



MONTEREY BAY AQUARIUM®

Seafood WATCH

Developing Sustainable Seafood Recommendations Updated September, 2003

Monterey Bay Aquarium is committed to inspiring conservation of the oceans. To this end, we make every attempt to purchase seafood products for our food service and husbandry departments from sustainable sources. In addition, the Seafood Watch program researches and analyzes wild caught and farmed seafood products for sustainability and shares these seafood recommendations with the public and other interested parties in the form of regionally specific Seafood Watch pocket guides and online at www.montereybayaquarium.org.

We define sustainable seafood as from sources, whether fished or farmed, that can exist into the long-term by maintaining or increasing stock abundance and conserving the structure, function, biodiversity and productivity of the surrounding ecosystem.

We have developed the following framework to research and evaluate the sustainability of seafood. We apply this framework whenever we produce our seafood recommendations.

Program Background

Our program goal is to shift the buying habits of consumers and purveyors to support sustainable fisheries and aquaculture operations. The *Seafood Watch* program was awarded a grant from the David & Lucile Packard Foundation in 2000 to:

- ❑ Provide seafood purchasing recommendations and background information that will enable consumers and purveyors to make better, environmentally sound choices.
- ❑ Conduct outreach and marketing to generate awareness about fisheries and aquaculture that will motivate seafood consumers and purveyors to shift their buying habits to support sustainable sources of seafood.
- ❑ Conduct scientifically rigorous research and make it more accessible to the public and other seafood user groups.

The *Seafood Watch* program is also a partner of the Seafood Choices Alliance, a collaboration of organizations that provide seafood purveyors with information to ensure that their fish is from abundant, wild populations that are under sound management, caught or farmed in ways that minimize harm to the ocean environment, and supports local fishing communities.

Framework for Developing Seafood Recommendations

Step I: Identify Seafood for Review

Market information is collected from specific regions of the United States to identify the seafood products that will appear in a national and regional versions of the *Seafood Watch* pocket guides. These include the most popular seafood items sold in the United States and in each region, incorporating imports and domestic products, which are then researched and evaluated by *Seafood Watch* staff. Ultimately a Seafood Report and accompanying recommendation are generated.

The market information is collected by *Seafood Watch* staff, our regional partners (zoos, aquariums, conservation organizations) and through regional working group meetings with fishery, aquaculture and conservation experts. Sources of the market information include (but are not limited to): industry reports; contact with seafood development councils; informal restaurant and fish/super-market surveys; the National Marine Fisheries Service; and the United Nations Food and Agriculture Organization.

To date, the regions subject to market research include:

- The West Coast
- Hawaii
- The Southeast (including the Mid-Atlantic and Gulf Coasts)
- The Northeast
- The Mid West (including the Great Lakes states)

These regions were derived from a 2001 National Fisheries Institute survey depicting frequency of seafood consumption. The regions are subject to change based on conflicting or overlapping market information.

Step II: Assemble Seafood Information

Once a seafood item has been selected to appear on the *Seafood Watch* pocket guide, staff researchers enlist the following methodology to assemble information:

1. **Conduct internet and library searches to gather comprehensive species information** (see the Seafood Report section in Step III for the type of information gathered). Sources of information may include peer-reviewed published papers; state and federal agency reports; the United Nations Food and Agriculture Organization reports; and other relevant government documents. *Seafood Watch* research assistants, regional partners, and our Board of Scientific Advisors also help identify relevant fishery or aquaculture contacts and gather information.
2. **Review the information and identify fishery or aquaculture experts to discuss issues and locate any additional resources.** The regional working group meeting mentioned in Step I and our Board of Scientific Advisors help *Seafood Watch* researchers identify a network of contacts who include academic and government scientists, resource managers, members of the fishing/aquaculture/seafood industry, and non-governmental organizations. These contacts are essential to compensate for the lag time in published data reflecting the most up to date information and/or when there are gaps or conflicting data.
3. **Incorporate all of the findings into a Seafood Report** (see Step III).
4. **Submit the Seafood Report for external review** (see Step IV).

Step III: Create a Seafood Report

The evaluation of each species occurs in the form of a Seafood Report drafted by *Seafood Watch* researchers. This Report begins with an introduction to the species and includes fishery and market information. In addition, each Report presents and evaluates scientific information related to each of Seafood Watch's sustainability criteria for wild caught and farmed species (see *Criteria* section). This information is combined to arrive at an overall sustainability recommendation (see *Recommendations* section). Specifically, the Reports include the following information:

Executive Summary

- Summary of the species' biology, fishery or aquaculture operation and analysis of sustainability criteria.

Introduction

- Species name (binomial nomenclature)
- Species image
- Species distribution, habitat and life history characteristics
- Statement on the availability of science

Market Information

- Common and market names
- Seasonal availability
- Product forms (fillets, sushi, frozen, etc.)
- Import/export sources and statistics
- Consumption information (markets, popularity, etc.)

