Capture Fisheries Evaluation

Species: *Insert Species*	**Region:** *Insert Region*
Analyst: *Insert Analyst*	**Date:** *Insert Date*

Seafood Watch™ defines sustainable seafood as originating from sources, whether fished[1] or farmed, that can maintain or increase production in the long-term without jeopardizing the structure or function of affected ecosystems.

The following **guiding principles** illustrate the qualities that capture fisheries must possess to be considered sustainable by the Seafood Watch program. Species from sustainable capture fisheries:

- have a low vulnerability to fishing pressure, and hence a low probability of being overfished, because of their inherent life history characteristics;
- have stock structure and abundance sufficient to maintain or enhance long-term fishery productivity;
- are captured using techniques that minimize the catch of unwanted and/or unmarketable species;
- are captured in ways that maintain natural functional relationships among species in the ecosystem, conserves the diversity and productivity of the surrounding ecosystem, and do not result in irreversible ecosystem state changes; and
- have a management regime that implements and enforces all local, national and international laws and utilizes a precautionary approach to ensure the long-term productivity of the resource and integrity of the ecosystem.

Seafood Watch has developed a set of five sustainability **criteria,** corresponding to these guiding principles, to evaluate capture fisheries for the purpose of developing a seafood recommendation for consumers and businesses. These criteria are:

1. Inherent vulnerability to fishing pressure
2. Status of wild stocks
3. Nature and extent of discarded bycatch
4. Effect of fishing practices on habitats and ecosystems
5. Effectiveness of the management regime

Each criterion includes:

- Primary factors to evaluate and rank
- Secondary factors to evaluate and rank
- Evaluation guidelines[2] to synthesize these factors
- A resulting **rank** for that criterion

Once a rank has been assigned to each criterion, an **overall seafood recommendation** for the species in question is developed based on additional evaluation guidelines. The ranks for each criterion, and the resulting overall seafood recommendation, are summarized in a table. Criterion ranks and the overall seafood recommendation are color-coded to correspond to the categories of the Seafood Watch pocket guide:

[1] "Fish" is used throughout this document to refer to finfish, shellfish and other wild-caught invertebrates.
[2] Evaluation Guidelines throughout this document reflect common combinations of primary and secondary factors that result in a given level of conservation concern. Not all possible combinations are shown – other combinations should be matched as closely as possible to the existing guidelines.

Best Choices/Green: Consumers are strongly encouraged to purchase seafood in this category. The wild-caught species is sustainable as defined by Seafood Watch.

Good Alternatives/Yellow: Consumers are encouraged to purchase seafood in this category, as they are better choices than seafood in the Avoid category. However there are some concerns with how this species is fished and thus it does not demonstrate all of the qualities of a sustainable fishery as defined by Seafood Watch.

Avoid/Red: Consumers are encouraged to avoid seafood in this category, at least for now. Species in this category do not demonstrate enough qualities to be defined as sustainable by Seafood Watch.

CRITERION 1: INHERENT VULNERABILITY TO FISHING PRESSURE

Guiding Principle: Sustainable wild-caught species have a low vulnerability to fishing pressure, and hence a low probability of being overfished, because of their inherent life history characteristics.

Primary Factors[3] to evaluate

Intrinsic rate of increase ('r')

- High (> 0.16)
- Medium (0.05 - 0.16)
- Low (< 0.05)
- Unavailable/Unknown

Age at 1st maturity

- Low (< 5 years)
- Medium (5 - 10 years)
- High (> 10 years)
- Unavailable/Unknown

Von Bertalanffy growth coefficient ('k')

- High (> 0.16)
- Medium (0.05 - 0.15)
- Low (< 0.05)
- Unavailable/Unknown

Maximum age

- Low (< 11 years)
- Medium (11 - 30 years)
- High (> 30 years)
- Unavailable/Unknown

[3] These primary factors and evaluation guidelines follow the recommendations of Musick et al. (2000). Marine, estuarine, and diadromous fish stocks at risk of extinction in North America (exclusive of Pacific salmonids). Fisheries 25:6-30.

