

A SPECIAL ALL-DIGITAL ISSUE

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Omega-3 INSIGHTS

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THE QUEST FOR

SUSTAINABILITY

Supporting Ocean Health,
Despite Disjointed Standards

- [Fishery Stocks](#)
- [IFFO RS](#)
- [Certification Case Study](#)

CONTENTS



3 Viewpoint

4 The Health of Omega-3 Fishery Stocks by Adam Ismail

Despite the absence of a unifying definition of sustainability, responsible fishery managers and third-party certification schemes analyze a variety of factors to get a sense of the current and future state of a fishery stock.

17 Certification of Fish Oil Using the IFFO Responsible Supply Standard by Andrew Jackson, Ph.D.

The Marine Ingredient Organisation (IFFO) developed a standard to help companies in the nutraceutical and aquaculture industries demonstrate they obtain their marine ingredients from well-managed factories that source from responsibly managed fisheries.

22 Third-Party Certification a Key Starting Point in Sustainable Omega-3 Production by Todd Edward Parker

A manufacturer of omega-3 products shares insight on the benefits of partnering with organizations such as the Marine Stewardship Council (MSC) and Friend of the Sea (FoS) for responsible resource management.

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Thinking Sustainable Fishery

When thinking about sustainability and fish, many consumers' first thoughts likely go to the seafood counter in the supermarket, and the signs calling out the location of origin of the fish available for sale. However, increasingly, consumers buying fish oil are also thinking about the sustainability angle. This is also driven by more options in terms of the types of fish oils available, whether driven by a marketing angle or research into the possible health benefits.



Fortunately, when it comes to the sustainability of fishing for fish oil, things are being taken seriously—and through a concerted effort by industry, fisheries, governments and NGOs, management of the fish stock is a top priority. In this issue of Omega-3 Insights, GOED's Adam Ismail outlines the sustainability and fishery practices associated with the different stocks serving the nutraceutical industry. In looking at different species and harvesting locations around the world, he outlines the practices in place, as well as the policies that are helping to ensure the catch for oil is well within managed guidelines. Sustainability has been a key topic within the industry for years, and seeing how focused attention has yielded positive performance is heartening.

Moving beyond the sustainability question, the other big area of focus seems to be around quality, another consideration in the supply chain. This October, attendees of the Omega-3 Insights Summit at SupplySide West will gain unique insights into the topic of freshness, and how quality-control practices throughout the supply chain can help deliver the highest-quality products to consumers. The Summit is produced in cooperation with GOED, and we'll look forward to seeing you there to discuss how to formulate the freshest possible products. SupplySide West runs Oct. 6 to 10 in Las Vegas; register now at west.supplysideshow.com.

Best regards,

A handwritten signature in black ink that reads "Heather Granato".

Heather Granato
VP Content, Health & Nutrition Network
hgranato@vpico.com



@heathergranato

The Health of Omega-3 Fishery Stocks

by Adam Ismail

The sustainability of the oceans is one of the most important—and controversial—challenges facing the world. Many fisheries have collapsed as a result of overfishing, so companies marketing products such as fish oils have a responsibility to understand the sustainability of the fisheries from which they source their oils. This also becomes a significant communications challenge because translating and packaging fishery science into a format customers and consumers can use is quite difficult, especially when more than one fishery is involved.

The first major challenge in this arena is the absence of a unifying definition of sustainability. For many in the fisheries sector, all that matters is the fish stocks are plentiful and not in danger of being overfished. For others, the ecosystem approach is more important because it also ensures human activity in the fisheries is not affecting other species. And for still others, non-fishery sustainability concepts are important, such as carbon footprints, social investments and waste treatments. Today, the fishing industry is still very much focused on the first level of this debate: whether the fisheries themselves are healthy. However, some media outlets and environmental advocates are focusing on all of the areas, which can create risks for companies that do not fully understand their supply chains. There are also data challenges. In parts of the world, some groups want to establish efforts to measure the populations of predator species, but the fishing industry is still just trying to accurately measure and manage the biomass of its target species, which is an enormous and costly challenge. For instance, measuring how many albacore tuna are in the entirety of the Pacific Ocean is a very different challenge than measuring how many anchovy are off the coast of Peru. However, both are independent fisheries and thus need data to be managed sustainably.

Fishery managers assess whether a fishery is overfished by measuring the biomass of the targeted fish in the ocean (B) and comparing it to the average level of biomass a fishery needs to produce at its maximum sustainable yield (B_{msy}). Every fishery is different, so there are lots of scientific models that go into determining both of these numbers. The second analysis fishery managers use is comparing the amount of fish being caught (F) to the amount that can be caught at the maximum sustainable yield (F_{msy}). The first analysis represents the current state of the fishery, and the