Fishery Information

- Fishery range and distribution
- Fishing methods and impacts
- Fishing effort and trends
- Management of the stocks
 - Body/agency and/or statement on lack thereof
 - Relevant laws, agreements, conventions and their implementation
 - Existing regulations (e.g. Fishery Management Plans and their mandates)
- Monitoring (observer program, trawl surveys, logbooks, port-inspections, Vessel Monitoring Systems, Chain-of-Custody documents)
- Enforcement
- Status of the stocks and population trends

Aquaculture Information

- Aquaculture operation type (net pens, inland system, etc.)
- Level of operation (extensive, semi-intensive, intensive)
- Type of feed
- Monitoring of the facility (water quality testing, net checks)
- Management of the operation
 - Body/agency and/or statement on lack thereof
 - Existing regulations

Analysis of Sustainability Criteria and Overall Seafood Recommendation

- Fisheries or Aquaculture criteria and analysis of information to support the recommendation

The information gathered in each Seafood Report is run against the following criteria. These criteria guide the Researchers in developing a seafood recommendation.

Seafood Watch Capture Fisheries Criteria

Criterion 1: Inherent Vulnerability to Fishing Pressure

Factors to evaluate:

- Intrinsic rate of increase ('r')
- Age at 50% sexual maturity
- Maximum age
- Reproductive potential (fecundity)
- Species range
- Evidence of special behaviors that increase ease, or population consequences, of capture
- Evidence of high population variability driven by physical environmental change

Criterion 2: Status of Wild Stocks

Factors to evaluate:

- Classification status
- Current population abundance relative to BMSY
- Long term trend in population abundance as measured by fishery independent means (i.e. stock assessment)
- Short term trend in population abundance as measured by fishery independent means (i.e. stock assessment)
- Long term trend in population abundance as estimated from catch per unit effort (CPUE)
- Short term trend in population abundance as estimated from catch per unit effort (CPUE)
- Occurrence of overfishing (current level of fishing mortality relative to overfishing threshold)
- Current age, size or sex distribution of the stock relative to natural condition
- Overall degree of uncertainty in status of stock

Criterion 3: Nature and Extent of Bycatch

Factors to evaluate

- Composition of the bycatch, including any species of "special concern"
- Population consequences of bycatch
- Quantity of bycatch relative to the quantity of targeted landings
- Short and long-term trend in quantity and composition of bycatch as a result of management decisions, including gear innovations.
- Evidence that the ecosystem has been or will likely be altered in response to the continued removal of the bycatch species

Criterion 4: Effect of Fishing Practices on Habitats and Ecosystems

Habitat factors:

- Effect of fishing gear on physical and biogenic habitats
- Resilience of physical and biogenic habitats to disturbance by fishing method
- Areal extent of cumulative fishing gear effects

Ecosystem factors:

- Evidence that the removal of targeted species has or will likely substantially disrupt the food web
- Evidence that the fishing method has caused or is likely to cause ecosystem state changes, including alternate stable states or regime shifts.

Criterion 5: Effectiveness of the Management Regime

Factors to evaluate:

- Stock Status: Does management implement a stock assessment that seeks scientific knowledge related to the short and long-term status of the stock?
- Scientific Monitoring: Does management regularly collect data and analyze it with respect to stock abundance?
- Scientific Advice: Does management ignore advice from its scientific advisors?
- Bycatch: Does management implement an effective bycatch reduction plan?
- Fishing practices: Does management address the effect of the fishing method(s) on habitats and ecosystems?
- Enforcement: Do management and appropriate government bodies enforce fishery regulations?
- Management Track Record: Have conservation measures enacted by management resulted in the long-term maintenance of stock abundance and ecosystem integrity?

Seafood Watch Aquaculture (farm-raised) Criteria

Criterion 1: Efficiency of Fishmeal Use

Factors to evaluate:

- Feeding method
- Nature of commercial feed, if used
- Feed Conversion ratio
- Stock status of the reduction fishery used for fish feed

Criterion 2: Genetic Risk to Wild Stocks

Factors to evaluate:

- Native/non-native status of farmed species
- Evidence that farmed fish regularly escape to the wild
- Evidence that escaped fish reduce wild stocks through competition for food resources or critical habitats, spawning disruption, genetic introgression through successful crossbreeding or the establishment of self-sustaining feral stocks

Criterion 3: Risk of Disease Transfer to Wild Stocks

Factors to evaluate

- Disease prevalence in operations
- Trend in disease prevalence
- Evidence of amplification and then retransmission of disease to wild stocks

Criterion 4: Effects on Other Species, Habitats and Ecosystems

Factors to evaluate:

- Location
- Potential impact to habitats: method of grow out/harvest
- Potential impacts to habitats: Extent (density of sites/area, fish/site and fish/pen)
- Evidence of negative effects of farming on local and surrounding habitats
- Evidence of positive effects of farming on local or surrounding ecosystems
- Source of seed stock
- Composition and relative biomass of bycatch during collection of seed stock
- Use and effect of predator controls (e.g. for birds and marine mammals) in farming operations