Reproductive potential (fecundity)

- High (> 100 inds./year)
- Moderate (10 – 100 inds./year)
- Low (< 10 inds./year)
- Unavailable/Unknown

Secondary Factors to evaluate

Species range

- Broad (e.g. species exists in multiple ocean basins, has multiple intermixing stocks or is highly migratory)
- Limited (e.g. species exists in one ocean basin)
- Narrow (e.g. endemism or numerous evolutionary significant units or restricted to one coastline)

Special Behaviors or Requirements: Existence of special behaviors that increase ease or population consequences of capture (e.g. migratory bottlenecks, spawning aggregations, site fidelity, unusual attraction to gear, sequential hermaphrodites, segregation by sex, etc., OR specific and limited habitat requirements within the species' range).

- No known behaviors or requirements OR behaviors that decrease vulnerability (e.g. widely dispersed during spawning)
- Some (i.e. 1 - 2) behaviors or requirements
- Many (i.e. > 2) behaviors or requirements

Quality of Habitat: Degradation from non-fishery impacts

- Habitat is robust
- Habitat has been moderately altered by non-fishery impacts
- Habitat has been substantially compromised from non-fishery impacts and thus has reduced capacity to support this species (e.g. from dams, pollution, or coastal development)

Evaluation Guidelines

1) Primary Factors
   a) If 'r' is known, use it as the basis for the rank of the Primary Factors.
   b) If 'r' is unknown, then the rank from the remaining Primary Factors (in order of importance, as listed) is the basis for the rank.

2) Secondary Factors
   a) If a majority (2 out of 3) of the Secondary Factors rank as Red, reclassify the species into the next lower rank (i.e. Green becomes Yellow, Yellow becomes Red). No other combination of Secondary Factors can modify the rank from the Primary Factors.
   b) No combination of primary and secondary factors can result in a Critical Conservation Concern for this criterion.

Conservation Concern: Inherent Vulnerability

- Low (Inherently Resilient) 
- Moderate (Moderately Vulnerable) 
- High (Highly Vulnerable) 

CRITERION 2: STATUS OF WILD STOCKS

Guiding Principle: Sustainable wild-caught species have stock structure and abundance sufficient to maintain or enhance long-term fishery productivity.

Primary Factors to evaluate

Management classification status

- Underutilized OR close to virgin biomass
- Fully fished OR recovering from overfished OR unknown
- Recruitment or growth overfished, overexploited, depleted or "threatened"

Current population abundance relative to B_{MSY}

- At or above B_{MSY} (> 100%)
- Moderately Below B_{MSY} (50 – 100%) OR unknown
- Substantially below B_{MSY} (< 50%)

Occurrence of overfishing (current level of fishing mortality relative to overfishing threshold)

- Overfishing not occurring ($F_{curr}/F_{msy} < 1.0$)
- Overfishing is likely/probable OR fishing effort is increasing with poor understanding of stock status OR Unknown
- Overfishing occurring ($F_{curr}/F_{msy} > 1.0$)

Overall degree of uncertainty in status of stock

- Low (i.e. current stock assessment and other fishery-independent data are robust OR reliable long-term fishery-dependent data available)
- Medium (i.e. only limited, fishery-dependent data on stock status are available)
- High (i.e. little or no current fishery-dependent or independent information on stock status OR models/estimates broadly disputed or otherwise out-of-date)

Long-term trend (relative to species' generation time) in population abundance as measured by either fishery-independent (stock assessment) or fishery-dependent (standardized CPUE) measures

- Trend is up
- Trend is flat or variable (among areas, over time or among methods) OR Unknown
- Trend is down

Short-term trend in population abundance as measured by either fishery-independent (stock assessment) or fishery-dependent (standardized CPUE) measures

- Trend is up
- Trend is flat or variable (among areas, over time or among methods) OR Unknown
- Trend is down

Current age, size or sex distribution of the stock relative to natural condition

- Distribution(s) is(are) functionally normal
- Distribution(s) unknown
- Distribution(s) is(are) skewed

Evaluation Guidelines

A "Healthy" Stock:

1) Is underutilized (near virgin biomass)
2) Has a biomass at or above BMSY AND overfishing is not occurring AND distribution parameters are functionally normal AND stock uncertainty is not high

A "Moderate" Stock:

1) Has a biomass at 50-100% of BMSY AND overfishing is not occurring
2) Is recovering from overfishing AND short-term trend in abundance is up AND overfishing not occurring AND stock uncertainty is low
3) Has an Unknown status because the majority of primary factors are unknown.

