Albacore Tuna

Thunnus alalunga

Canada, Japan and U.S.

Hand-operated pole and lines and Trolling lines

October 21, 2014

Alexia Morgan

Disclaimer
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Seafood Watch Standard used in this assessment: Standard for Fisheries vF2
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About Seafood Watch

Monterey Bay Aquarium’s Seafood Watch® program evaluates the ecological sustainability of wild-caught and farmed seafood commonly found in the United States marketplace. Seafood Watch® defines sustainable seafood as originating from sources, whether wild-caught or farmed, which can maintain or increase production in the long-term without jeopardizing the structure or function of affected ecosystems. Seafood Watch® makes its science-based recommendations available to the public in the form of regional pocket guides that can be downloaded from www.seafoodwatch.org. The program’s goals are to raise awareness of important ocean conservation issues and empower seafood consumers and businesses to make choices for healthy oceans.

Each sustainability recommendation on the regional pocket guides is supported by a Seafood Report. Each report synthesizes and analyzes the most current ecological, fisheries and ecosystem science on a species, then evaluates this information against the program’s conservation ethic to arrive at a recommendation of “Best Choices,” “Good Alternatives” or “Avoid.” The detailed evaluation methodology is available upon request. In producing the Seafood Reports, Seafood Watch® seeks out research published in academic, peer-reviewed journals whenever possible. Other sources of information include government technical publications, fishery management plans and supporting documents, and other scientific reviews of ecological sustainability. Seafood Watch® Research Analysts also communicate regularly with ecologists, fisheries and aquaculture scientists, and members of industry and conservation organizations when evaluating fisheries and aquaculture practices. Capture fisheries and aquaculture practices are highly dynamic; as the scientific information on each species changes, Seafood Watch®’s sustainability recommendations and the underlying Seafood Reports will be updated to reflect these changes.

Parties interested in capture fisheries, aquaculture practices and the sustainability of ocean ecosystems are welcome to use Seafood Reports in any way they find useful. For more information about Seafood Watch® and Seafood Reports, please contact the Seafood Watch® program at Monterey Bay Aquarium by calling 1-877-229-9990.
**Guiding Principles**

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.

Based on this principle, Seafood Watch had developed four sustainability **criteria** for evaluating wildcatch fisheries for consumers and businesses. These criteria are:

- How does fishing affect the species under assessment?
- How does the fishing affect other, target and non-target species?
- How effective is the fishery’s management?
- How does the fishing affect habitats and the stability of the ecosystem?

Each criterion includes:

- Factors to evaluate and score
- Guidelines for integrating these factors to produce a numerical score and **rating**

Once a rating has been assigned to each criterion, we develop an overall recommendation. Criteria ratings and the overall recommendation are color-coded to correspond to the categories on the Seafood Watch pocket guide and online guide:

**Best Choice/ Green**: Are well managed and caught in ways that cause little harm to habitats or other wildlife.

**Good Alternative/ Yellow**: Buy, but be aware there are concerns with how they’re caught.

**Avoid/ Red**: Take a pass on these for now. These items are overfished or caught in ways that harm other marine life or the environment.

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\(^1\) “Fish” is used throughout this document to refer to finfish, shellfish and other invertebrates.
Summary

Albacore tuna are caught in a variety of fisheries throughout the world. This report focuses on three, United States, Canada (troll only), and Japan, troll and pole fisheries for albacore tuna in the North Pacific Ocean.

Abundance levels of albacore tuna in the North Pacific Ocean are high and fishing mortality rates are low. Troll and pole fisheries are highly selective and interactions with species of concern, such as marine mammals, sea turtles and sea birds have not been reported. Some shark species may be caught but in very low amounts. This type of gear also has little to no impact to bottom habitats.

Albacore in the North Pacific Ocean are managed throughout their range by two regional fishery management organizations (RFMOs), the Western and Central Pacific Fisheries Management Council (WCPFC) and the Inter-American Tropical Tuna Commission (IATTC). In domestic waters, the National Marine Fisheries Service is responsible for albacore tuna management in the United States, Department of Fisheries and Oceans Canada in Canadian waters and in Japan by the Ministry of Agriculture, Forestry and Fisheries.