Criterion 5: Potential Pollution Effects

Factors to evaluate:

- Waste water treatment
- Evidence of local or regional wastewater effects

Criterion 6: Use of chemicals, including but not limited to antibiotics, pesticides, herbicides, algaecides, and insecticides

Factors to evaluate:

- Current chemical use
- Trend in chemical use

Criterion 7: Effectiveness of the Management Regime

Factors to evaluate:

- Use of licensing to control the location (siting), number, size and stocking density of farms
- Demonstrated application of existing federal, state and local laws to current aquaculture operations
- Existence and effectiveness of measures to prevent disease and to treat those outbreaks that do occur (e.g. pest management practices, fallowing of pens, retaining diseased water, etc.)
- Regulation of chemicals such as antibiotics, pesticides, and herbicides
- Existence and effectiveness of “better management practices” (preferably from non-industry sources) for aquaculture operations, especially to reduce escaped fish
- Existence and effectiveness of policies and incentives (preferably from non-industry sources) utilizing the precautionary approach to guide expansion of the aquaculture industry

Seafood Watch Sustainability Recommendations

After the information from the Seafood Report is run through the criteria, one of three potential recommendations is generated: Best Choice, Caution/Better Choice or Avoid. These recommendations are ultimately printed on the *Seafood Watch* pocket guide and on the aquarium web site at www.montereybayaquarium.org.

Best Choices

These seafood products evaluated well against most or all of our sustainability criteria. The wild population is abundant enough to sustain current fishing; there are low levels of wasted catch (bycatch), and the fish are caught or farmed in ways that minimize environmental impacts.

Caution/Better Choices

These seafood products did not evaluate well against one or more of the criteria, but are better choices than seafood on the Avoid list. There may be concerns about the status of the stocks, bycatch levels or effects of fishing or aquaculture practices on the environment. Seafood from a specific source may be caught in a manner that is more sustainable than from other sources. Consumers are encouraged to check the source carefully.

Avoid

These seafood products evaluated very poorly against one, or poorly against many of our sustainability criteria, and are thus deemed not sustainable. Wild stocks may be overfished, there may be high levels of bycatch, and/or the fish is caught or farmed in a way does not conserve the structure, function, biodiversity or productivity of the surrounding ecosystem.

Step IV: Seafood Report Review

Each Seafood Report is externally reviewed for scientific content and accuracy:

- Phase I:** *Seafood Watch* Science Manager
 - Review for content, scientific rigor and *Seafood Watch* consistency, voice, tone, grammar
- Phase II:** *Seafood Watch* Researcher
 - Revise the report
- Phase III:** At least two fishery or aquaculture experts and relevant Board of Expert members
 - Review for content, accuracy, and thoroughness
- Phase IV:** *Seafood Watch* Researcher
 - Revise the report
- Phase V:** *Seafood Watch* Science Manager and Editor
 - Final review for grammar and presentation
- Phase VI:** *Seafood Watch* Program Assistant
 - Post Report for public access on aquarium web site and Seafood Information Center (see Step VI)

Step V: Seafood Watch Ranking Session

Completed Seafood Reports and the ensuing recommendations are shared with *Seafood Watch* regional partners, the regional working group participants and with the partners of the Seafood Choices Alliance for feedback and to work toward consistency with other seafood awareness campaigns. *Seafood Watch* staff then gather for an intensive Ranking Session where staff present, discuss, and critique each other's Reports and recommendations. Accumulated feedback from working group participants and other interested parties is also discussed at the Ranking Session. Ultimately, the *Seafood Watch* staff must reach internal consensus before finalizing and publishing a recommendation.

Step VI: Monitoring, Updates and Evaluation

Fisheries and aquaculture information is constantly changing due to ongoing research by scientists, resource managers, conservation groups, and the seafood industry as well as shifts in the marine environment. In addition, the *Seafood Watch* criteria and methodology is continually refined to better reflect the nature of conservation science and conservation decision-making. Our Board of Scientific Advisors, staff and regional partners monitor for these updates and new developments. Our relationships with scientists and industry representatives allow efficient communication of new information. In addition, the Seafood Information Center – an online database housing the fisheries and aquaculture information used to develop the Seafood Reports at www.seafoodinfocenter.org - allows other interested parties to contribute new information at any time.

The *Seafood Watch* Reports and subsequent recommendations are dynamic documents. They are updated as new information becomes available. Our recommendations are therefore updated twice a year both on our printed regional pocket guides and online.

Seafood Watch is currently conducting a formal evaluation of our program strategies. The evaluation will be concluded in early 2004. Contact Jennifer Dianto, *Seafood Watch* Program Manager at (831) 647-6872 or email jdianto@mbayaq.org with any comments or questions.