A "Poor" Stock:

1) Is fully fished AND trend in abundance is down AND distribution parameters are skewed
2) Is overfished, overexploited or depleted AND trends in abundance and CPUE are up.
3) Overfishing is occurring AND stock is not currently overfished.

A stock is considered a **Critical Conservation Concern** and the species is ranked "Avoid**"**, regardless of other criteria, if it is:

1) Overfished, overexploited or depleted AND trend in abundance is flat or down
2) Overfished AND overfishing is occurring
3) Listed as a "threatened species" or similar proxy by national or international bodies

Conservation Concern: Status of Stocks

- Low (Stock Healthy)
- Moderate (Stock Moderate or Unknown)
- High (Stock Poor)
- Stock Critical

CRITERION 3: NATURE AND EXTENT OF DISCARDED BYCATCH[4]

Guiding Principle: A sustainable wild-caught species is captured using techniques that minimize the catch of unwanted and/or unmarketable species.

Primary Factors to evaluate

Quantity of bycatch, including any species of "special concern" (i.e. those identified as "endangered", "threatened" or "protected" under state, federal or international law)

- Quantity of bycatch is low (< 10% of targeted landings on a per number basis) AND does not regularly include species of special concern
- Quantity of bycatch is moderate (10 – 100% of targeted landings on a per number basis) AND does not regularly include species of special concern OR Unknown
- Quantity of bycatch is high (> 100% of targeted landings on a per number basis) OR bycatch regularly includes threatened, endangered or protected species

Population consequences of bycatch

- Low: Evidence indicates quantity of bycatch has little or no impact on population levels
- Moderate: Conflicting evidence of population consequences of bycatch OR Unknown
- Severe: Evidence indicates quantity of bycatch is a contributing factor in driving one or more bycatch species toward extinction OR is a contributing factor in limiting the recovery of a species of "special concern"

Trend in bycatch interaction rates (adjusting for changes in abundance of bycatch species) as a result of management measures (including fishing seasons, protected areas and gear innovations):

- Trend in bycatch interaction rates is down
- Trend in bycatch interaction rates is flat OR Unknown
- Trend in bycatch interaction rates is up
- Not applicable because quantity of bycatch is low

[4] Bycatch is defined as species that are caught but subsequently discarded because they are of undesirable size, sex or species composition. Unobserved fishing mortality associated with fishing gear (e.g. animals passing through nets, breaking free of hooks or lines, ghost fishing, illegal harvest and under or misreporting) is also considered bycatch. Bycatch does not include incidental catch (non-targeted catch) if it is utilized, is accounted for, and is managed in some way.

Secondary Factor to evaluate

Evidence that the ecosystem has been or likely will be substantially altered (relative to natural variability) in response to the continued discard of the bycatch species

- Studies show no evidence of ecosystem impacts
- Conflicting evidence of ecosystem impacts OR Unknown
- Studies show evidence of substantial ecosystem impacts

Evaluation Guidelines

Bycatch is **"Minimal"** if:

1) Quantity of bycatch is <10% of targeted landings AND bycatch has little or no impact on population levels.

Bycatch is **"Moderate"** if:

1) Quantity of bycatch is 10 - 100% of targeted landings
2) Bycatch regularly includes species of "special concern" AND bycatch has little or no impact on the bycatch population levels AND the trend in bycatch interaction rates is not up.

Bycatch is "Severe" if:

1) Quantity of bycatch is > 100% of targeted landings
2) Bycatch regularly includes species of "special concern" AND evidence indicates bycatch rate is a contributing factor toward extinction or limiting recovery AND trend in bycatch is down.