IN THIS ISSUE

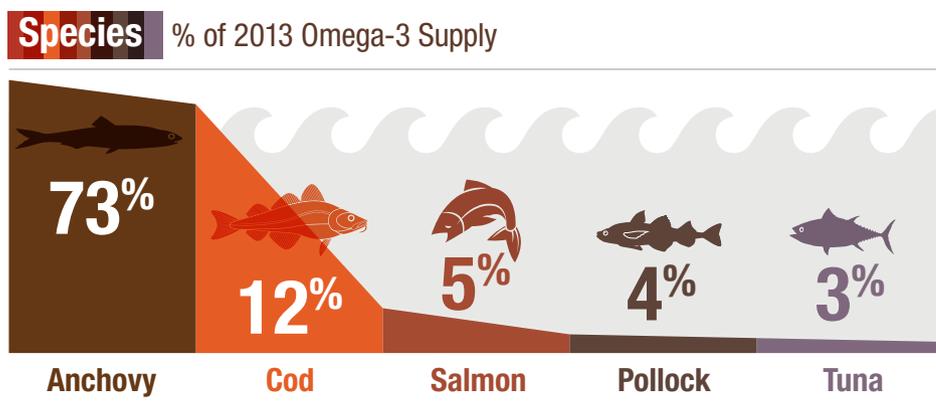
Viewpoint p. 3

Certification of Fish Oil Using the IFFO
Responsible Supply Standard p. 17

Table of Contents p. 2

second provides some insight into the future state of the fishery, because if the fishery is currently healthy but the rate of fishing is greater than the maximum sustainable yield, then it will not be healthy in the future.

This is why it is important to look at the specific fisheries from which one's oils are sourced. There is work going on at the Codex Alimentarius Commission of the Food and Agriculture Organization of the United Nations (FAO) to establish a standard for named fish oils for human consumption, and this work has yielded a treasure trove of data on the specific fisheries used for omega-3 oils. The Global Organization for EPA and DHA Omega-3s (GOED) has also recently finished its analysis of the omega-3 ingredient market and has estimated the amounts of crude marine oils required from various fisheries to service the global omega-3 market. Both sets of estimates align very closely and allow for analysis of these fisheries. The table shows the proportion of crude fish oils required from various species used in omega-3 oils last year.



Total of Top Five Fisheries **97%**

Source: GOED estimates

Anchovy Fisheries

While anchovy fisheries exist all over the world, many of them are relatively small and used primarily for seafood production. Omega-3 fish oils are produced primarily from the north-central Peruvian fishery, the southern Peru/northern Chile fishery, and the Moroccan fishery. The Peruvian and Chilean anchovy stock is not only the largest fish stock in the world, but also the largest fishery in the world based on its catch volumes.

The north-central Peruvian fishery is entirely managed by the Peruvian government and accounts for 60 percent of all the fish oil produced for omega-3s in the world. Fishery managers have maintained there needs to be 6 million metric tons of spawning anchovy biomass in the ocean to ensure a sustainable fishery, and in [its most recent](#) estimate, the Instituto del Mar de Perú (IMARPE) reported stocks were at 9.7 million tons. The government tends to set quotas for the fishery at levels that ensure the biomass does not drop below 6 million tons, and [by most accounts](#), compliance with the quotas in the fishery is high.



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The fishery does receive its share of criticism though. First, IMARPE does not make a lot of its data, scientific analysis or its framework for making decisions freely available. IMARPE does disclose much of its analysis at local seminars, but does not necessarily publish the information on its website, which frustrates non-governmental organizations (NGOs) that work on fishery sustainability issues. One of the main issues is the fishery is more or less divided into two parts: the highly regulated industrial fishery and the less-monitored artisan fishery. Quotas are not applied to the artisan fisheries—most of their catch is supposed to go for direct human consumption as seafood—but little is known about how much these boats actually catch and whether they comply with the regulations. These boats are small vessels and there is social pressure in Peru to support these smaller fishermen. The industrial fishery has been accused of causing pollution and social inequity in coastal fishing ports, but the industry defends itself against such claims, noting many of the issues are in towns with other large chemical and mining industries that are contributors to the pollution. Regardless, it has launched a series of initiatives to continue investing in communities and reducing its waste streams.

The fishery has been certified sustainable by both the Friend of the Sea (FoS) and IFFO RS ([see page 17](#)) programs, and the Peruvian anchovy is listed as being of “[least concern](#)” on the International Union for Conservation of Nature and Natural Resources’ (IUCN) Red List program.



Quotas are not applied to the artisan fisheries—most of their catch is supposed to go for direct human consumption as seafood—but little is known about how much these boats actually catch and whether they comply with the regulations.

Further down the coastline, Peru co-manages a separate fishery with Chile, although it is largely believed to be the same anchovy stock as is found in the north-central Peruvian fishery. In recent years, this fishery has accounted for about 8 percent of omega-3 crude oil supplies. The stock requires a minimum biomass of 924,000 tons for maximum sustainable production. This stock is also considered healthy; its estimated biomass [was just above this level in 2013](#) at 1.016 million tons. Quotas are generally set based on scientific advice, but it has not mattered in recent years because the anchovy stock has not really migrated south and catch volumes have been as much as 30 percent lower than the quotas.

One of the main challenges in this fishery is that both the Peruvian and Chilean governments have regulated the fishery, but have not really coordinated their efforts. The International Court of Justice [recently issued a ruling](#) that resolves a longstanding border dispute with implications for fishing rights, and it is hoped that cooperation will improve in the future. Transparency into how quotas are set is an issue in this fishery as well, but the Chilean government is starting to make [more data available](#). For the 2014 fishery, the Sustainable Fisheries Partnership, an NGO, [has said](#) the Chilean government ignored scientific advice and set the quota significantly higher than was advised. Chile does, however, [set quotas for both](#) the industrial and artisan fisheries, in contrast to Perú.

