



Developing Sustainable Seafood Recommendations Updated April 23, 2008

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 evaluates 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.seafoodwatch.org.

We define sustainable seafood as from sources, whether fished or farmed, that can maintain or increase production into the long-term without jeopardizing the structure or function of affected ecosystems.

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

Seafood Watch's mission is to empower seafood consumers and businesses to make choices for healthy oceans. We work to shift the buying habits of these groups to support sustainable fisheries and aquaculture operations. Since the program's inception in 2000, Seafood Watch® continues to meet the following goals:

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

Our work is made possible by generous support from individuals, foundations, corporations and partners.

Seafood Watch® is also a partner of the Seafood Choices Alliance: an association of conservation organizations, educational institutions and professionals in the food industry working toward the common goal of creating a demand for sustainable seafood.

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 to be evaluated for regional versions of the Seafood Watch® pocket guide. These include (but are not limited to) 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 market information include (but are not limited to): industry reports, contact with seafood development councils, informal restaurant and fish/supermarket surveys, the National Marine Fisheries Service, and the United Nations Food and Agriculture Organization.

To date, market research has been completed for the following regions of the United States:

- West Coast
- Hawaii
- Southeast (including the Mid-Atlantic)
- Northeast
- Central U.S. (including the Great Lakes states)
- Southwest

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 for evaluation, Seafood Watch® research analysts enlist the following methodology to assemble and analyze information:

1. **Gather comprehensive species and fishery/aquaculture information** (see the Seafood Report section in Step III for the type of information gathered). Sources of information includes peer-reviewed published papers, state and federal agency reports, the United Nations Food and Agriculture Organization reports and other relevant government documents. Our regional partners and our Board of Advisors also help identify relevant fishery or aquaculture contacts and information.
2. **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 Advisors help us identify a network of experts including 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

Seafood Watch® analyses each species by compiling information as it relates to our sustainability criteria for wild caught and farmed species (see *Criteria* section). The individual criteria are combined to arrive at an overall sustainability recommendation (see *Recommendations* section). Specifically, the Reports generally include the following information:

Executive Summary

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

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 presented in each Seafood Report is run against the following criteria. These criteria guide our Seafood Watch® research analysts 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 first maturity
- von Bertalanffy growth coefficient (k)
- Maximum age
- Reproductive potential (fecundity)
- Species range
- Evidence of special behaviors that increase ease of capture
- Quality of habitat from non-fishery impacts

Criterion 2: Status of Wild Stocks

Factors to evaluate:

- Classification status
- Current population abundance relative to B_{MSY}
- Occurrence of overfishing (current level of fishing mortality relative to overfishing threshold)
- Overall degree of uncertainty in stock status
- Long and short term trend in population abundance as measured by fishery dependent and independent means
- Current age, size or sex distribution of the stock relative to natural condition

Criterion 3: Nature and Extent of Discarded Bycatch

Factors to evaluate

- Quantity of bycatch relative to the quantity of targeted landings
- Composition of the bycatch, including any species of "special concern"
- Population consequences of bycatch
- Short and long-term trends in bycatch interaction rates
- Evidence of ecosystem alteration through 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
- Spatial extent of fishing gear effects
- Evidence of ecosystem alteration through use of fishing gear

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: Use of Marine Resources

Factors to evaluate:

- Nature of commercial feed, if used
- Reduction Rate, Inclusion Rate, and Feed Conversion Ratio, if applicable
- Stock status of the reduction fishery used for fish feed
- Source of stock for farmed species

Criterion 2: Risk of Escaped Fish to Wild Stocks

Factors to evaluate:

- Frequency of escape
- Native/non-native status of escaped fish
- 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
- Conservation status of impacted wild stocks

Criterion 3: Risk of Disease and Parasite Transfer to Wild Stocks

Factors to evaluate

- Risk of amplification and retransmission of disease
- Risk of species introductions or translocations
- Bio-safety risks inherent in the operations
- Stock status of impacted wild stocks

Criterion 4: Risk of Pollution and Habitat Impacts

Factors to evaluate:

- Effluent water treatment
- Evidence and extent of local and regional effluent effects
- Habitat impacts from operations

Criterion 5: Effectiveness of the Management Regime

Factors to evaluate:

- Demonstrated application of existing federal, state and local laws to current aquaculture operations
- Use of licensing to control the location (siting), number, size and stocking density of farms
- Existence and effectiveness of “better management practices” for aquaculture operations, especially to reduce escaped fish
- Existence and effectiveness of measures to prevent disease and to treat those outbreaks that do occur
- Existence of regulations for therapeutants, including their release into the environment, such as antibiotics, biocides, and herbicides
- Use and effect of predator controls in farming operations
- Existence and effectiveness of policies and incentives utilizing a precautionary approach against irreversible risks to guide expansion of the aquaculture industry

After the information in the Seafood Report is run through the criteria, one of three potential seafood recommendations is generated: Best Choice, Good Alternative or Avoid. These recommendations are ultimately printed on the Seafood Watch® pocket guide and on our web site at www.seafoodwatch.org.

Best Choices

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

Good Alternatives

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 Watch® encourages consumers to purchase seafood in this category while recognizing that there may be some concerns about long-term sustainability. Consumers are encouraged to learn more and check their sources carefully.

Avoid

These seafood products evaluated very poorly against one, or poorly against many of our sustainability criteria, and are thus deemed to not be sustainable. Wild stocks may be overfished, there may be unacceptably high levels of bycatch, and/or the fish is caught or farmed in ways that have deleterious impacts on affected ecosystems.

Step IV: Seafood Report Review

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

- Phase I:** Seafood Watch® Science Manager
 - Review for content, scientific rigor, consistency, voice, tone, grammar
- Phase II:** At least two external fishery or aquaculture experts and relevant Board of Advisor members
 - Review for content, accuracy, and thoroughness
- Phase III:** Seafood Watch® Science Manager and Copy Editor
 - Final review for grammar and presentation
- Phase VI:** Seafood Watch® Web Developer
 - Post Report for public access on Seafood Watch® web site (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 in recommendations with other seafood awareness campaigns. Seafood Watch® then conducts an intensive ranking session where our research analysts 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. Seafood Watch®, and none of the groups mentioned above, is responsible for the final seafood recommendations.

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® methodology is continually refined to better reflect the nature of conservation science and conservation decision-making. Our Board of Advisors, internal staff and regional partners monitor for these new developments. In addition, the working group process and our ongoing relationships with scientists and industry representatives allow effective communication of emerging information.

Seafood Watch® Seafood Reports and their subsequent recommendations are dynamic documents. They are updated as new information becomes available. Our printed regional pocket guides are updated twice a year, and Seafood Watch® research analysts incorporate any changes in stock status as this information becomes available.