subsidies to scrap and up-grade vessels, and subsidies to improve fuel efficiency (Owen and Troedson 1993). These initiatives combined to form part of a multifaceted response in support of its distant water fleet.[3]

The state has thus been a central player in the management and development of Japan's fishing fleet. Whether in periods of relative prosperity or decline, government played a dominant role in the management and development of policy for the industry. This is not to suggest that there was always harmony between government and industry in formulating policy; quite the contrary. However, in stark contrast

[2] This includes weather forecasting at sea, ability to detect surface and subsurface current fronts and thermoclines, strong thin longlines, snap-on hooks, fast line haulers, specialized rapid auctioning and sea and land fresh and frozen sashimi tuna supply chain.

[3] This includes payment of access fees to coastal waters, representation of industry interests at international meetings, and aid to coastal states. For a comprehensive discussion of these strategies see (Bergin and Haward 1996).

to Australia, commercial goals and priorities are assumed in the construction and development of policy.

In part this reflects the character of the business/government relations that have taken root in Japan. State management of its distant water fleet is emblematic of the guidance and strongly interventionist role of the state across the economy (Johnston 1982). Japan's pathway to economic modernity has fused commercial objectives into national plans, industry/government partnerships and critically state guidance of the economy (Johnston 1982). State support for the fishing industry thus needs to be understood within a context in which commercial aspirations, goals and objectives have been embedded in the state's regulatory structures and across political and economic life.

It would be somewhat misleading, however, to explain state involvement in the sector purely in these terms. Studies have revealed that across the sector government subsidies and programs to the distant water fleet far exceeded returns by industry during the 1980s (Owen and Troedson 1993). More puzzling still, there has been extensive collusion between state/industry officials in the SBT fishery, especially over the harbouring of illegal catch. This was revealed in 2006 where market research uncovered underreported catch levels of up to 178,000 t since the mid-1980s (Phillips et al. 2009). This, in turn, was the most dramatic expression of continuing resistance to reducing quota levels since the beginning of trilateral discussions in the early 1980s (see below). It also makes plain a political reality shaping Japan's national position. As the longevity of the stock appears at best a secondary concern and state support of industry has remained resolute long after the industry has remained profitable, it is clear that a viable commercial sector is not the main concern of policy. Rather, it is in essence the survival of the industry. Once again, an understanding of the past is important to appreciating this reality.

Since the Meiji Restoration of 1868, the agriculture and fishing industries have been important sectional interests, whose support was critical to achieving the political stability needed in order to attain rapid modernization of the Japanese economy (Johnston 1982). As a consequence both sectors have achieved strong representation in the decision making apparatus of the state. Indeed, in return for support from rural electorates, both sectors have been firmly entrenched in a strong corporatist alliance between the bureaucracy and industry (Barclay and Koh 2005). This has been a defining political reality that has shaped Japan's rapid economic development from 1868 and critically has endured (as we can see in the SBT fishery) to this day (Pempel and Tsunekawa 1979).

Shamed by the 2006 revelations, the Japanese delegation agreed to reduce its catch to 3,000 t from the previous level of 6,065 t in place between 2007 and 2011 (Findlay 2007). It remains doubtful whether this will see a long term substantive shift in fishing behaviour given the entrenched interests that construct national policy on this issue. Indeed, Japan's political economy will continue to caste a deep 'ecological shadow' over the SBT fishery. As we will see, the Australian context provides a significant contrast where the fishing fleet and technological development is secondary to a regulatory environment which places the protection of stock as the government's principle goal. It is to this issue that discussion will now turn.

Australia

The Australian SBT industry began in the early 1950s as a small inshore fishery, working off the coast of South Eastern Australia. In the 1950s two separate sectors emerged, off New South Wales (NSW), and South Australia (SA); in the late 1960s a third emerged in Western Australia (WA). Across all sectors, pole and line and purse seining (introduced in South Australia in the 1970s) have been the primary methods of harvest. Levels of production reached between 5,000 and 6,000 t in the NSW and SA sectors during the 1970s and 6,000 t in the WA fishery by the early 1980s (Caton 1994).