The fishery has also been certified as sustainable by both FoS and the IFFO RS program.

The last significant anchovy fishery for omega-3 oils is the Moroccan anchovy fishery, supplying about 5 percent of the fish oil used for omega-3s globally in 2013. This stock is actually fished by both Mauritanian and Moroccan vessels, and [in recent years](#) Mauritania has taken nearly 75 percent of the catch. However, nearly all of the fish oil produced from this fishery for omega-3 uses is produced from the Moroccan harvest. Overall, the fishery is believed to be healthy, but data is sparse and hard to obtain and therefore its full status is not known. The [European Union \(EU\)](#) noted in 2012 the biomass seemed to be increasing and the FAO estimated the average spawning biomass was 243,000 tons in 2012. However, the maximum sustainable yield has not been established for the fishery, so B_{msy} cannot be established either. Biomass surveys are done infrequently, so with a species of fish that reproduces rapidly, it is difficult to estimate the current level of biomass at any given time. Regardless, the actual catches in the fishery have been approximately in line with what scientific advisors at the EU and FAO have advised.

One of the key issues with this fishery is the lack of transparency as to how it is managed. There appear to be no quotas set by the government, with scientific advice coming from outside of Morocco rather than being developed by scientists focused on this fishery. However, the catch size is more or less in line with the limits of these outside opinions, meaning the fishery is operating at its maximum sustainable yield. The FAO has [specifically recommended](#) that catches not exceed 116,000 tons until better data is available on the fishery. In recent years, Morocco's share of the catch has totaled approximately 33,000 tons.

This fishery has been certified sustainable by FoS and is not on the IUCN Red List.

The last significant anchovy fishery



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Cod Fisheries

According to Codex data, all of the cod liver oil produced in the world is derived from the Arctic Cod fishery in the Barents Sea. This fishery supplies approximately 12 percent of the omega-3 fish oils produced in the world, mostly in the form of cod liver oil. Cod fisheries have always been cited as the prime example of how humans can collapse fisheries, but at the same time, this Barents Sea cod fishery has become a model for how humans can help a fishery rebound to incredible levels. [Scientists estimate](#) there must be a minimum of 460,000 tons of spawning biomass in the fishery to produce at its maximum sustainable yield, but the latest survey showed nearly 1.8 million tons in the waters. This is remarkable considering the fishery had reached a low of 100,000 tons of biomass [during the 1960s and again in the 1980s](#). The most recent quota was set at 1 million tons, but the actual catch was slightly lower at 966,000 tons, so compliance by fishermen is also high.

The fishery has been a [model for recovery](#) because the countries involved in the fishery have simultaneously worked hard to eliminate illegal fishing and set aggressively low quotas to allow the biomass to recover. The primary criticism



Company Profile



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of the fishery today is some of the vessels continue to use equipment that causes a moderately high by-catch of other species and potential damage to the ocean floor. The International Council for the Exploration of the Seas, a multinational government body, has made specific recommendations in this area to minimize the impact.

This fishery has been certified by both the Marine Stewardship Council (MSC) and FoS. The species is listed as “[vulnerable](#)” on the IUCN Red List, but the last evaluation of the fishery by IUCN was conducted in 1996 and reflects the collapse of other cod fisheries. Since that time, the biomass has more than tripled in size.

Salmon Fisheries

Salmon supplied about 5 percent of the omega-3 oils consumed in 2013, approximately 54 percent of which came from the Alaskan salmon fisheries and 46 percent from the Norwegian salmon farms. Wild salmon is a very unique species, which makes assessing its sustainability in the same manner as other fisheries very difficult. Unlike other oceanic species, salmon migrate from freshwater rivers at birth, into the ocean during their adult life, and back to rivers for spawning. This unique lifecycle allows hatcheries to augment the fish populations upstream in rivers. So rather than trying (or needing) to measure biomass in the ocean, fishery managers measure the number of fish leaving and returning to rivers each year, and then estimate how many additional salmon need to be added to the fishery from hatcheries. That oversimplifies all the science that goes into managing the fishery, but is the basic approach used.

The Alaskan salmon fisheries are widely considered to be sustainably managed, but there are many species and many different migration runs. From interviews with its members, GOED believes the majority of the omega-3 oils come from pink salmon. The Alaskan pink salmon fishery managers have actually [not missed a target for escapement](#), the number of fish returning to the rivers to spawn, for more than 15 years. The fishery’s lower limit for escapements, which is the closest equivalent to a B_{msy} level, is around 6.3 million fish as measured in about one-third of the 2,000+ streams in which the salmon spawn, but [in 2013](#), the measured escapement reached more than 25 million fish and led to a record salmon harvest.

The [most common criticism](#) of salmon fisheries is that the various stocks and species mix in the ocean, and a fishery targeting one particular type of salmon could catch another type as by-catch. If all fisheries are sustainably managed, it is not generally an issue, but in recent years, some Canadian salmon stocks have been under pressure and have mixed with the healthier Alaskan pink

Salmon supplied about 5 percent of the omega-3 oils consumed in 2013, approximately 54 percent of which came from the Alaskan salmon fisheries and 46 percent from the Norwegian salmon farms.





salmon stocks. This has led to some unintentional by-catch, although the impact on Canadian stocks is believed to be low.