Bycatch is considered a **Critical Conservation Concern** and the species is ranked "Avoid", regardless of other criteria, if:

1) Bycatch regularly includes species of special concern AND evidence indicates bycatch rate is a factor contributing to extinction or limiting recovery AND trend in bycatch interaction rates is not down.
2) Quantity of bycatch is high AND studies show evidence of substantial ecosystem impacts.

Conservation Concern: Nature and Extent of Discarded Bycatch

- Low (Bycatch Minimal)
- Moderate (Bycatch Moderate)
- High (Bycatch Severe)
- Bycatch Critical

CRITERION 4: EFFECT OF FISHING PRACTICES ON HABITATS AND ECOSYSTEMS

Guiding Principle: Capture of a sustainable wild-caught species maintains natural functional relationships among species in the ecosystem, conserves the diversity and productivity of the surrounding ecosystem, and does not result in irreversible ecosystem state changes.

Primary Habitat Factors to evaluate

Known (or inferred from other studies) effect of fishing gear on physical and biogenic habitats

- Minimal damage (i.e. pelagic longline, midwater gillnet, midwater trawl, purse seine, hook and line, or spear/harpoon) 
- Moderate damage (i.e. bottom gillnet, bottom longline or some pots/ traps) 
- Great damage (i.e. bottom trawl or dredge) 

For specific fishery being evaluated, resilience of physical and biogenic habitats to disturbance by fishing method

- High (e.g. shallow water, sandy habitats) 
- Moderate (e.g. shallow or deep water mud bottoms, or deep water sandy habitats) 
- Low (e.g. shallow or deep water corals, shallow or deep water rocky bottoms) 
- Not applicable because gear damage is minimal 

If gear impacts are moderate or great, spatial scale of the impact

- Small scale (e.g. small, artisanal fishery or sensitive habitats are strongly protected) 
- Moderate scale (e.g. modern fishery but of limited geographic scope) 
- Large scale (e.g. industrialized fishery over large geographic areas) 
- Not applicable because gear damage is minimal 

Primary Ecosystem Factors to evaluate

Evidence that the removal of the targeted species or the removal/deployment of baitfish has or will likely substantially disrupt the food web

- The fishery and its ecosystem have been thoroughly studied, and studies show no evidence of substantial ecosystem impacts 
- Conflicting evidence of ecosystem impacts OR Unknown 
- Ecosystem impacts of targeted species removal demonstrated 

Evidence that the fishing method has caused or is likely to cause substantial ecosystem state changes, including alternate stable states

- The fishery and its ecosystem have been thoroughly studied, and studies show no evidence of substantial ecosystem impacts
- Conflicting evidence of ecosystem impacts OR Unknown
- Ecosystem impacts from fishing method demonstrated

Evaluation Guidelines

The effect of fishing practices is **"Benign"** if:

1) Damage from gear is minimal AND resilience to disturbance is high AND neither Ecosystem Factor is red.

The effect of fishing practices is **"Moderate"** if:

1) Gear effects are moderate AND resilience to disturbance is moderate or high AND neither Ecosystem Factor is red.
2) Gear results in great damage AND resilience to disturbance is high OR impacts are small scale AND neither Ecosystem Factor is red.
3) Damage from gear is minimal and one Ecosystem factor is red.

The effect of fishing practices **is "Severe"** if:

1) Gear results in great damage AND the resilience of physical and biogenic habitats to disturbance is moderate or low.
2) Both Ecosystem Factors are red.

Habitat effects are considered a **Critical Conservation Concern** and a species receives a recommendation of "**Avoid"**, regardless of other criteria if:

- Four or more of the Habitat and Ecosystem factors rank red.

Conservation Concern: Effect of Fishing Practices on Habitats and Ecosystems

- Low (Fishing Effects Benign)
- Moderate (Fishing Effects Moderate)
- High (Fishing Effects Severe)
- Critical Fishing Effects

CRITERION 5: EFFECTIVENESS OF THE MANAGEMENT REGIME

Guiding Principle: The management regime of a sustainable wild-caught species implements and enforces all local, national and international laws and utilizes a precautionary approach to ensure the long-term productivity of the resource and integrity of the ecosystem.