Despite more modest origins compared to its Japanese counterpart, the Australian industry had, to confront a significant crisis during the early 1980s. This was the result of the expansion in the number of operators across all sectors. The extent of the crisis was revealed in a Federal government inquiry published in 1984. It concluded that 45 vessels in the WA sector and 10 purse seiners (and a small number of pole boats) would more efficiently harvest the resource. This was a significant reduction from the 90 vessels in the WA sector and 35 vessels operating in the SA portion of the fishery at that time (IAC 1984). Declining incomes to operators were further exacerbated by a glut in domestic and international canning markets during these years (IAC 1984). Indeed, some 68% of the NSW and SA fishers and 89% of the WA fishers recorded significant financial losses during the early 1980s (Crough 1987).

The rising catch from the Australian industry was also causing growing scientific concern. While overall tonnage was significantly less than their Japanese counterparts, the expansion in catch effort by Australian operators was alleged to be preventing fish from reaching full maturity. Trilateral scientific meetings at this time concluded that 1 t of surface (Australian) catch had a commensurate impact of 2.25 t of longline catch on the parental biomass (Caton et al. 1990). These concerns appear to have been vindicated as by the 1980s there was a complete absence of SBT in NSW grounds with only small schools of fish being sighted in the early 1990s (Caton 1994).

The Australian SBT fishery was thus caught in a cycle of fleet overcapitalization and declining fish numbers; the fishery was beset by the 'Tragedy of the Commons'. In response to this crisis, there was a shift in management responsibility from the States to the Federal government and a management plan was implemented in October 1984. This would reveal a very different management environment than its Japanese counterpart, one which placed protection of the stock at the centre of its management priorities.

Central in driving this agenda forward was the Australian Federal Government. It was the architect of the 1984 management plan, which had a dramatic impact on the size of the fleet. By 1987 fishing capacity had been reduced by 50% (Wesney 1989). This reflected in part the significantly reduced quota level imposed on the sector at the start of the plan. In that year the quota ceiling was set at 14,500 t (Hayes 1997). However, for the WA and NSW sectors continued involvement in the fishery became highly problematic. Continuation in the fishery was now governed by Individual Transferable Quotas (ITQs). This property entitlement allowed operators

to purchase a proportion of the TAC set by government. Small quota allocations to WA and NSW operators at the start of the plan, however, repositioned the fishery strongly in favour of the SA sector as the limited quota share made their long term involvement uneconomic. A significant transfer of wealth occurred from the WA and NSW sectors as quota entitlements were sold to the SA operators. Indeed, by the late 1980s the WA and NSW sectors had closed and the fishery centered on Port Lincoln in SA (Green and Nayer 1989).

The downsizing of fleet was just the first stage of a significant restructure confronting the sector. At issue was a drastic realignment of the fleet as industry confronted a radically new fishing environment by the late 1980s. Once again, the Australian government's response was in marked contrast to its Japanese counterpart.

The catalyst was the reduction in 'global quota' brokered in that year resulting in a reduction of 54% in the Australian quota from 11,500 t in 1988 to 5,265 t in 1989 (Neave 1995). This threw Australian industry into turmoil–'forcing' the industry to fish exclusively for the sashimi market in order to maximize returns. In theory, fishing for the Japanese sashimi market offered a more attractive and viable economic alternative to selling fish on the domestic canning market. As a premium high value market, financial returns were many multiples of traditional canning markets.[4] However, while some early attempts to fish for this market had been made it was still very much at a trial-and-error stage (Caton 1994). Targeting the sashimi market required extensive, hard-to-win knowledge of new fishing grounds, new fishing techniques and marketing knowledge and relationships to suit the nuances and peculiarities of this high value market. Large capital investments would also be needed to purchase new fishing vessels and/or to make current vessels more seaworthy in order to target the larger fish that swim in the deeper offshore waters. Training and experience in tuna longlining was also needed as local skills and experience in this fishery were not available at this time.