By nature, farmed salmon are sustainable “fisheries” because 100 percent of the salmon are raised in hatcheries and then transferred to nets and raised to adulthood. However, they are frequently criticized by environmental groups because fishmeal and fish oil are used from forage fisheries—such as anchovy, herring, capelin and other small fish—to feed the salmon. The “feed ratio” has been cited as the most common criticism, since more than 1 kg of forage fish is needed to produce 1 kg of salmon. However, these concerns seem to be a point of sensation rather than substance. In part this is because salmon are voracious predators in the wild, consuming much more fish in the ocean than in aquaculture farms, but also because fish farms have begun incorporating significant amounts of soybean meal and oil into the feeds to reduce the reliance on more costly fish-based feeds. Individual farms are managed differently, so some try to have a more natural fish-based diet than others, but it means omega-3 companies have additional burdens tracing oil through the system if they are marketing farmed salmon oils.

The Alaskan salmon fisheries have been certified sustainable by MSC, FoS, Global Trust and the IFFO RS programs. Norwegian farmed salmon have been certified by IFFO RS and the Aquaculture Sustainability Council (ASC), but these certifications are specific to individual farms since each controls its feed supply chain differently.

Pollock Fisheries

The Alaskan pollock fishery is currently the only pollock fishery supplying oil for omega-3 uses, providing about 4 percent of the oil going into these applications. This fishery is also considered to be healthy and sustainable. [In 2013](#), the spawning biomass was measured at 2.6 million tons, well above the 2.1 million scientists estimate is needed to produce at the fishery’s maximum sustainable yield. The fishery managers are also generally more conservative than scientists in this case, setting quotas that are lower than scientific recommendations in [seven of the last 10 years](#). Fishermen are also generally regarded to be compliant with the quotas and the catch has never exceeded scientific recommendations.

The primary criticism of this fishery is there are a number of very sensitive species that live on the ocean floors in Alaskan waters and some remnant technologies can still threaten these species. This is less of a concern today, as this fishery has transformed into a much more industrial fishery with larger oceanic vessels that fish in deeper waters where the pollock do not exclusively populate the ocean floor. Nonetheless, some scientists have recommended setting lower fishing quotas to allow some of these other species to repopulate, which would in turn allow for higher pollock quotas in the future. Due to its

location north of the Arctic Circle, there is also concern about how climate change may affect the fishery, but little is known today and scientists have urged the U.S. government to invest in research on the topic.

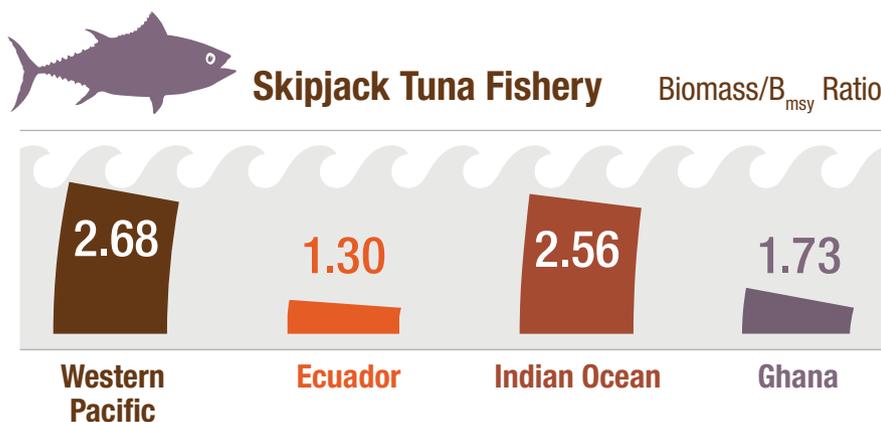
This fishery has been certified as sustainable by the MSC.

Tuna Fisheries

Tuna is probably the most complex of all the fisheries supplying the omega-3 industry, mostly due to the wide range of tuna species, countries and migration ranges involved in managing the fisheries. That tuna stocks are on the verge of collapse is one of the most oft-repeated statements in the media, but this is only accurate for a few tuna species in specific regions of the world. Codex data shows within the tuna fisheries, skipjack tuna supplied about 76 percent of the tuna oil demand from omega-3s, followed by yellowfin at 17 percent, albacore at 5 percent, and bigeye tuna at 2 percent.

Tuna biomass is very difficult to measure precisely because they do not tend to swim in large schools like other fish and have vast migration ranges. As a result, tuna stock data is usually presented as an index in relation to the B_{msy} limits, rather than with estimated tonnages of fish. In addition, quotas for most tuna stocks do not exist, but fishery managers watch the level of catch to ensure the fishery is safe—and raise any problems within the multinational treaty organizations tasked with protecting the oceans. The problem is this makes the stocks susceptible to political pressures from various nations involved in the fishery, and the pace of progress can be slow.

Skipjack tuna stocks are distributed all over the world. The Western Pacific fishery accounts for 68 percent of the omega-3 oils sourced from skipjack, Ecuador for 8 percent, the Indian Ocean for 9 percent, and Ghana for 6 percent, according to Codex data. In all of these fisheries, the biomass is believed to be above the biomass reference levels required for producing at maximum sustainable yields.