Although few management measures are in place for albacore tuna, both internationally and domestically, in the North Pacific Ocean, they have a healthy status, low bycatch and low impacts on bottom habitats.
### Final Seafood Recommendations

<table>
<thead>
<tr>
<th>SPECIES/ FISHERY</th>
<th>CRITERION 1: IMPACTS ON THE SPECIES</th>
<th>CRITERION 2: IMPACTS ON OTHER SPECIES</th>
<th>CRITERION 3: MANAGEMENT EFFECTIVENESS</th>
<th>CRITERION 4: HABITAT AND ECOSYSTEM</th>
<th>OVERALL RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albacore</td>
<td>Green (3.830)</td>
<td>Green (5.000)</td>
<td>Yellow (3.000)</td>
<td>Green (3.870)</td>
<td>Best Choice (3.861)</td>
</tr>
<tr>
<td>United States of America North Pacific, Hand-operated pole and lines, United States of America</td>
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</tr>
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<tr>
<td>Japan Northwest Pacific, Hand-operated pole and lines, Japan</td>
<td></td>
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<tr>
<td>United States of America North Pacific, Trolling lines, United States of America</td>
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<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Scoring Guide

Scores range from zero to five where zero indicates very poor performance and five indicates the fishing operations have no significant impact.

Final Score = geometric mean of the four Scores (Criterion 1, Criterion 2, Criterion 3, Criterion 4).

- **Best Choice/Green** = Final Score > 3.2, and no Red Criteria, and no Critical scores
- **Good Alternative/Yellow** = Final score > 2.2-3.2, and neither Harvest Strategy (Factor 3.1) nor Bycatch Management Strategy (Factor 3.2) are Very High Concern, and no more than one Red Criterion, and no Critical scores
- **Avoid/Red** = Final Score ≤ 2.2, or either Harvest Strategy (Factor 3.1) or Bycatch Management Strategy (Factor 3.2) is Very High Concern or two or more Red Criteria, or one or more Critical scores.

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2 Because effective management is an essential component of sustainable fisheries, Seafood Watch issues an Avoid recommendation for any fishery scored as a Very High Concern for either factor under Management (Criterion 3).
Introduction

Scope of the analysis and ensuing recommendation

This report is for the Canadian, United States and Japanese north Pacific Ocean albacore tuna (*Thunnus alalunga*) troll and pole fisheries.

Species Overview

Albacore tuna are widely distributed in temperate and tropical waters in all ocean. There are six management units of albacore tuna, North and South Pacific Ocean, North and South Atlantic Ocean, Indian Ocean and Mediterranean Sea (ISSF 2014).

In international waters, the Western and Central Pacific Fisheries Commission and Inter-American Tropical Tuna Commission manage albacore tuna. The Canadian management body is the Department of Fisheries and Oceans, the National Marine Fisheries Service in the United States and the Ministry of Fisheries and Agriculture in Japan.

Production Statistics

Globally, longline fisheries catch the majority of albacore tuna but in the North Pacific Ocean troll and pole fisheries are also very important. Total albacore catches in the North Pacific in 2013 were 92,900 t (ISSF 2014). During 2013, troll and pole fisheries captured 34% of all albacore tuna compared to 40% by longline fisheries (ISSF 2014).

In the North Pacific Ocean, surface fisheries, which include troll and pole, catch more than half of all albacore tuna. Troll and pole fisheries capture small juvenile albacore. Total catches in the North Pacific peaked at 126,000 t in 1976, reached the lowest level of 37,000 t in 1991 and subsequently reached the second highest peak of 125,000 t in 1999. Catches have varied between 65,000 lbs and 92,000 lbs between 2006 and 2012 (ISCAWG 2014). Pole and line and troll catches in the region have increased from lows in the 1990's of 10,000 t to around 50,000 t in the early 2000's. In recent years, pole and line catches have been less, fluctuating around 30,000 t (ISSF 2014). (ISSF 2014).

The Canadian troll, United States troll/pole and Japanese pole and line fisheries are the primary surface fleets in this region. In recent years, Canadian troll catches of albacore tuna have ranged from a low of 2,734 t in 1999 to a high of 7,856 t in 2004. The majority of this catch, primarily in recent years, has occurred along the US and Canadian coast line (FOC 2012). Since 1996, US troll and pole and line catches of albacore tuna have ranged from 8,400 t to 17,000 t (FOC 2012). Catches of albacore tuna by Japan peaked in the early 1970s and have remained below this peak since. In 2012, the Japanese fleet caught over 40,000 t of albacore tuna in the North Pacific (ISCAWG 2014).
Catches of north Pacific albacore (*Thunnus alalunga*) by major gear types, 1966-2012. The Other gear category includes catches with purse seine, recreational gear, hand lines, and harpoons (ISCAWG 2014).