The conversion to high value SBT longline fishing would thus require time and much experimentation. Realistically, it would take a number of years to make these adjustments. The SA industry was in no position, however, to adopt this path, having incurred significant debt, the result in part of heavy borrowing to purchase quota from WA and NSW (Crough 1987). Instead, operators turned to skipjack fishing in the South Pacific in order to generate vitally needed income. This proved a disaster. The Australian industry could not compete with the highly subsidized tuna fleets of Japan, South Korea and USA, who could fish at a significantly lower cost base. With the failure of this initiative, a significant proportion of the SA tuna industry went into receivership in 1992 (TBOA 1996).

The road to high value fishing was thus proving to be a perilous journey for the Australian industry. The Australian SBT industry had undergone radical change as a consequence of Federal government management of the fishery. In part this reflected (as previously mentioned) Federal government policy in the fishery. However, the capacity to rapidly implement this change during these years requires explanation.

[4] Prices for SBT for canning reached A$1,200/mt, while for sashimi market prices reached A$ 30,000/mt (Franklin 1988).

As community backlash gained momentum over proposed changes to water access in the Murray Darling Basin or powerful interests challenge climate change policy within Australia, compromise and even reversal of government policy in these areas seemed almost to be inevitable, but this did not occur in the tuna fishery. Indeed Brian Jeffries, the elected President of the Tuna Boat Owners Association (TBOA), recognized that the extent of industry restructuring was without parallel in the Australian economy when he stated in 1992:

> It is hard to imagine any industry that has been through greater upheaval than the SBT industry. For example, secondary industries such as motor vehicles and textiles, and footwear have been allowed to change over a long period with substantial government assistance… In contrast, SBT has been persuaded to build up a big debt and then had the quota cut by over 60% in one year. (Jeffries 1992)

Industry capacity to influence and shape management is therefore a crucial ingredient to appreciating developments in the Australian sector. In other words, while the Federal government has been an important player in driving this agenda forward it is the political capacity to implement this agenda which also requires explanation. In essence this reflects the position of industry within the Australian economy. The fishing industry within Australia has historically been a small scale cottage industry whose economic and social significance has been at best marginal within the Australian economy (Industry Commission 1991). The structural capacity of industry to influence policy has been further weakened by the fragmented nature of industry representation; the industry rarely speaks with a united voice to either government or the community (HRSC 1997).

The dominance of a precautionary approach in the management of the fishery thus reflects an industry where the interests of fishers (unlike other sectors in Australia) is of little political consequence, where the protection of fish stocks has strong support in the community, and, critically, where the government is determined to carry out its agenda. It is therefore remarkable that, considering the financial turmoil of the industry in the early 1990s and its limited political influence, by the mid-1990s the Australian SBT industry had been radically transformed. This was largely due to substantial cooperation between Australian industry and Japanese industry in successful sea ranching trials which quickly transformed the industry's fortunes (Bergin and Haward 1994). To this day, the Australian SBT fishery has largely continued in this way, operating from one location, in Port Lincoln, with some expansion into longlining on NSW grounds in the late 2000s (Hobsbawn et al. 2007).

However, the commercial success of industry does not belie the significant pressures that underpinned this change. Indeed, the political capacity to achieve these outcomes is central to explaining developments. The dramatic downsizing of the fleet and the government's resolve to make fleet adjustment the responsibility of industry could not have been achieved without the political capability to accomplish these ends. The limited capacity of industry to shape management outcomes is thus critical to understanding domestic developments in the fishery and critically appreciating the Australian position at the international negotiations—a position that is in direct contrast to Japan. How then does this explain the dynamics of international

discussions and indeed the conflict and disagreements over science which has underpinned these discussions? It is to this issue that discussion will now turn.