Source: Fishsource.com

The primary criticisms of the fisheries are primarily around management procedures, as quotas are not set and much of the data used for management decisions is not transparent, but also that international illegal and unreported fishing laws are not enforced well. However, skipjack tuna is [listed on the IUCN Red List](#) as a species of “least concern.” The Indian Ocean fisheries have also been certified as being sustainable by FoS and the IFFO RS program, and the International Seafood Sustainability Foundation (ISSF) [gives all of the skipjack fisheries](#) its highest “green” rating for the health of the biomass. So despite the lack of best practice management procedures, these fisheries are believed to be largely sustainable today.

Yellowfin tuna are similarly dispersed with Western Pacific fisheries accounting for 62 percent of the yellowfin tuna oils used in omega-3s, followed by Indian Ocean fisheries at 34 percent and the Ghana fishery at 4 percent, according to Codex data. With the exception of Ghana, these fisheries are considered to be healthy and above the biomass levels required for producing at maximum sustainable yields. In Ghana, the biomass is slightly below the advised reference levels, but the rate of exploitation in the fishery is less than the level scientific advisors recommend, which should help increase the health of the stock.



Source: Fishsource.com

The Western Pacific yellowfin stock has been certified sustainable by FoS, but yellowfin does [appear on the IUCN Red List](#) as “near threatened.” The [ISSF has given](#) the Indian Ocean and Western Pacific yellowfin fisheries a “green” rating for the biomass levels, but noted the rate of fishing in the Western Pacific is a little high. The Atlantic yellowfin fishery, in which Ghana fishes, received the lowest “red” rating for its biomass levels.

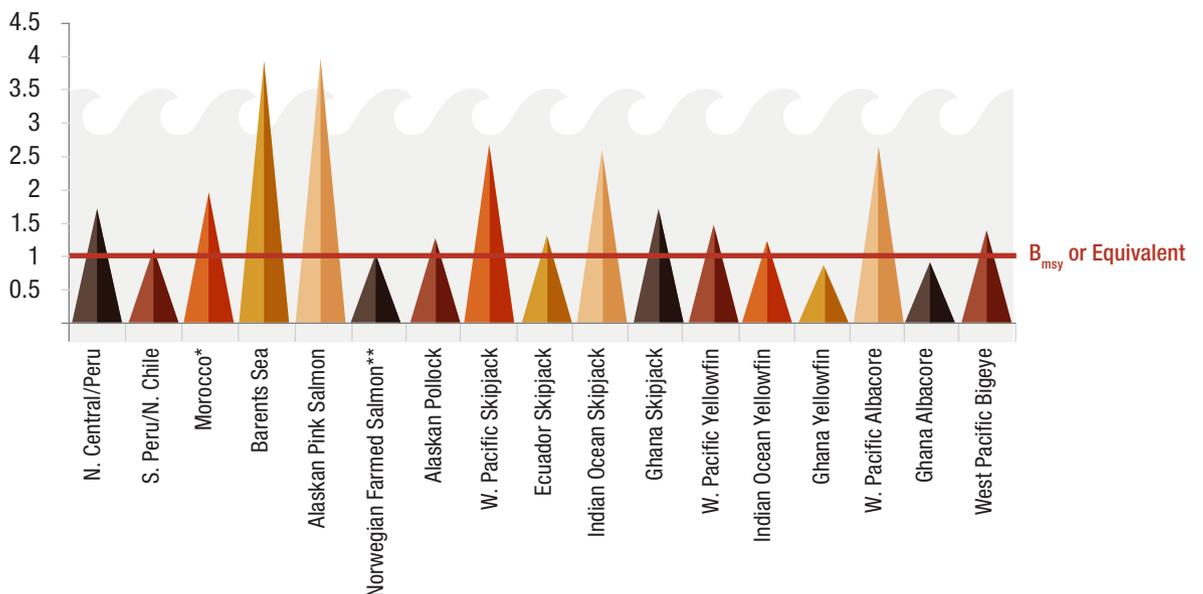
Albacore and bigeye tuna stocks account for very little of the omega-3 oils, so we will not go into these fisheries in depth. However, albacore biomass levels are well above the reference levels advised for the fishery and the rate of fishing is below scientific warning levels as well, but this species also

[appears on the IUCN Red List](#) as “near threatened” as of a 2011 assessment. Bigeye tuna stocks appear to be healthy as well, but the rate of fishing is higher than scientists advise, which indicates future stocks may be reduced if the trend is not changed. Bigeye tuna also appears on the [IUCN Red List](#) as a “vulnerable” species.

Summary

Obviously no fishery is perfect, and as time goes on the definition of “sustainability” will continue to advance as well. This means fisheries must be subject to continuous improvement programs to ensure they meet modern scientific norms of the day. The challenge is since fisheries are so complex and different, it is difficult to compare their sustainability status. As noted previously, there are many layers to sustainability, but at the foundational level for fisheries, one must be able to assess whether there is enough biomass of a particular species for it to flourish. The vast majority of the volume of oils omega-3 companies are buying does indeed come from fisheries with healthy stocks today. For comparison, GOED calculated an index (see chart) of the target fish species biomass in the omega-3 fisheries discussed in this article in relation to the best scientific estimates for the levels of biomass required to produce at maximum sustainable yield. The fisheries below the red line have biomass levels below B_{msy} .

