

**CASE STUDY:  
ASSESSING THE SUSTAINABILITY OF PACIFIC BIGEYE TUNA SUPPLIES  
ENTERING THE HAWAII FRESH FISH MARKET**

**Prepared for IUCN-the World Conservation Union**

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**Abstract**

Bigeye tuna is the most desired species in Hawaii's *sashimi* tuna market. No eco-labeling systems are currently in place to assess the sustainability of the various suppliers of Pacific bigeye tuna. The present case study evaluates bigeye tuna supplies entering Hawaii based on the Food and Agriculture Organization's (FAO) minimum standards to qualify fisheries for eco-labeling. These standards require consideration of: 1) the fishery management system; 2) fish stock status and remedial action if needed to avoid an overfished condition; and 3) major fishery impacts on the ecosystem.

Most of the bigeye tuna that enters Hawaii's fresh fish market and onward markets in the U.S. is landed by Hawaii's pelagic longline fishery. A China-flagged longline fleet based in Majuro, Marshall Islands is the largest exporter of fresh bigeye tuna to Hawaii, with smaller quantities air shipped by a Tonga-flagged and based longline fleet. Hawaii's longline fishery, as well foreign suppliers based in the Marshall Islands and Tonga, are all traceable to fishery management systems, thereby satisfying the first FAO standard. Only in Hawaii's longline fishery are the number and size of fishing vessels capped by regulations, thereby meeting FAO's second standard to consider stock status. Without similar mandates to limit longline fishing effort and capacity, foreign suppliers of bigeye tuna to Hawaii fail to meet FAO's second standard. Actions to directly limit tuna fishing capacity are needed so that Pacific bigeye tuna does not become "overfished" in the future. Only Hawaii's longline fishery can meet FAO's third standard of considering fishery impacts on the ecosystem. U.S. regulations require Hawaii longliners to use gear and methods that are proven to reduce interactions with protected sea turtles and sea birds. Without similar mandates, non-Hawaii longline fisheries are presently out of compliance with FAO's third standard for eco-labeling.

Future emphasis in the management of Pacific tuna longline fisheries should be on a) imposing international limits on the number and size of longline vessels, as in Hawaii's longline fishery; and b) adopting or adapting the best practices of Hawaii's longline fishery for reducing sea turtle and seabird interactions to all other fleets. Only after broad compliance of Pacific tuna fisheries with standards for responsible fishing does traceability become important. Rather than devote substantial resources to third-party eco-labeling and traceability in these fisheries, the same resources might be better spent by adding strong incentives and tangible rewards for responsible fishing to Pacific tuna management systems.

## 1. Case Study: Fish Resource, Fishing Method and Target Market

The present paper was prepared under contract to IUCN-The World Conservation Union. The terms of reference call for "...a case study on chain of custody, problems with status quo, strategies for improvements, using as a basis for study fisheries in the Pacific." The following study focuses on Pacific bigeye tuna harvested in multi-species catches by pelagic longline fleets and delivered to Hawaii's fresh fish market. Discussed in this case study are the Hawaii market for fresh bigeye tuna, suppliers of this product and the present absence of third-party eco-labeling and/or traceability systems for this product. Minimum standards of the Food and Agriculture Organization (FAO) of the United Nations for eco-labeling are described and then used to assess the sustainability of the various supplies of bigeye tuna entering Hawaii. Recommendations are made for a "poor man's" traceability system for bigeye tuna that builds on existing "positive lists" of authorized pelagic longline fishing vessels operating offshore of Hawaii and elsewhere in the Pacific Ocean.

Bigeye tuna is in high demand for *sashimi* (raw fish sliced thin). Premium prices are paid in Hawaii (as in Japan) for adult bigeye tuna captured by longline fishing in deep, cold ocean waters that enhance fish oils and translucent red muscle – highly desirable attributes in *sashimi*. Other fishing methods harvest bigeye tuna of lower quality that swim closer to the ocean surface.

The majority of the bigeye tuna entering the Hawaii fresh tuna market are supplied by Hawaii's domestic longline fishery that, in 2006, landed an estimated 4,598 metric tonnes (MT) valued at over \$34 million.<sup>1</sup> Hawaii is also a market destination and gateway for imports of fresh bigeye tuna arriving by air freight from the Pacific basin. The U.S. Nicholson Act prohibits foreign fishing vessels from discharging fish catches in Hawaii, so no bigeye tuna is landed directly from foreign-flag vessels.

In 2006, an estimated 261 MT of fresh bigeye tuna valued at US \$ 1.74 million passed through the Honolulu District of U.S. Customs.<sup>2</sup> In recent years, a China-flagged longline fleet operating from a Majuro, Marshall Islands base has supplied the bulk of the fresh bigeye tuna imported by Hawaii seafood wholesalers.