International Management: The CCSBT

The signing of the Convention for the Conservation of Southern Bluefin Tuna in May 1993 created the CCSBT which came into force in May 1994. The Convention outlines the key objectives of the Commission and the key processes and procedures to achieve these ends. Article 3 of the Convention sets as a key objective 'the conservation and optimal utilisation of Southern Bluefin Tuna' (CCSBT n.d.a); Article 8 (3) for the Commission to set a TAC and to allocate this among members (CCSBT n.d.a), and for the Commission to meet on an annual basis to realize these objectives (Article 6[3]). A scientific committee was also created (Article (9) to help realize these objectives. Its function is to coordinate research and data, assess and analyse stock trends and report its findings on the stock to the Commission (CCSBT n.d.a). The scientific committee is thus central to the management of the fishery.

As we have seen, the CCSBT emerged from the more informal trilateral arrangements first established in the 1980s. Its scope, number of parties and sophistication has certainly widened with the passage of time. One constant, however, has been the significant tension that has characterized international management of the resource. In 1984, Japanese vessels were prohibited from fishing in Australian waters as a consequence of Japan's refusal to agree to the quota level demanded by Australia and New Zealand (Neave 1995). With Japan subsequently agreeing to catch reductions in 1985 this has been emblematic of negotiations moving from reluctant acceptance to long periods of stalemate where the Commission has been unable to reach a consensus on quota (Findlay 2007).

International negotiations over the stock have thus been marked by tension. More insidious have been long held fears of unreported catches occurring outside the ambit of the CCSBT (Polechek and Davies 2008). These were fully realized in 2006 with the discovery of the significant discrepancy between the declared global catch and the amount of product sold on the Japanese market, which as mentioned, was estimated as amounting to 178,000 t over a 20 year period. This suggests then a legitimacy crisis within the Commission particularly amongst successive Japanese delegations. Indeed, in the years when agreement has been reached suggesting greater unanimity between the parties this reflected the geopolitical realities of the fishery rather than a consensus based on science.[5] Certainly, science has been at the core of the tensions between the parties. It is to this issue discussion will now turn.

[5] Japan's acceptance of quota level during the 1980s was the result of a number of leverages the Australian government was able to successfully link to an agreement on quota. This includes access to Australian ports and Australia's Fishing Zone. The importance of both factors to Japan's fishing campaign in the southern hemisphere has been widely acknowledged and well documented in studies (Green 1991). In an interview by the author with a Australian industry official in March 1998, while acknowledging the importance of these leverages, he also added that in 1989 the

The Scientific Debate

At the centre of the dispute is assessment of the stock's recovery—in other words, how well the stock is rebuilding from its 1980 level (Ward et al. 1998). While science has expanded the knowledge of the stock, the stock's recovery, its resilience and capacity to rebuild from the low levels of the 1980s is the key point of dispute.

On this critical issue, Japan has typically leant towards more optimistic conclusions while Australia and New Zealand have been more circumspect. These differences have a long history. Virtual Population Analysis (VPA), a mathematical model used to project the recruitment potential of the stock, is a case in point (Caton et al. 1990**)**. In the 1989 scientific meeting, a critical year in which global quotas were dramatically reduced, the difference in projections was stark: Australian VPA assessments predicted further long term decline in the stock at the same time as Japan projected more positive recruitment trends (Caton et al. 1990). This has been a typical outcome of VPA assessments in the CCSBT.

Similarly, Catch Per Unit Effort (CPUE) data—a measurement of stock abundance based on hook rates in the fishery (Sainsbury 1992)—has been a significant source of disagreement between the parties. While CPUE data was crucial in warning of the stock's demise this has been, like VPA assessments, a key point of dispute. The discrepancy centres on the interpretation of CPUE data. For example, when CPUE data indicates a positive return in the numbers of fish within a particular location (reflected in an increase in hook rates), Australia and New Zealand are more cautious in their overall assessment; that is, despite these positive trends, it is not assumed to be indicative of the fishery in its totality. Alternatively, Japan has historically held a contrary position; that positive recruitment in one locale is typical of the fishery overall. Critically, these differences are not largely self-evident from the data but reflect the preference towards two competing hypotheses: the 'variable square hypothesis' that the fish are not evenly spread across the fishery; and 'constant square hypothesis' which as the term suggests, assumes a more uniform spread of fish across the ocean.[6] Similar to VPA assessments, then, this variance in conclusions has a long history in the CCSBT.