Biomass Index of Omega-3 Fisheries



*No B_{msy} level has been set for the anchovy fishery, so the more conservative B_{lpr} (lowest reference point for biomass) is used

**Farmed salmon are not a wild stock, so they are by nature at B_{msy}

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Continued vigilance is of course needed to ensure these fisheries remain healthy in the long run. However, it does beg the question, “Why do omega-3 fisheries look so sustainable when we hear constantly that the oceans are overfished?” Part of the answer may lie in the amount of capital required to build efficient fish oil manufacturing facilities. Many of these factories are multimillion dollar, immobile facilities that require sustainable supplies of raw material. Companies are less likely to risk large amounts of fixed capital in areas where they feel there is significant risk that the fisheries will dry up and be unable to supply their operations.

In addition, there is a communications issue related to fisheries. The FAO calls fisheries producing at their maximum sustainable yield “fully exploited,” a term that has created a lot of controversy. Environmental advocacy groups have said these fisheries are nearly overfished because they are almost above the limit. However, the reality is that to be fully exploited, sustainable limits are set and the fisheries are catching at exactly those levels—it is rarely a coincidence that the amount of fish caught is nearly exactly at the advised quotas. It also does not mean the next year the catch will exceed the sustainable levels. This is why it is important to look at the history of a fishery’s compliance with these limits. If it has traditionally been compliant, there is little reason to think it will stray into the overexploited territory—but if there is variance, one may want to be more cautious when choosing sources of omega-3 oils. □

Adam Ismail has served as the first executive director at Global Organization for EPA and DHA Omega-3s (GOED) for more than seven years and oversees all organizational development for new and existing members. Since being named executive director in March 2007, Ismail has led GOED to experience a seven-fold growth in its membership and budget, worked on the founding of an international learning consortium based at Purdue University, and spearheaded overturning a ban on fish oil imports in Europe. With more than 10 years in the natural health and nutraceutical industries, Ismail’s previous experience includes product development for Cargill Inc.’s omega-3 line and several years as a senior consultant for both Health Strategy Consulting and Health Business Partners. He holds an MBA from the University of Navarra’s IESE Business School (Barcelona, Spain) and a bachelor’s degree from Boston University’s School of Management.



Certification of Fish Oil

Using the IFFO Responsible Supply Standard

by Andrew Jackson, Ph.D.

The nutritional benefits of fish oil are becoming increasingly well known to the general public; however, the thirst for knowledge is also leading consumers to become more concerned about the provenance of any fish oil they buy. Purchasers of fish oil for use in the nutraceutical industry are therefore no longer satisfied with just knowing the quality of the oil they purchase. They also want to know from which fishery the oil came, if that fishery is well managed, whether the fishing boats were fishing legally, if the fish oil factory has a raw material procurement policy that ensures only such fish are used and that they were fresh, and whether it has the quality-management systems to ensure transparency and traceability from the whole fish to the oil container.

Developing the RS Standard

It was because of such questions and the increased frequency with which they were being asked that the Marine Ingredient Organisation (IFFO), back in 2007, decided it should develop a standard that would help the industry demonstrate responsible practices while addressing these important issues. At the same time, the aquaculture industry was asking many of the same questions, not only about fish oil, but also about the fishmeal that came from the same factories. The result was IFFO's formation of a technical advisory committee (TAC) with members from many parts of the value chain, as well as other stakeholders such as World Wildlife Fund (WWF) and the Marine Conservation Society (MCS).

IN THIS ISSUE

[The Health of Omega-3 Fishery Stocks](#) p. 4

[Third-Party Certification a Key Starting Point in Sustainable Omega-3 Production](#) p. 22

[Table of Contents](#) p. 2

After 18 months of discussions by TAC, the IFFO Global Standard for the Responsible Supply of fishmeal and fish oil (IFFO RS) was launched in 2009. To earn the standard's unit of certification, a fish oil factory must be able to demonstrate a responsible raw material sourcing policy, as well as responsible manufacturing practices. A responsible raw material buying policy is one that only buys whole fish from a fishery managed according to the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries (the Code). It is the only international agreement that covers global fishing and has been endorsed by almost every country. The introduction states: "The Code, which was unanimously adopted by the FAO Conference, provides a necessary framework for national and international efforts to ensure sustainable exploitation of aquatic living resources in harmony with the environment."



Increasingly, fishmeal and fish oil is coming not from whole fish but from fishery by-products, for example from tuna processing waste such as heads, tails, guts, skin, etc.

Meeting the Standard

In order to demonstrate a fishery is managed to this code and therefore meets the IFFO RS standard, it must either be MSC certified or approved through the IFFO RS fishery assessment. The latter is based on the key elements of the Code and requires proof of critical factors such as stock management; control of fishing effort; by-catch management; minimizing any impacts on non-target species; and control measures to avoid illegal, unregulated and unreported (IUU) fishing.

Increasingly, fishmeal and fish oil is coming not from whole fish but from fishery by-products, for example from tuna processing waste such as heads, tails, guts, skin, etc. As it is generally perceived that the recycling of fisheries waste is to be encouraged, the RS standard is less demanding in this area and only requires the by-products can be shown not to have come from a species on the IUCN Red List or from IUU fishing.