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<sup>1</sup>NOAA Fisheries, Office of Science & Technology, annual commercial landing statistics, <http://www.st.nmfs.noaa.gov/st1/commercial/index.html> (accessed November 19, 2007).

<sup>2</sup> NOAA Fisheries, Office of Science & Technology, annual trade statistics, <http://www.st.nmfs.noaa.gov/st1/commercial/index.html> (accessed November 19, 2007).

## 2. Existing or Planned Certification and Eco-Labeling Programs for Fresh Bigeye Tuna Supplied to Hawaii

No formal eco-labeling or product traceability systems currently exist to document the chain of custody of Pacific bigeye tuna from harvest through processing, distribution and marketing in Hawaii or in other markets that receive fresh bigeye tuna from Hawaii.

The National Oceanic and Atmospheric Administration( NOAA) Fisheries of the U.S. requires dealers who import, export or re-export frozen but not fresh bigeye tuna to hold a valid highly migratory species international trade permit and submit statistical documents and reports to help track international trade of this and other highly migratory species.<sup>3</sup> Under the U.S. Country of Origin Labeling Act, all seafood imported into the U.S. for retail sale must have labels identifying country of origin and method of production (e.g., “wild harvest”). Any distributor of a commodity covered by this law may be required to maintain a verifiable recordkeeping audit trail. Restaurants are exempt from country of origin seafood labeling requirements.<sup>4</sup>

Only a few buyers of Hawaii bigeye tuna are planning to establish eco-labeling and/or traceability procedures to verify that this species comes from sustainable sources. For example, Wal-Mart, the world’s largest retailer, announced in January 2006 that it would modify its procurement policy and only buy only wild-caught fish certified by the Marine Stewardship Council (MSC). At a “Seafood Sustainability Meeting,” November 10, 2006, Wal-Mart management advised all seafood suppliers and buyers to be prepared to help achieve the company’s goal of having all certified seafood within 2-4 years, utilizing the services of MSC for eco-labeling of wild fish. Fresh bigeye tuna is often sold through the Wal-Mart subsidiary Sam’s Club at Hawaii and California locations (Jed Inouye, President, Seafood Hawaii, personal communication). During a May 2007 visit to Hawaii, some of Wal-Mart’s top management were briefed on the harvesting, marketing and management systems of Hawaii’s domestic longline fleet that supplies the majority of bigeye tuna to Hawaii’s fresh fish market.

Whole Foods Inc. representatives plan to visit Hawaii in January 2008 to evaluate Hawaii fisheries and suppliers based on the company’s seafood sustainability criteria before finalizing plans to stock their Hawaii stores with Hawaii fish products (Eric Gilman, World Conservation Union, personal communication).

The non-profit Hawaii Seafood Council is developing a Hawaii Seafood Brand emphasizing Hawaii pelagic longline fisheries as highly responsible based on a comprehensive assessment of the 282 provisions in Articles 7,8,10,11 and 12 of the FAO Code of Conduct for Responsible Fisheries (hereafter “Code”)<sup>5</sup> and other measures of sustainability.

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<sup>3</sup> <http://swr.nmfs.noaa/pir/hms.htm>

<sup>4</sup> <http://www.ams.usda.gov/cool/training.htm>

<sup>5</sup>Bartram, P., J.J. Kaneko and G. Krasnick. PacMar Inc. 2006. Responsible fisheries assessment of Hawaii’s pelagic longline fisheries. Prep. for Hawaii Seafood Project, National Oceanic and Atmospheric Administration, U.S. Dept. of Commerce. Honolulu, HI.

### **3. FAO Minimum Standards to Qualify Fisheries and Fishery Products for Eco-Labeling**

“Sustainability” of a fishery means that harvest levels do not exceed the capacity of a fish stock to replenish itself within a functioning ecosystem. A growing number of marketers and consumers are concerned with differentiating food products from different suppliers according to whether the methods of production are sustainable. It is impossible for them to detect sustainability because it is a “credence” or process attribute.<sup>6</sup>

Sustainability of a fishery product, therefore, must be assessed by applying a set of standards to the fisheries that supply the product. The FAO Committee of Fisheries (COFI) adopted a set of voluntary guidelines for the eco-labeling of fish products during its 26<sup>th</sup> session held 7-11 March 2005.<sup>7</sup> These are minimum standards to qualify fisheries and fishery products for eco-labeling, drawing on the Code. They include requirements for consideration of: 1) the fishery management system; 2) the fish stock and need for remedial action; and 3) serious fishery impacts on the ecosystem.

#### **3.1 FAO eco-labeling standard for fishery management systems**

According to the FAO, a fishery may qualify for eco-labeling if it is conducted under a management system that ensures compliance with requirements and criteria selected from the Code, detailed in Table 1. The management system and fishery should operate in compliance with the requirements of local, national and international law and regulations, including the requirements of any regional fisheries management organization that manages the target stocks.<sup>8</sup>

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<sup>6</sup>U.S. Department of State – Traceability in the U.S. Food Supply.  
<http://usinfo.state.gov/ei/Archive/2004/Mar/29-403518.html>.