**Importance to the US/North American market.**

During 2013, the United States imported the most (39%) albacore tuna from Thailand. Other countries the United States imports large amounts of albacore from include Vietnam (20%) and Indonesia (16%) (NMFS 2014).
Major contributors to US albacore tuna imports in 2013, all countries and regions (%) (country of origin) (NMFS 2014).

**Common and market names.**

Albacore tuna is also known as germon, longfinned tuna, albecore, white tuna and T. germo.

**Primary product forms**

Albacore tuna is commonly sold fresh, frozen and canned.
Assessment

This section assesses the sustainability of the fishery(s) relative to the Seafood Watch Criteria for Fisheries, available at http://www.seafoodwatch.org.

Criterion 1: Impacts on the species under assessment

This criterion evaluates the impact of fishing mortality on the species, given its current abundance. The inherent vulnerability to fishing rating influences how abundance is scored, when abundance is unknown.

The final Criterion 1 score is determined by taking the geometric mean of the abundance and fishing mortality scores. The Criterion 1 rating is determined as follows:

- Score >3.2=Green or Low Concern
- Score >2.2 and ≤3.2=Yellow or Moderate Concern
- Score ≤2.2=Red or High Concern

Rating is Critical if Factor 1.3 (Fishing Mortality) is Critical

Criterion 1 Summary

<table>
<thead>
<tr>
<th>ALBACORE</th>
<th>Inherent Vulnerability</th>
<th>Abundance</th>
<th>Fishing Mortality</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>Method</td>
<td>United States of America/North Pacific</td>
<td>Hand-operated pole and lines</td>
<td>United States of America</td>
</tr>
<tr>
<td>Canada/Northeast Pacific</td>
<td>Hand-operated pole and lines</td>
<td>Canada</td>
<td>2.00: Medium</td>
<td>4.00: Low Concern</td>
</tr>
<tr>
<td>Japan/Northwest Pacific</td>
<td>Hand-operated pole and lines</td>
<td>Japan</td>
<td>2.00: Medium</td>
<td>4.00: Low Concern</td>
</tr>
<tr>
<td>United States of America/North Pacific Trolling lines</td>
<td>United States of America</td>
<td>2.00: Medium</td>
<td>4.00: Low Concern</td>
<td>3.67: Low Concern</td>
</tr>
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<td>Canada/Northeast Pacific Trolling lines</td>
<td>Canada</td>
<td>2.00: Medium</td>
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<td>3.67: Low Concern</td>
</tr>
</tbody>
</table>

Albacore tuna populations in the North Pacific Ocean are healthy and fishing pressure appears to be at sustainable levels.
Criterion 1 Assessment

SCORING GUIDELINES

Factor 1.1 - Inherent Vulnerability

- **Low**—The FishBase vulnerability score for species is 0-35, OR species exhibits life history characteristics that make it resilient to fishing, (e.g., early maturing).
- **Medium**—The FishBase vulnerability score for species is 36-55, OR species exhibits life history characteristics that make it neither particularly vulnerable nor resilient to fishing, (e.g., moderate age at sexual maturity (5-15 years), moderate maximum age (10-25 years), moderate maximum size, and middle of food chain).
- **High**—The FishBase vulnerability score for species is 56-100, OR species exhibits life history characteristics that make it particularly vulnerable to fishing, (e.g., long-lived (>25 years), late maturing (>15 years), low reproduction rate, large body size, and top-prey). Note: The FishBase vulnerability scores is an index of the inherent vulnerability of marine fishes to fishing based on life history parameters: maximum length, age at first maturity, longevity, growth rate, natural mortality rate, fecundity, spatial behaviors (e.g., schooling, aggregating for breeding, or consistently returning to the same sites for feeding or reproduction) and geographic range.

Factor 1.2 - Abundance

- **5 (Very Low Concern)**—Strong evidence exists that the population is above target abundance level (e.g., biomass at maximum sustainable yield, BMSY) or near virgin biomass.
- **4 (Low Concern)**—Population may be below target abundance level, but it is considered not overfished
- **3 (Moderate Concern)** —Abundance level is unknown and the species has a low or medium inherent vulnerability to fishing.
- **2 (High Concern)**—Population is overfished, depleted, or a species of concern, OR abundance is unknown and the species has a high inherent vulnerability to fishing.
- **1 (Very High Concern)**—Population is listed as threatened or endangered.