When it comes to demonstrating responsible management, the factory has to be able to demonstrate to the auditor's satisfaction that procedures are in place to record all raw materials entering the plant, including volumes, species, condition, etc. Proof has to be given of reporting all landings to the relevant authorities. In addition, there must be full traceability throughout the process to ensure purity of the product through the implementation of an internationally recognized management system in the plant.

Making the Standard Credible

The success of a standard depends on its credibility, not so much to the potential clients but to the wider stakeholders such as customers, customers of customers, environmental non-governmental organizations (eNGOs), media, etc. Building a credible standard starts at inception, with a wide range of stakeholders involved in first stages of development, as was the case with IFFO RS. It is vital that the auditing and certification arms of the standard are conducted by independent auditors trained in the specific area. To this end, the International Organization for Standardization (ISO) produced a guide to follow, ISO 65—general requirements for bodies operating product certification systems. The guide lays down a whole series of measures and procedures which ought to be adopted to produce a credible standard.

The intention of IFFO RS was to follow this guide from the outset and, after setting the standard, an independent third-party certification body, SAI Global, was then appointed to undertake the audits and award certificates to compliant factories. SAI Global has subsequently been audited by the Irish National Accreditation Body (INAB), and the operation of the IFFO RS standard has successfully demonstrated to be fully compliant with the ISO 65 guide. Guide 65 ensures the resulting certifications are impartial, consistent with international standards and based on objective testing.

Uptake of IFFO RS

Since the first factory achieved certification in 2009, more than 100 factories have successfully been awarded IFFO RS certification worldwide. The volume of approved fish oil coming from these certified factories now exceeds 40 percent of the world's production, with new factories being added all the time. South America and Europe represent the majority of the certified production, but the United States and South Africa are now producing significant volumes, and factories in Asia have recently been certified as well.



Chain of Custody Standard

The IFFO RS standard, as already mentioned, covers the factory where the crude fish oil is produced. However, some companies also want to be able to demonstrate that their refined oil is from IFFO RS certified sources. To aid with this process, a chain of custody standard was developed, which involves auditing the supply chain from the original fish oil factory through the refinery, thereby allowing a claim to be made that the refined oil came from responsibly managed fisheries and well-managed factories.

Which Factories Are Certified and Which Fisheries Are Approved?

Interested parties wishing to find out which factories are currently certified and which raw materials have been approved for their use can visit the IFFO RS website, iffo.net/iffo-rs. In addition to information about the program, it contains copies of the latest fisheries assessments and downloadable copies of the standards. The site also details improvements being made to the standard and its governance, all in an effort to ensure it remains credible and relevant to the changing needs of the industry.

The Future for the IFFO RS Standard

Hopefully the number of factories certified and the volume of oil produced under the standard will continue to grow, however the “low-hanging fruit” has been harvested, and for many of the remaining factories and fisheries, improvements must be made. IFFO RS is now starting to work with a number of factories to try and get their raw material and management practices to a point where they could be successfully audited. In order to help these factories gain some recognition for these efforts, a formal Improver’s Programme is being set up which will help both producers and buyers demonstrate the progress made toward gaining full IFFO RS certification.

In addition, improvements are being made to the governance of the standard. For example, TAC has now been changed into the IFFO RS board—a body that’s increasingly becoming autonomous and taking full responsibility for all aspects of the standard. The change has allowed for greater transparency in the group’s operation and decision-making processes, with increasing opportunities for widespread consultation.

The intention is to ensure the IFFO RS standard will continue to provide the nutraceutical and aquaculture industries a means by which they can demonstrate they obtain their marine ingredients from well-managed factories which source from responsibly managed fisheries. This should help ensure the industry has a sustainable future producing pure and healthy products. □

Andrew Jackson, Ph.D., is the technical director of IFFO, the global trade organization representing the marine ingredient industry and associated businesses, with around 200 members in more than 40 countries. Since joining IFFO, he led the team that developed and launched the IFFO Global Standard for the Responsible Supply for fishmeal and fish oil (IFFO RS). More than 40 percent of the world’s supply of fishmeal and fish oil now comes from factories certified to the IFFO RS standard.

Prior to joining IFFO in 2006, Jackson obtained a doctoral degree from Stirling University, U.K., and worked in fish nutritional research and feed formulation for government, academia and industry. He spent nearly 20 years in the salmon farming industry in a range of different senior positions in both Scotland and Chile. Jackson was also chairman of the Scottish Salmon Producers Organization, the trade body for the largest aquaculture industry in the U.K.



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Third-Party Certification a Key Starting Point in Sustainable Omega-3 Production

by *Todd Edward Parker*

Global omega-3 production has skyrocketed the past three decades in response to an ever-increasing public demand, which has been fueled by a constant stream of positive health research. As the vast majority of raw material used in omega-3 production comes from finite marine sources, the great challenge facing the industry is to ensure that meeting present demand does not deplete the ocean habitat to the point where future generations will be unable to enjoy the health benefits of marine long-chain essential fatty acids (EFAs). The time has come to establish industry practices that demonstrate raw material sustainability, ecologically sound harvesting methods and production transparency.

With a long history in primary fishing, fish processing and omega-3 production, Pharma Marine AS is a Norwegian manufacturer of specialty omega-3 ingredients (Calamarine®, CodMarine®). The company's experience as both a raw material supplier and a manufacturer has given it the perspective necessary to develop an approach to omega-3 manufacturing that it believes can be a model for the industry. This approach combines a collaboration of third-party certification schemes that specialize in "best practices" for raw material sourcing, production strategies that maximize the utilization of source raw materials, and technologies that optimize the omega-3 yield derived from precious marine resources.