<sup>7</sup>Food and Agriculture Organization (FAO) of the United Nations. 2005. Guidelines for the ecolabeling of fish and fishery products from marine capture fisheries. Food and Agriculture Organization of the United Nations, Rome.

<sup>8</sup>Ibid: para. 28.

**Table 1. FAO Standards for Management Systems (after FAO 2005: para. 29).**

|   |  |
|---|--|
| Adequate data and/or information are collected, maintained and assessed in accordance with applicable international standards and practices for evaluation of the current state and trends of the stocks.   | After Code Article 7.4.4                                 |
| In determining suitable conservation and management measures, the best scientific evidence available is taken into account by the designated authority, as well as consideration of relevant traditional knowledge, provided its validity can be objectively verified, in order to evaluate the current state of the stock under consideration in relation to, where appropriate, stock specific target and limit reference points.   | After Code Articles 6.4, 7.4.1                           |
| Data and information, including relevant traditional knowledge, provided its validity can be objectively verified, are used to identify adverse impacts of the fishery on the ecosystem, and timely scientific advice is provided on the likelihood and magnitude of identified impacts.  | After Code Article 7.2                                   |
| The designated authorities adopt appropriate measures for the conservation and sustainable use of the stock under consideration based on the data, information and scientific advice previously referred to. Short-term consideration should not compromise the long-term conservation and sustainable use of fisheries resources.  | After Code Article 7.1.1                                 |
| An effective legal and administrative framework at the local, national or regional level, as appropriate, is established for the fishery and Compliance is ensured through effective mechanisms for monitoring, surveillance, control and enforcement.  | After Code Article 7.7.1<br>After Code Article 7.1.7     |
| The precautionary approach is being implemented to protect the stock under consideration and to preserve the aquatic environment. <i>Inter alia</i> this will require that the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures.<br>Further, relevant uncertainties are being taken into account through a suitable method of risk assessment. Appropriate reference points are determined and remedial actions to be taken if reference points are approached or exceeded are specified. | After Code Article 7.5.1<br><br>After Code Article 7.5.2 |

### 3.2 FAO eco-labeling standard for the fish stock under consideration

FAO eco-labeling standards call for the fish stock(s) under consideration to be a) not overfished and b) maintained at a level which promotes the objective of optimal utilization and maintains its availability for present and future generations (FAO Code Article 7.1.1), taking into account that longer-term changes in productivity can occur due to natural variability and/or impacts other than fishing.

In the event that biomass drops well below such target levels, management measures should allow for restoration within reasonable time frames of the stocks to such levels (FAO Code, Article 7.6) (FAO 2005: para. 30).

### **3.3 FAO eco-labeling standard for fishery impacts on the ecosystem**

FAO specifies that, to qualify for eco-labeling, a fishery's adverse impacts on the ecosystem should be appropriately assessed and effectively addressed (FAO Code, Article 7.5.1). Much greater scientific uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries than in assessing the state of target stocks. This issue can be addressed by taking a risk assessment/risk management approach that considers the most probable adverse impacts, taking into account available scientific information and local knowledge provided that its validity can be objectively verified. Those impacts that are likely to have serious consequences should be addressed. This may take the form of an immediate management response or further analysis of the identified risk (FAO 2005: 8-9)

## **4. Do Bigeye Tuna Fisheries that Supply Hawaii Meet FAO Standards?**

The sustainability of the bigeye tuna longline fisheries that supply Hawaii's fresh fish market is evaluated in the following sections based on the three categories of FAO minimum standards for eco-labeling (FAO 2005).

### **4.1 FAO eco-labeling standard for fishery management systems**

Most of the fresh bigeye tuna marketed in Hawaii is landed as part of multi-species catches by the domestic fleet of U.S.-flagged, Hawaii-based longline vessels and is sold through competitive bidding at a centralized fish auction in Honolulu. Hawaii's domestic longline fishery is comprised of about 125 active vessels that target bigeye tuna year-round.<sup>9</sup>

As part of the auction's seafood safety program, the staff verifies all vessels delivering fish against a company list of pre-registered vessels. Every fish sold through the auction is traceable to the harvesting vessel through tags that auction staff attaches to each fish before sale. Wholesalers and retailers that buy fresh fish through the auction have their own internal tracking systems for bigeye and other fresh fish. All pelagic longline vessels that unload fish to sell through the auction are managed by NOAA Fisheries under U.S. government regulations. A major element of this management system is the Hawaii longline limited access permit program that authorizes particular vessels (up to a limit of 164) to engage in longline fishing. In addition, no longline fishing by Hawaii or other U.S. vessels is allowed in the high seas without a High Seas Fishing Compliance Act permit issued by NOAA Fisheries.