These contrasts in VPA projections, and interpretation of CPUE data, thus underscore in part the 'opaque lens' from which stock assessments are constructed—science having to provide recommendations in a context of incomplete or developing knowledge. Indeed, James Crawford at the International Law of the Sea Tribunal captured these uncertainties when he stated:

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acceptance by the Japanese delegation of the significant reduction in quota in that year, despite strong objections, reflected the perception by Japanese industry that Australian industry would decimate the resource in protest (through the use of purse-seiners in Port Lincoln) if Japan did not accept the quota level being proposed by the Australian and New Zealand governments.

[6] All scientific parties do however recognize that the 'constant' and 'variable' square hypotheses represent ideal types and that the 'reality' of the stock's abundance is somewhere between these models.

> The first point I want to make about the scientific disagreement is that it is not in essence a disagreement about the present state of affairs. It is a question of projection. Projections are just about predictions. They are based on the available data and series of assumptions. In this respect they are like weather forecasts. Weather forecasts require a lot of science and they require a lot of observation. They are based on a set of assumptions and yet we know… the weather is still uncertain even from day to day. With fish stocks the uncertainty is much worse because in our case we are trying to predict the state of fish stocks a considerable period in advance, something like twenty years. Such projections are difficult and may require very sensitive assumptions about a range of matters. (ITLOS 1999)

In other words, with the tightening of the science necessarily providing the basis for more 'objective' facts on which to base management decisions, the current differences in stock assessments reflect, as James Crawford states, assumptions and weightings that are at significant variance. Stock projections are not based on an immutable body of evidence. Indeed as differences have morphed into the management debate both sides have accused the other of practising politicized science—science that is less valid than their counterparts. Japan, in particular, has been quite explicit about what it sees as the more overtly 'political' nature of Australia's scientific position (CCSBT 1998). A final section will seek to account for the dispute where explanations, it will be argued, have institutional origins—their basis being in the relationship between industry and the state as discussed earlier in this chapter.

The Political Economy of Science

The scientific dispute, from the perspective of this chapter, is not about the 'objectivity' of a country's position. As each party has accused the other of practising 'politicized' science the implicit claim by each party is that the other is not adhering to the dictates of objectivity and impartial policy advice. The accusations themselves reflect how science has come to assume the mantle of objectivity able to dissolve sectional interest and provide a more objective basis from which management can proceed.

Ironically these taunts do hold an element of truth. However, rather than reflecting a cynical manipulation of science by powerful domestic constituencies, from the perspective of this chapter, science—its purpose, function and relationship to the other stakeholders—is steeped in the historical development of both countries, where the relationship between science, industry and the state has forged distinct roles, purpose and position in the domestic policy debate.

Writing in the 1960s, George Borgstrom provided a significant insight into the Japanese context when he observed:

> There is an unquestionable trend towards applied research, particularly such investigations which are of an immediate concern. There is no clear demarcation between scientific pursuits, control functions and routine observations. This is explained by the pressing needs of the rapidly expanding fishing fleet and in particular the tuna operation now spreading to all major operations…There is no question that the overwhelming demands of the active tuna fleets and fishing companies not only straight jackets research but also explains the fact the

> research work is very patchy and diverge primarily into fields adjacent to those practical areas which are given high priority. (Borgstrom 1964)

In others words, the purpose of scientific research is tied to the support and development of the fishing industry. Borgstrom goes on to illustrate how the rapid expansion of Japan's distant water fleet after WWII was underpinned by a vast research infrastructure, locating, identifying and collating data for the express purpose of discovering new sources of stock for the ever expanding distant water fleet (Borgstrom 1964). Indeed, this research network has also been mobilized as a key 'weapon' in supporting industry confronted with the significant challenges to its distant water fleet from the 1970s, not only in seeking out new sources of fish but new avenues (such as fish farming) in which industry can diversify its operations (Bergin and Haward 1996).