Factor 1.3 - Fishing Mortality

- **5 (Very Low Concern)**—Highly likely that fishing mortality is below a sustainable level (e.g., below fishing mortality at maximum sustainable yield, FMSY), OR fishery does not target species and its contribution to the mortality of species is negligible (≤ 5% of a sustainable level of fishing mortality).
- **3.67 (Low Concern)**—Probable (>50%) chance that fishing mortality is at or below a sustainable level, but some uncertainty exists, OR fishery does not target species and does not adversely affect species, but its contribution to mortality is not negligible, OR fishing mortality is unknown, but the population is healthy and the species has a low susceptibility to the fishery (low chance of being caught).
- **2.33 (Moderate Concern)**—Fishing mortality is fluctuating around sustainable levels, OR fishing mortality is unknown and species has a moderate-high susceptibility to the fishery and, if species is depleted, reasonable management is in place.
- **1 (High Concern)**—Overfishing is occurring, but management is in place to curtail overfishing, OR fishing mortality is unknown, species is depleted, and no management is in place.
- **0 (Critical)**—Overfishing is known to be occurring and no reasonable management is in place to curtail overfishing.

ALBACORE

Factor 1.1 - Inherent Vulnerability
Fishbase assigned a high vulnerability score of 58 out of 100 (Froese and Pauly 2013). However, the life history characteristics of albacore suggest only a medium vulnerability to fishing. For example, albacore reach sexual maturity between 5 and 6 years of age and reach a maximum age of 15 years (ISCAWG 2014). They are broadcast spawners, and top predators (Froese and Pauly 2013). Based on these life history characteristics we have awarded a medium score.

**Factor 1.2 - Abundance**

The most recent stock assessment for albacore tuna in the North Pacific Ocean was conducted in 2014. According to this assessment, the spawning stock biomass (SSB) in 2012 (last year of data included in the model) was 110,101 t with stock depletion estimated to be 35.8% of the unfished SSB. No biomass based reference points are in place, but the assessment concluded that there was little indication that the SSB was below any candidate biomass-based reference points. We have therefore awarded a low concern score because it is likely that albacore tuna in the North Pacific are not overfished but not a very low concern score because no reference points are currently accepted (ISCAWG 2014).

**Factor 1.3 - Fishing Mortality**

The current fishing mortality rate (F2010-2012) for albacore tuna in the North Pacific Ocean is around 72% of the interim reference point (FSSB-ATHL50% the fishing mortality rate that would lead to future minimum SSB falling below the SSB-ATHL threshold level at least once during a 25 year projection period). In addition, the current fishing mortality rates (F2010-2012) is below other F-based reference points (FMSY F0.1 and F10-
40% (fishing mortality that gives 10-50% reduction in the spawning potential ratio)) except FMED and F50%.
Albacore tuna in the North Pacific Ocean are therefore not currently undergoing overfishing. However, any
increases in fishing mortality rates will significantly reduce the spawning biomass (ISCAWG 2014). We have
awarded a low and not very low concern score because there is no accepted target reference point (only
interim) and because increases in fishing mortality could reduce the spawning biomass.
**Criterion 2: Impacts on other species**

All main retained and bycatch species in the fishery are evaluated in the same way as the species under assessment were evaluated in Criterion 1. Seafood Watch® defines bycatch as all fisheries-related mortality or injury to species other than the retained catch. Examples include discards, endangered or threatened species catch, and ghost fishing.

To determine the final Criterion 2 score, the score for the lowest scoring retained/bycatch species is multiplied by the discard rate score (ranges from 0-1), which evaluates the amount of non-retained catch (discards) and bait use relative to the retained catch. The Criterion 2 rating is determined as follows:

- Score >3.2=Green or Low Concern
- Score >2.2 and ≤3.2=Yellow or Moderate Concern
- Score ≤2.2=Red or High Concern

**Rating is Critical if Factor 2.3 (Fishing Mortality) is Critical**

**Criterion 2 Summary**

Only the lowest scoring main species is/are listed in the table and text in this Criterion 2 section; a full list and assessment of the main species can be found in Appendix A.