An assessment of Hawaii longline fisheries and management system was conducted to evaluate the extent of compliance with the FAO Code (Bartram et al. 2006). For the provisions prescribed in Code Article 7 (Fishery Management), Hawaii longline fisheries scored 109 of 113 possible points (96 percent) using a scoring system adapted from Caddy (1996).

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<sup>9</sup> <http://www.pifsc.noaa.gov/fmsd/reports.php>

Hawaii's longline fishery is managed in conformance with standards set forth in the U.S. Magnuson-Stevens Fishery Conservation and Management Act. Fishery compliance with the FAO Code is also encouraged through U.S. membership and participation in regional fishery management organizations (RFMOs) -- the Western and Central Pacific Fisheries Commission (WCPFC) and Inter-American Tropical Tuna Commission (IATTC) whose convention areas include virtually all of the geographic range of Pacific bigeye tuna. The U.S. must ensure that the Hawaii longline fishery is in compliance with internationally-agreed conservation and management measures. Surveillance and enforcement against illegal, unreported and unmonitored (IUU) fishing in the Exclusive Economic Zone around Hawaii and surrounding high seas is provided by the U.S. Coast Guard. The greatest threat to international management efforts of the WCPFC and IATTC is from IUU fishing. The extent of IUU longline fishing in the Pacific is not well documented. Since the introduction of a "positive list" of authorized vessels in 2002-2003, the Organization for the Promotion of Responsible Tuna Fisheries (OPRT) estimates the number of IUU vessels involved in large-scale tuna longlining has been reduced from 250 to approximately 25 at present.<sup>10</sup>

The WCPFC and IATTC are collaborating in developing a mechanism for regular exchange of vessel data and for sharing of information during the development of IUU lists, design of WCPFC's regional observer program and vessel monitoring system, and increasing compatibility of conservation and management measures per the agreement between the two RFMOs.<sup>11</sup>

Hawaii importers of bigeye tuna have complete tracking systems that allow for identification of the foreign harvest vessels for every shipment of bigeye tuna received by air cargo (Tom Calvert, Thomas Calvert & Associates; Tom Kraft, T.J. Kraft Ltd., personal communications). Knowing the names of harvesting vessels allows Hawaii fresh bigeye tuna importers and their customers to check vessel names against positive lists of authorized pelagic longline fishing vessels. Such cross-checking is done infrequently, however.

As of November 10, 2007, the positive list of WCPFC named 3,665 authorized longline vessels operating in the convention area.<sup>12</sup> The positive list of the IATTC named 1,297 large longline vessels (over 24 meters total length) authorized to operate in the eastern Pacific convention area as of November 10, 2007.<sup>13</sup>

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<sup>10</sup>OPRT 2007. Sashimi tuna market and its impact to tuna. Presentation to Joint Meeting of Tuna RFMOs, January 22-26, 2007, Kyoto, Japan.

<sup>11</sup>Potential Program of Work for 2<sup>nd</sup> WCPFC-IATTC Consultative Meeting, Tumon, Guam 3 December 2007, WCPFC/IATTC-2007-CONS2/03.

<sup>12</sup>WCPFC Record of Authorized Vessels, <http://www.wcpfc.int>.

<sup>13</sup>Regional Vessel Register List, <http://www.iattc.org>.

China-flagged longline vessels operating from Majuro, Marshall Islands, and Tonga-flagged and based longline vessels are presently the largest exporters of fresh bigeye tuna to Hawaii. Both nations are members of the WCPFC and hence, they adhere to fishery management measures that further compliance with the FAO Code, including monitoring, surveillance and enforcement against IUU tuna vessels and participation in establishment of mandatory vessel monitoring and observer requirements for all tuna vessels in the WCPFC convention area.

In conclusion, fresh bigeye tuna marketed in Hawaii or transshipped through Hawaii to U.S. markets are from either the Hawaii domestic longline fishery that clearly meet FAO standards for fishery management (Bartram et al. 2006) or from island nations that participate fully in a regional fishery management organization that furthers the FAO standards for management called for in Article 7 of the Code.

The OPRT tracks bigeye and other species of tuna entering the Japanese market to ensure that it is from cooperating nations. Japan has accused vessels from Chinese Taipei (Taiwan) of illegally laundering frozen bigeye and other species of tuna by abusing transshipment activity from some large-scale longline to reefer carrier vessels at sea. Inspection revealed that false information had been provided for fishing area, name of vessels and transshipping position in a well organized operation that produced false information under the instructions from uncooperative owners of fishing vessels and carrier vessels. Confronted by this illegal activity, Japan is strengthening port inspection on tuna fishing vessels and cargos.<sup>14</sup>

This report suggests that Chinese Taipei may not be completely fulfilling its responsibilities as a member of the WCPFC and, thus may not be in full compliance with the FAO eco-labeling standard for fishery management systems. Hawaii seafood buyers, therefore, should be cautious about importing fresh bigeye (or any other) tuna transshipped from Pacific bases by Taiwanese longline vessels under Taiwan flag or flags of convenience.