In contrast, industry's journey to becoming a high value fishery in Australia is emblematic of a management emphasis where the stock is the central locus of policy. In other words, management within the Australian context has foregrounded the 'precautionary principle' underpinning its management decisions. In somewhat pithy terms, in Japan scientific research has a distinctly commercial purpose; in Australia, scientific research is embedded within more conservationist parameters.

Critically, then, science within the respective policy communities holds a very different institutional purpose, function and role. This is a vital point. It suggests that the scientific conflict in the Commission is really about the role that science *should* play in the management of the stock. Both forms of science are perfectly 'rational' in their own terms—it is not at its core then a dispute that has 'technical' origins. Rather, it is a clash between two forms of science. Both *forms* of science have a long history—scientific research of a 'pure-basic' persuasion and 'applied scientific research'. In the case of the former its purpose is to discover general laws governing the natural world (the interactions that make up the ecosystem, the physical laws governing the universe); the latter, observation to achieve product innovation (Jasonoff and Wynne 1998). The key difference thus turns on the question of emphasis. Japan's leaning towards more optimistic VPA projections, and its leaning towards a 'constant square hypothesis, is indicative of a commercial milieu where 'finding fish' takes precedence over ecological considerations. Alternatively the more precautionary approach that underpins Australia's VPA projections and its more cautious interpretation of the CPUE data reflects a science embedded in the relationship between the stock and its natural surrounds.

In other words, the two forms of science, their goals and purpose are being reflected in the uncertainties of the stock assessments; in the different weightings given to the inputs that make up the VPA models and the interpretative frameworks applied to the CPUE data. However, in another important sense, the differences in science also have their institutional expression. In Japan, a dense network of private and state run institutes form a close nexus between industry and the state (Borgstrom 1964; Bergin and Haward 1996; Owen and Troedson 1993). In this respect the institutional configuration of scientific research mirrors that of an applied research environment—where a close relationship between science, industry, and focus groups is created to achieve product innovation. In Australia, the work

of scientists is arguably quite independent from the policy setting, mirroring the autonomy typical of scientific endeavour of a more pure persuasion. Both settings, however, are not simply institutional configurations separate from social and political contexts. Indeed, the privileging of each 'scientific form' has deep historical roots rendering somewhat problematic the claim that science is simply captured by contemporary pressure group interests.

Indeed it is the contention of this chapter that the different scientific forms do not reflect some cultural predilection of the parties, nor as previously stated a primarily technical point of difference. Rather, it reflects the structural relationship between state and fishing industry as discussed earlier in this chapter. Science provides a functional role to state and industry in Japan while remaining more autonomous from industry within Australia. This reflects the different historical trajectories that have shaped state and industry relations in both settings.

Conclusion

This case study has argued that the problems confronting the fishery have political origins. While technology and fleet overcapitalization have often been identified as the cause of the reduction in the world's fish stocks, this chapter argues that the issue of governance is an important consideration. Indeed, the chapter argued that within the domestic policy debate in Australia and Japan, science has served a very different function and purpose in response to the decline in stock levels. These outcomes, it has been suggested, do not stand separately from the actors involved in the management debate but critically reflect the actors that shape and develop policy in both settings. Overfishing and fleet development is thus not an overarching/uniform response but critically reflects the domestic context in which fishing fleets are regulated.

The importance of the case study is to highlight the need to recognize the politics shaping the global decline in stock levels. This is an urgent task. In Southeast Asia for example evidence of overfishing has been well documented with fisheries throughout the region under significant stress. However, despite this evidence, fleet development continues largely unconstrained, and the region's fish stocks remain under severe pressure from overfishing (Williams 2007).