The Essential Role of Third-Party Verification

Third-party certification schemes such as the Marine Stewardship Council (MSC) and Friend of the Sea (FoS) provide numerous important benefits to the omega-3 industry by focusing on methods of responsible resource management. These groups specialize in various aspects of raw material selection and sourcing that are critical to sustainability.

Examples include:

- Verifying fish stocks are healthy and assessed by the best available scientific advice
- Ensuring fishing methods/practices do not harm the marine environment (monitoring of benthic habitats, by-catch of seabirds, mammals or any endangered and threatened species, as well as discards)

IN THIS ISSUE

[The Health of Omega-3
Fishery Stocks](#) p. 4

[Certification of Fish Oil Using the IFFO
Responsible Supply Standard](#) p. 17

[Table of Contents](#) p. 2

- Demanding proper long-term management plans are in place to safeguard both stocks and the marine environment
- Ensuring traceability throughout the supply chain from boat to plate (with strict batch records, chain-of-custody documentation and third-party audits/surveillance).

These issues can be complicated. For example, in order for a fishery (a unit of certification comprising of a given species, catch method and location) to obtain MSC certification, not only does it have to fulfill the requirements set out in the standard, but there needs to be an agreement on catch and quotas between all nations that fish on the same stocks. If any one country breaches the agreement, the entire fishery will be suspended. Because of the implementation of guidelines and practices espoused by groups such as MSC, the North East Arctic cod, haddock and saithe fisheries have strongly rebounded after experiencing decline due to previous overfishing and inadequate stock-management practices. The present health of North East Arctic waters is a prime example of regional, industry and third-party auditing organization cooperation.

Third-party certification schemes such as MSC and FoS also provide guidance to consumers wishing to make purchasing decisions based upon sound ecological considerations. Participation in effective marine-preservation strategies and the increase in consumer awareness complete the circle and will help maximize the conservation outcomes.

Obtaining third-party certification takes time and effort, but clearly, keeping marine stocks robust and the ocean environment healthy for future generations are causes worthy of a commitment.

Raw Material Maximization: The Solution to Limited Marine Resources

Every day, hundreds of tons of fisheries' by-product are either thrown back into the oceans or into the trash bin. In some fisheries, more than half of the landed weight is discarded. These "trimmings" of seafood production, though perhaps not fit for the dinner table, are excellent sources of protein and fatty acids. Norway is actively working to minimize the discard of fishing by-product,

"The MSC is a global organization and registered charity that sets standards for sustainable fishing and seafood traceability. It ensures that MSC-labeled seafood comes from, and can be traced back to, a sustainable fishery. Through working with the fishers, producer organizations, operators, processors and the whole supply chain until it reaches the consumer, we are transforming the seafood market to a sustainable one. There are over 23,000 MSC-labeled products available for sale in 106 countries."

— Minna Epps, MSC manager, Scandinavia and Baltic Sea region

and efforts are underway to maximize the utilization of all the fish harvested from its territorial waters.

Pharma Marine AS has developed two lines of omega-3 ingredients made exclusively from the trimmings of seafood intended for human consumption. Calamarine is made from the trimmings of squid, also referred to as calamari, and CodMarine is made from the trimmings of North East Arctic cod, haddock and saithe. It is important to emphasize all the trimmings are utilized in omega-3 production, not just the lipid-dense livers. Largely because of the health of the North East Arctic cod stock, the abundance of the Pacific calamari biomass, successful certification of the fisheries, and maximum utilization of all trimmings, Pharma Marine has achieved MSC chain of custody and FoS certification.



“Over 35 major players in omega-3 oils and omega-3 supplement production have gained the Friend of the Sea seal of approval. Production of omega-3 from by-cuts and trimmings is surely a low-impact origin, and could even be beneficial for the environment, as it reduces the amount of waste.”

— Paolo Bray, managing director, Friend of the Sea

Finally, from a sustainability perspective and using good business sense, it is important to maximize the end-product yield from every kilogram of raw material that enters the production process. Experienced personnel using modern technology can extract significantly more finished omega-3 oil from raw material than was possible in the early years of omega-3 production. Increasing the yield by 5 to 10 percent translates into many additional tons of omega-3 output annually.

Third-party organizations dedicated to marine sustainability and environmental protection play a key role in establishing cooperation and enforcing accountability between all stakeholders in the omega-3 supply chain. It is up to individual manufacturers to expand the utilization of presently discarded lipid-rich raw materials and to maximize the net yield from production. Pharma Marine AS believes adopting this comprehensive approach will ensure that human health will continue to benefit from marine-derived long-chain fatty acids for many years to come. □

Todd Edward Parker is an author, educator and 25-year executive in the natural health industry.



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Vice President, Sales, Health & Nutrition

Danica Cullins dcullins@vpico.com

Strategic Account Director **Amy Thorlin**

Senior Account Executives **Ioana Neacsu**
Anthony Arteca
Karen Salas

Content Marketing Manager **Karen Butler**

kbutler@vpico.com

Vice President, Content,
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mewing@vpico.com

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3300 N. Central Ave. #300, Phoenix, AZ 85012
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