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<sup>14</sup>Katsuyama, K. 2006. Japanese tuna trade regulations based on international requirements. P. 127-131 In: (S. Subasinghe, S. Pawiro, S.M. Anthony ed.) World Tuna Trade Conference (9<sup>th</sup>: 2006: Bangkok, Thailand). Proceedings of the Tuna 2006 Bangkok 9<sup>th</sup> INFOFISH World Tuna Trade Conference, Bangkok, 25-27 May 2006. INFOFISH, Malaysia.

## 4.2 FAO eco-labeling standard for the fish stock under consideration

The Pacific Ocean stock of bigeye tuna (*Thunnus obesus*) is not presently overfished or depleted, but it is one of the tuna stocks currently in an “overfishing” condition, according to scientific consensus.<sup>15</sup> “Overfishing” means that current harvesting effort is above a level which is sustainable in the long term, with no potential room for further sustainable increases in catches. The total longline catch of Pacific bigeye tuna in 2006 was 75,496 MT with a landed value of approximately \$ US 504 million, according to provisional estimates.<sup>16</sup>

Fishing pressure on Pacific bigeye tuna comes from pelagic longline fleets that harvest adult fish for the *sashimi* market and from purse seine fleets that harvest juvenile bigeye tuna around floating fish aggregation devices (FAD) for canning. Increased FAD fishing of juvenile tuna by purse seiners has caused concern over the status of adult stocks of bigeye and yellowfin tuna targeted by longline fisheries (Hampton et al. 2006).

Since 1999, participants in multi-nation high-level conferences that led to the adoption of the Western and Central Pacific Tuna Convention and the establishment of the WCPFC have urged all fishing nations to exercise reasonable restraint in expanding fishing effort and fleet capacity in the WCPFC convention area. Nevertheless, tuna fleets of several countries have breached these past agreements and resolutions. Only one longline fishery operating in the WCPFC convention area is actually regulated under a limited entry program that caps the number and size of vessels – the Hawaii longline fishery.

This precautionary management measure was established in 1992 to control fishing capacity in the Hawaii longline fishery through maximum limits on the number (164) and size (101 feet overall length) of vessels authorized to fish with Hawaii longline limited access permits. Longline fishing vessels registered with Hawaii limited access permits have never numbered more than 141 since the limit of 164 permits was established.<sup>17</sup>

No other longline fisheries that supply bigeye tuna to Hawaii and onward U.S. markets have addressed the overfishing condition of Pacific bigeye tuna by directly limiting fishing capacity. Thus, only bigeye tuna that enters the Hawaii market from Hawaii’s own longline fishery can be said to be compliant with the FAO eco-labeling standard calling for management actions to prevent fish stocks from becoming overfished.

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<sup>15</sup>Hampton, J., A. Langley and P. Kleiber. 2006. Stock assessment of bigeye tuna in the western and central Pacific Ocean, including an analysis of management options. WCPFC-SC2-2006/SA WP-2. western and Central Pacific Fisheries Commission, Scientific Committee 2<sup>nd</sup> Regular Session, 7-18 August 2006. Manila, PI.

<sup>16</sup>Williams, P. and C. Reid. 2007. Overview of tuna fisheries in the western and central Pacific Ocean, including economic conditions – 2006. WCPFC-SC3-2007/GN WP-1, Western and Central Pacific Fisheries Commission Scientific Committee 3<sup>rd</sup> regular session, 13-24 August 2007, Honolulu, HI.

<sup>17</sup>(Western Pacific Fishery Management Council, FMP and Annual Reports for Pelagic Fisheries of Western Pacific Region, <http://www.wpcouncil.org/pelagic.htm>).

China-flagged longliners operating of the Marshall Islands and Tonga-flagged and based longliners account for most of Hawaii's fresh bigeye tuna imports. These fleets have licenses to fish in the respective exclusive economic zones of the Marshall Islands and Tonga but neither these port states nor the vessel flag states have limited tuna fishing effort or capacity through fishing license limitation. Until this occurs or WCPFC requires its members to adopt conservation and management measures that directly limit tuna longline fishing effort, foreign longline fisheries will not be in compliance with the FAO eco-labeling standard for fish stock consideration and remedial action.