References

ABARE (2003) Australian fisheries statistics 2002. Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra

ABARE (2005) Australian fisheries statistics 2004. Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra

Barclay K, Koh S (2005) Neoliberalism in Japan's tuna fisheries? Government intervention and reform in the distant water longline industry. Asia Pacific School of Economics and Government, The Australian National University, Canberra

Bergin A, Haward M (1994) Recent developments in international management. Mar Policy 18(3):263–272
Bergin A, Haward M (1996) Japan's tuna industry: a setting sum or new dawn. Nova Science Publishers Inc, New York
Borgstrom G (1964) Japan's world success in fishing. Fishing News Books, London
Caton A (1991) Overview. In: Deriso RB, Bayliff WH (eds) World meeting on stock assessment of bluefin tunas: strengths and weaknesses. Inter-American Tropical Tuna Commission, La Jolla
Caton A (1994) Commercial and recreational components of the Southern Bluefin Tuna. In: Shomura RS, Majkowski J, Langi S (eds) Interactions of Pacific tuna fisheries: proceeding of the first FAO expert consultation on interactions of Pacific tuna fisheries, Noumea, 1991. Rome: FAO Technical Paper 336/2
Caton A, Ward PJ (1996) Access arrangements for Japanese longliners in Eastern Australian waters. In: Ward PJ (ed) Japanese longlining In Eastern Australian waters 1962–1990. Bureau of Resource Sciences, Canberra
Caton A, McLoughlin E, Williams MJ (1990) Southern Bluefin Tuna: scientific background to the debate. AGPS Bulletin No. 3, Canberra
CCSBT (n.d.a) Text of the convention for the conservation of Southern Bluefin Tuna. http://www.ccsbt.org/userfiles/file/docs_english/basic_documents/convention.pdf. Accessed 8 Feb 2012
CCSBT (n.d.b) Origins of the convention. http://www.ccsbt.org/site/origins_of_the_convention.php. Accessed 8 Feb 2012
CCSBT (1998) Report of the resumed fourth annual meeting of the commission for the conservation of Southern Bluefin Tuna, 19 to 21 February, Tokyo. http://www.ccsbt.org/site/reports_past_meetings.php. Accessed 8 Feb 2012
CCSBT (2008) Report of the Performance Review Working Group, 3–4 July 2008, Canberra, Australia. http://www.ccsbt.org/docs/pdf/meeting_reports/ccsbt_15/report_of_PRWG.pdf. Accessed 11 Nov 2010
CCSBT (Commission for the Conservation of Southern Bluefin Tuna) (2011) Website. Accessed 24 Sept 2011
CCSBT Extended Scientific Committee (2009/2010) Reports of the fourteenth and fifteen meetings of the scientific committee, CCSBT. http://www.ccsbt.org/site/reports_past_meetings.php. Accessed 8 Feb 2012
Clean Seas (2011) Clean seas website. http://www.cleanseas.com.au/. Accessed 27 Sept 2011
Crough CJ (1987) Australian tuna industry. Pacific Island Development Program, East-West Centre, Honolulu
FAO (2010) Regional fishery bodies summary description: commission for the conservation of Southern Bluefin Tuna (CCSBT). FAO, Rome
Findlay J (2007) Southern Bluefin Tuna fishery. In: Larcombe J, McLoughlin K (eds) Fishery status reports, 2006. Bureau of Rural Science, Canberra
Franklin P (1988) Australian Southern Bluefin Tuna fishery. Australian Fisheries Service, Canberra
Green G (1991) The value to Japan of access to the Australian fishing zone. ABARE, Canberra
Green G, Nayar M (1989) Individual transferable quotas and the Southern Bluefin Tuna fishery. ABARE Occasional Paper No 105, AGPS, Canberra
Haward M, Bergin A (2001) The political economy of the Japanese distant water fisheries. Mar Policy 25(2):91–101
Hayes E (1997) A review of the Southern Bluefin Tuna fishery: implications for ecologically sustainable management. TRAFFIC Oceania, Sydney
Hobsbawn PJ, Hender J, Rowcliffe S, Murphy R (2007) Australia's annual review of the Southern Bluefin Tuna fishery. In: Extended commission of the fourteenth meeting of the commission for the conservation of Southern Bluefin Tuna. http://www.ccsbt.org/docs/pdf/meeting_reports/ccsbt_14/report_of_CCSBT14.pdf. Accessed 23 Nov 2010
HRSC (House of Representatives Standing Committee on Primary Industries and Rural and Regional Affairs) (1997) Managing commonwealth fisheries: the last frontier. AGPS, Canberra