Primary Factors to evaluate

Stock Status: Management process utilizes an independent scientific stock assessment that seeks knowledge related to the status of the stock

- Stock assessment complete and robust 
- Stock assessment is planned or underway but is incomplete OR stock assessment complete but out-of-date or otherwise uncertain 
- No stock assessment available now and none is planned in the near future 

Scientific Monitoring: Management process involves regular collection and analysis of data with respect to the short and long-term abundance of the stock

- Regular collection and assessment of both fishery-dependent and independent data 
- Regular collection of fishery-dependent data only 
- No regular collection or analysis of data 

Scientific Advice: Management has a well-known track record of consistently setting or exceeding catch quotas beyond those recommended by its scientific advisors and other external scientists:

- No 
- Yes 
- Not enough information available to evaluate OR not applicable because little or no scientific information is collected 

Bycatch: Management implements an effective bycatch reduction plan

- Bycatch plan in place and reaching its conservation goals (deemed effective) 
- Bycatch plan in place but effectiveness is not yet demonstrated or is under debate 
- No bycatch plan implemented or bycatch plan implemented but not meeting its conservation goals (deemed ineffective) 
- Not applicable because bycatch is “low” 

Fishing practices: Management addresses the effect of the fishing method(s) on habitats and ecosystems

- Mitigative measures in place and deemed effective
- Mitigative measures in place but effectiveness is not yet demonstrated or is under debate
- No mitigative measures in place or measures in place but deemed ineffective
- Not applicable because fishing method is moderate or benign

Enforcement: Management and appropriate government bodies enforce fishery regulations

- Regulations regularly enforced by independent bodies, including logbook reports, observer coverage, dockside monitoring and similar measures
- Regulations enforced by fishing industry or by voluntary/honor system
- Regulations not regularly and consistently enforced

Management Track Record: Conservation measures enacted by management have resulted in the long-term maintenance of stock abundance and ecosystem integrity

- Management has maintained stock productivity over time OR has fully recovered the stock from an overfished condition
- Stock productivity has varied and management has responded quickly OR stock has not varied but management has not been in place long enough to evaluate its effectiveness OR Unknown
- Measures have not maintained stock productivity OR were implemented only after significant declines and stock has not yet fully recovered

Evaluation Guidelines

Management is deemed to be "**Highly Effective**" if the majority of management factors are green AND the remaining factors are not red.

Management is deemed to be "**Moderately Effective**" if:

1) Management factors "average" to yellow
2) Management factors include one or two red factors

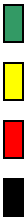
Management is deemed to be "**Ineffective**" if three individual management factors are red, including especially those for Stock Status and Bycatch.

Management is considered a **Critical Conservation Concern** and a species receives a recommendation of "**Avoid"**, regardless of other criteria if:

1) There is no management in place
2) The majority of the management factors rank red.

Conservation Concern: Effectiveness of Management

- Low (Management Highly Effective)
- Moderate (Management Moderately Effective)
- High (Management Ineffective)
- Critical (Management Critically Ineffective)



Overall Seafood Recommendation

Overall Guiding Principle: Sustainable wild-caught seafood originates from sources that can maintain or increase production in the long-term without jeopardizing the structure or function of affected ecosystems.

Evaluation Guidelines

A species receives a recommendation of "**Best Choice**" if:

1) It has three or more green criteria and the remaining criteria are not red.

A species receives a recommendation of "**Good Alternative**" if:

1) Criteria "average" to yellow
2) There are four green criteria and one red criteria
3) Stock Status and Management criteria are both ranked yellow and remaining criteria are not red.

A species receives a recommendation of "**Avoid**" if:

1) It has a total of two or more red criteria
2) It has one or more Critical Conservation Concerns.

Summary of Criteria Ranks

	Conservation Concern			
Sustainability Criteria	Low	Moderate	High	Critical
Inherently Vulnerability				
Status of Wild Stocks				
Nature and Extent of Discarded Bycatch				
Habitat and Ecosystem Effects				
Effectiveness of Management				

Overall Seafood Recommendation

Best Choice 

Good Alternative 

Avoid 