To date, the WCPFC has established annual bigeye tuna quotas for members and associated nations based on annual bigeye tuna catches by national fleets in the 2001-2004 period.<sup>18</sup> This measure is inadequate in addressing the tuna fishing overcapacity problem, according to some members of the Scientific Committee (SC) that advises WCPFC because the commission has not yet adopted the recommendation of the SC to reduce tuna fishing capacity in the convention area by at least 25 percent<sup>19</sup>

In cooperation with the Japanese government, OPRT and the Japanese longline industry have voluntarily acted to reduce the size of its large-scale longline fleet through a buyback program that aims to scrap about 20 percent of this fleet. OPRT has also enlisted the cooperation of other nations, notably Chinese Taipei, to reduce their fleet and require that Taiwanese-owned vessels that are now under flags of convenience fly the Taiwanese flag.<sup>20</sup> If this fleet reduction is verifiable and traceable, the Japanese and possible Taiwanese longline fisheries may satisfy the FAO eco-labeling standard for the fish stock under consideration because they are taking tangible actions to reduce bigeye fishing mortality before the stock becomes overfished. Hawaii imports of bigeye tuna from these sources, therefore, might then be considered as meeting this standard.

#### **4.3 FAO eco-labeling standard for fishery impacts on the ecosystem**

Comprehensive estimates of pelagic fish population biomass and size structure, through analysis of all available data from Pacific tuna fisheries (including multi-national longline fisheries) for 1950-2004, indicate relatively minor impacts on the pelagic trophic structure in the Pacific Ocean.<sup>21</sup>

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<sup>18</sup> Conservation & Management Measures & Resolutions, CMM 2005-01, <http://www.wcpfc.int>.

<sup>19</sup><http://www.soest.hawaii.edu/PFRP/newsletters/Jan-June2007.pdf> .

<sup>20</sup> Joseph, J. 2003. Managing fishing capacity of the world tuna fleet. FAO Fisheries Circular No. 982, Food and Agriculture Organization of the United Nations, Rome, 2003.

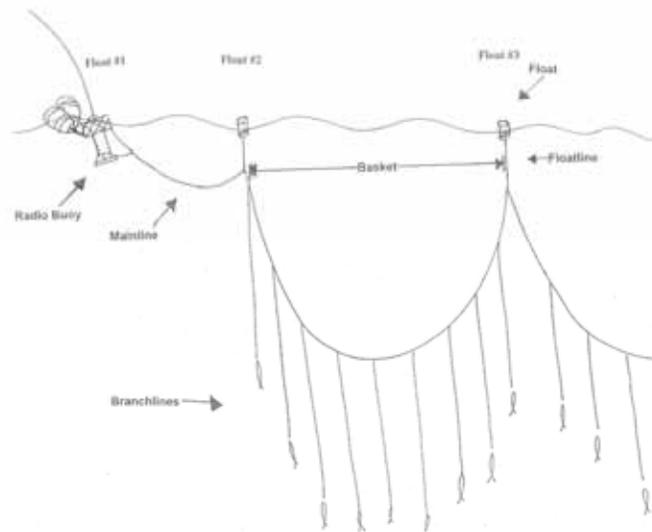
<sup>21</sup><http://www.sciencemag.org/cgi/content/abstract/314/5806/1773?>

The ecosystem perspective, however, has heightened concern about the possible impacts of “bycatch” (both fish and non-fish) in tuna longline fisheries. The term “bycatch” is defined as fish released after capture that are dead or with a poor chance of survival. Incidental catches of protected species, such as seabirds and sea turtles, have become a very important, if not dominant, factor in the perception and management of Pacific tuna longline fisheries.

Pelagic longline fisheries are sometimes characterized as having “high bycatch.” The problem with this generalization that pelagic longlining is not a homogenous method of fishing and bycatch impacts can vary significantly with when, where and how the mainline and hooks are deployed. The general design of pelagic longline gear is relatively simple (Figure 1).

**Figure 1. General Design of Pelagic Longline Gear**

a) Mainline between floats



The quantities and species composition of targeted and incidental catch in pelagic longline fisheries are strongly influenced by operating characteristics, including area and season fished, time of set, ocean temperature, fishing depth, types of hooks, baits and other factors, have been found to significantly affect the catch rates and mix of species caught. Variation in gear characteristics can significantly affect the level of longline fishery interaction with sea turtles, for example (Table 2).

**Table 2. Gear Characteristics and Possible Implications for Incidental Take of Sea Turtles. Source: Bartram and Kaneko, 2004.**

| <i>Characteristic</i>        | <i>Diversity in Pacific Longline Fisheries</i> | <i>Possible Implications for Sea Turtle Bycatch</i>   |
|------------------------------|--|---|
| <b>Hook type</b>             | J hook; circle hook                            | Large circle hooks less likely to hook loggerhead and leatherback turtles than J-hooks.   |
| <b>Hooks between floats</b>  | 2 to 35  | No. of hooks between floats is a proxy for depth of fishing.  |
| <b>Float line length</b>     | 0 to 40 meters (m)                             | Longer float lines are associated with deeper hook depths. Deep sets incidentally capture 10 times fewer sea turtles than shallow sets.                     |
| <b>Branch line length</b>    | 5 to 30m                                       | Longer branch lines may allow hooked or entangled turtles to reach the ocean surface to breathe.  |
| <b>Minimum depth fished</b>  | 5 to 45m                                       | Shallow minimum depth places larger no. of hooks set in the shallow “turtle layer,” resulting in higher sea turtle capture rates than deeper minimum depth. |
| <b>Range of depth fished</b> | 5 to 400m                                      | Deep range of fishing significantly reduces sea turtle capture rates compared to shallow range of fishing.  |
| <b>Hook soak time</b>        | 6 to 20 hrs.                                   | Longer period, combined with shallow depth of fishing, increases possibility of incidental sea turtle capture.  |