IAC (Industry Assistance Commission) (1984) Southern Bluefin Tuna. AGPS Report No. 349, Canberra
Industry Commission (1991) Cost recovery for managing fisheries (draft report). AGPS, Canberra
ITLOS (International Law of the Sea Tribunal) (1999) Press Release, 27 August. www.itlos.org/news/press_release/1999/press_release_28_en.doc. Accessed 4 Aug 2002 (pp 7–8)
Jasonoff S, Wynne B (1998) Science and decision making. In: Rayner S, Malone EL (eds) Human choice and climate change: the societal framework, vol 1. Batelle Press, Columbus
Jeffries B (1992) The tuna industry-future directions. In: Inaugural Southern Bluefin Tuna science-industry-management workshop, 24–25 June, Port Lincoln. CSIRO Division of Fisheries, Hobart
Johnston C (1982) MITI and the Japanese miracle: the growth of industrial policy 1925–1975. Stanford University Press, California
Neave P (ed) (1995) The Southern Bluefin Tuna fishery 1993. Fisheries assessment report compiled by the Southern Bluefin Tuna fishery stock assessment group. Australian Fisheries Management Authority, Canberra
Owen AD, Troedson DA (1993) The Japanese tuna industry and market: A.C.I.A.R project no. 8928. Australian Council for International Agricultural Research, University of New South Wales, Sydney
Pempel T, Tsunekawa K (1979) Corporatism without labor? The Japanese anomaly. In: Schmitter PC, Lehmbruch G (eds) Trends towards corporate intermediation. Sage Publications, Beverly Hills
Phillips K, Begg G, Curtotti R (2009) Southern Bluefin Tuna. In: Wilson D, Curtotti R, Begg G, Phillips K (eds) Fishery status reports 2008. Bureau of Rural Science and Australian Bureau of Agricultural and Resource Economics, Canberra
Polacheck T, Davies C (2008) Considerations of implications of large unreported catches of Southern Bluefin Tuna for assessments of tropical tunas, and the need for independent verification of catch and effort statistics. CSIRO Marine and Atmospheric Research, Hobart
Sainsbury K (1992) What is happening to the Southern Bluefin Tuna stock? In: Inaugural Southern Bluefin Tuna science-industry-management workshop, 24–25 June, Port Lincoln. CSIRO Division of Fisheries, Hobart
TBOA (Tuna Boat Owners of Australia) (1996) Submission no. 44. In: Joint standing committee on treaties, inquiry into the subsidiary agreement between the government of Australia and the government of Japan concerning Japanese long-line fishing, s318–s339. Parliament of Australia, Canberra
Ward P, Nektarios T, Kearney B (1998) Getting science into regional fishery management: a global overview. Fisheries Resources Branch, Bureau of Rural Science, Department of Agriculture, Fisheries and Forestry, Canberra
Wesney D (1989) Applied fisheries management plans: individual transferable quota's and input controls. In: Neher PA, Arnason R, Mollett N (eds) Rights based fishing. NATO ASI Series, Series E, Applied Sciences. Kluwer, Dordrecht
Wigan M (1998) The last of the hunter gatherers: fisheries crisis at sea. Swan Hill Press, Shrewsbury
Williams M (2007) Enmeshed. Australia and Southeast Asia fisheries. Lowy institute paper 20. Lowy Institute, Sydney