The Hawaii longline fishery can claim to have effectively addressed the problem of longline interactions with sea turtles and seabirds. The swordfish sector of the Hawaii longline fishery was closed for three years because of a high level of gear interactions with protected sea turtles. This sector was re-opened in 2004 under new Federal regulations that require the use of circle (rather than J) hooks and fish (rather than squid) bait, with other gear restrictions to reduce sea turtle bycatch.<sup>22</sup>

The maximum annual incidental “take” of protected sea turtles and albatrosses in the Hawaii longline fishery are established in Biological Opinions conducted by the National Oceanic and Atmospheric Administration (NOAA) Fisheries and U.S. Fish and Wildlife Service, as required by the U.S. Endangered Species Act (ESA). If these limits are exceeded, consultations under Section 7 of ESA may be initiated by these agencies.

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<sup>22</sup> [http://www.fpir.noaa.gov/SFD/SFD\\_regs\\_index.html](http://www.fpir.noaa.gov/SFD/SFD_regs_index.html), Code of Federal Regulations, Title 50, Part 665.32

Fishery regulations implemented under the U.S. Magnuson-Stevens Fishery Conservation and Management Act and “biological opinions” mandated under the U.S. Endangered Species Act have:

- Differentiated the “shallow set” Hawaii longline fishery for swordfish (which harvests bigeye tuna incidentally) from the “deep set” longline fishery for tuna (which targets bigeye tuna);
- Provided for 100 percent observer coverage on swordfish longline trips, establish a maximum annual limit on incidental “takes” of leatherback or loggerhead turtles and on the annual number of swordfish longline sets;<sup>23</sup> and
- Required the use of specific measures to reduce interactions with protected species of seabirds in the Hawaii longline fishery and to minimize the severity of injuries to these animals after incidental capture.<sup>24</sup>

The new regulations have resulted in an 89 percent reduction in the incidental take of all turtle species in the Hawaii longline fishery,<sup>25</sup> an 83 percent reduction in seabird bycatch rates in the Hawaii tuna longline fishery sector,<sup>26</sup> and a 96 percent reduction in seabird bycatch in the Hawaii swordfish longline fishery sector.<sup>27</sup>

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<sup>23</sup>Biological Opinion on the Hawaii-based pelagic, deep-set longline fishery, October 4, 2005, [5.2.1](#); U.S. Fish and Wildlife Service Biological Opinion on the effects of the reopened shallow-set sector of the Hawaii-based longline fishery on the short-tailed albatross (*Phoebastria albatrus*), October 8, 2004, Formal Consultation Log Number 1-2-1999-F-02.2, [pp. 71-72](#).

<sup>24</sup>[http://www.fpir.noaa.gov/SFD/SFD\\_regs\\_index.html](http://www.fpir.noaa.gov/SFD/SFD_regs_index.html), Code of Federal Regulations, Title 50, Part 665.35.

<sup>25</sup>Gilman, E., D. Kobayashi, T. Swenarton, N. Brothers, P. Dalzell and I. Kinan-Kelly. 2007. Reducing sea turtle interactions in the Hawaii-based longline swordfish fishery. *Biol. Conserv.* 139 (1-2): 19-28.

<sup>26</sup>Gilman, E. and D. Kobayashi. 2007. Reducing seabird bycatch in the Hawaii longline tuna fishery. National Marine Fisheries Service, Pacific Islands Regional Office, Honolulu, HI.

<sup>27</sup>Pre-regulation seabird bycatch rate calculated from Cousins, K.L., P. Dalzell and E. Gilman. 2000. Appendix 1. Managing pelagic longline-albatross interactions in the North Pacific Ocean. In: (Cooper, J. ed.) Albatross and Petrel Mortality from Longline Fishing International Workshop, Honolulu, HI, USA. 11-12 May 2000. Report and presented papers. *Marine Ornithology* 28: 159-174 and Ito, R.Y. and W.A. Machao. 2001. Annual report of the Hawaii-based longline fishery for 2000. Southwest Fisheries Science Center Adm. Report H-01-07. Honolulu Laboratory, National Marine Fisheries Service, NOAA. Honolulu, HI. Post-regulations seabird bycatch rate from Annual report on seabird interactions and mitigation efforts in the Hawaii-based longline fishery for calendar year 2005. Pacific Islands Regional Office, National Marine Fisheries Service, Honolulu, HI.

Members and cooperating parties in the WCPFC have agreed that methods to reduce sea turtle and seabird bycatch need to be widely adopted in pelagic longline fisheries<sup>28</sup> and some non-Hawaii fisheries are conducting experiments to determine best practices to reduce protected species interactions with longlines. However, no pelagic longline fisheries operating in the WCPFC convention area other than Hawaii's longline fishery are presently mandated by fishery regulations to reduce protected species interactions. Thus, only Hawaii's domestic longline fishery can be said to be "effectively" addressing FAO's eco-labeling standard for fishery impacts on the ecosystem.

Foreign longline fisheries that export fresh bigeye tuna to Hawaii might satisfy this FAO standard in the future if the members of the WCPFC mandate the use of best practices to reduce the incidence and severity of protected species bycatch for their national longline fleets such as those required in Hawaii's longline fishery.

## **5. "Poor Man's" Bigeye Tuna Traceability System**

Traceability, including eco-labeling, is one of many trade and market-related measures that could play a supportive role in promoting long-term sustainability of bigeye tuna longline fisheries. Traceability systems involve record-keeping procedures for tracking the flow of products or product attributes through the production process and/or supply chain. Section 3 described FAO's three minimum standards to qualify fisheries and their products for eco-labeling.

The first FAO standard – fishery management system – is traceable for Hawaii bigeye tuna supplies by cross-checking the harvesting vessel identification against "positive lists" of vessels under a management system and authorized to engage in Pacific longline fishing (e.g., Hawaii longline limited access permit vessel registry, WCPFC and IATTC positive vessel lists).

The second FAO standard – consideration of fish stock and remedial action to avoid overfished status – is traceable for Hawaii bigeye tuna supplies by identifying the harvesting vessel and matching it to flag state and then assessing if that flag state has established limits on the number and size of longline vessels in its national fleet. Only firm limits on fishing capacity can address the current problem of overfishing of Pacific bigeye tuna and prevent this stock from becoming overfished in the future.

The third FAO standard – fishery impact on the ecosystem – is not traceable with presently available information, except for the Hawaii longline fishery, in which gear and operational characteristics are regulated and continuously monitored for possible impacts on protected species. For non-Hawaii longline fisheries to satisfy the third FAO standard, additional information about gear and operations would have to be documented.

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<sup>28</sup>Conservation & Management Measures & Resolutions, Resolution-2005-04, CCM-2006-02, <http://www.wcpfc.int>.

For example, if the usual longline fishing area is in tropical or sub-tropical latitudes, gear interactions with seabirds would be expected to be negligible. If the longline gear is deployed in a “deep-set” configuration, then possible interactions with sea turtles would be ten times less likely than if the gear is deployed in a “shallow set” configuration, in which the majority of hooks are positioned in the upper 40m of the ocean most often frequented by sea turtles. If a large circle hook is used on the branching lines, the rate and severity of interactions with sea turtles would be much less than if a J hook is used. If hooks are baited with fish, the level of longline interaction with sea turtles would be expected to be much lower than if squid is the bait. Existing positive lists could be enhanced to add information about gear and operating characteristics of Pacific longline vessels, thereby allowing a first approximation of their possible levels of interaction with protected sea turtles and sea birds.

A “poor man’s” traceability system for bigeye tuna supplies to Hawaii and other markets could be built from existing longline vessel positive lists without incurring the significantly greater expense and documentation requirements of more elaborate third-party eco-labeling schemes.

## **6. Conclusions and Recommendations**

- In the present case study of bigeye tuna suppliers to the Hawaii fresh fish market, only Hawaii’s pelagic longline fishery was able to satisfy all three FAO minimum standards for eco-labeling. The extraordinary amount of regulation and monitoring of the Hawaii longline fishery and the rich source of data it provides for resource assessment and technological solutions to bycatch issues qualify this as a model for Pacific longline fisheries management.
- Hawaii seafood wholesalers market fresh bigeye tuna supplied by the Honolulu fish auction, a clearly sustainable source based on FAO’s eco-labeling standards, but they also sell bigeye tuna imported from foreign suppliers not presently in compliance with two of FAO’s eco-labeling standards. This information should be passed on to customers.
- Future emphasis in the management of Pacific longline fisheries should be on a) imposing international limits on the number and size of longline vessels, as in Hawaii’s longline fishery; and b) adopting or adapting the best practices of Hawaii’s longline fishery for reducing sea turtle and seabird interactions to all other fleets. Only after broad compliance of Pacific tuna fisheries with standards for responsible fishing do traceability and chain of custody become important.
- Current conservation and management measures of the WCPFC treat all national tuna fisheries the same. This does not reward responsible fishing. Rather than devote substantial resources to third-party eco-labeling and traceability in these fisheries, the same resources might be better spent by improving Pacific tuna fishery management with strong incentives for responsible fishing.