<table>
<thead>
<tr>
<th>ALBACORE - CANADA/NORTHEAST PACIFIC - HAND-OPERATED POLE AND LINES - CANADA</th>
<th>Subscore: 5.000</th>
<th>Discard Rate: 1.00</th>
<th>C2 Rate: 5.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species</td>
<td></td>
<td>Inherent Vulnerability</td>
<td>Abundance</td>
</tr>
<tr>
<td>No other main species caught</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| ALBACORE - CANADA/NORTHEAST PACIFIC - TROLLING LINES - CANADA |
|---|---|---|---|---|
| Subscore: 5.000 | Discard Rate: 1.00 | C2 Rate: 5.000 |
| Species | | Inherent Vulnerability | Abundance | Fishing Mortality | Subscore |
| No other main species caught |

| ALBACORE - JAPAN/NORTHWEST PACIFIC - HAND-OPERATED POLE AND LINES - JAPAN |
|---|---|---|---|---|
| Subscore: 5.000 | Discard Rate: 1.00 | C2 Rate: 5.000 |
| Species | | Inherent Vulnerability | Abundance | Fishing Mortality | Subscore |
| No other main species caught |

| ALBACORE - JAPAN/NORTHWEST PACIFIC - TROLLING LINES - JAPAN |
|---|---|---|---|---|
| Subscore: 5.000 | Discard Rate: 1.00 | C2 Rate: 5.000 |
| Species | | Inherent Vulnerability | Abundance | Fishing Mortality | Subscore |
| No other main species caught |
Bycatch in the North Pacific albacore troll and pole fishery is minimal, representing typically less than 1% of the total catch (Kelleher 2005). Bycatch does not typically include any species of concern, such as sea birds, sea turtles, or marine mammals, although sharks may be incidentally caught. For example, bycatch in the Canadian North Pacific albacore troll fishery during 2011, consisted of 10 albacore tuna considered too small, 8 blue sharks, 2 shortfin mako sharks, 6 Pacific Bluefin tuna, 1 bigeye tuna, 2 dolphin fish and 42 yellowtail, all of which were released alive. This represented 0.02% of the total catch by weight (Holmes 2012). During 2011, less than 4 mt of other species (other tuna, dorado, groundfish and salmon) were landed by the US west coast albacore hook and line fishery (PFMC 2012). Although baitfish are used in this fishery, their ratio of tuna to baitfish is around 30:1. In addition, baitfishing typically makes up only a small proportion of the total fishing effort on bait species (Gillet 2012). Due to these reasons, no baitfish species are not included in this report and we have therefore only included albacore tuna, the target species, in this report.

2.4 - Discards + Bait / Landings

The average discard rate in tuna pole and line fisheries is 0.1%, although this rate can be slightly higher, up to 0.4%, in some fisheries operating in the Western and Central Pacific Ocean (Kelleher 2005). For example in the Canadian North Pacific albacore troll and pole fishery the discard rate has recently been reported to
be 0.02% of the total catch by weight {Holmes 2012}. Troll and pole and line fisheries depend heavily on the use of baitfish, which most often comes from other fisheries {Gillett 2012}. However, the amount of tuna caught is much greater than the amount of baitfish used. The tuna to bait ratio is typically around 30 to 1, although this can vary by fishery due to differences in the baitfish used, and fishing technique {Gillett 2010}. Therefore we have left the score as <20%.
**Criterion 3: Management Effectiveness**

Management is separated into management of retained species (harvest strategy) and management of non-retained species (bycatch strategy).

The final score for this criterion is the geometric mean of the two scores. The Criterion 3 rating is determined as follows:

- Score >3.2=Green or Low Concern
- Score >2.2 and ≤3.2=Yellow or Moderate Concern
- Score ≤2.2 or either the Harvest Strategy (Factor 3.1) or Bycatch Management Strategy (Factor 3.2) is Very High Concern = Red or High Concern

Rating is Critical if either or both of Harvest Strategy (Factor 3.1) and Bycatch Management Strategy (Factor 3.2) ratings are Critical.

**Criterion 3 Summary**

<table>
<thead>
<tr>
<th>Region / Method</th>
<th>Harvest Strategy</th>
<th>Bycatch Strategy</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada / Northeast Pacific / Trolling lines / Canada</td>
<td>3.000</td>
<td>0.000</td>
<td>Yellow (3.000)</td>
</tr>
<tr>
<td>Canada / Northeast Pacific / Hand-operated pole and lines / Canada</td>
<td>3.000</td>
<td>0.000</td>
<td>Yellow (3.000)</td>
</tr>
<tr>
<td>Japan / Northwest Pacific / Trolling lines / Japan</td>
<td>3.000</td>
<td>0.000</td>
<td>Yellow (3.000)</td>
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<td>0.000</td>
<td>Yellow (3.000)</td>
</tr>
<tr>
<td>United States of America / North Pacific / Trolling lines / United States of America</td>
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<td>0.000</td>
<td>Yellow (3.000)</td>
</tr>
<tr>
<td>United States of America / North Pacific / Hand-operated pole and lines / United States of America</td>
<td>3.000</td>
<td>0.000</td>
<td>Yellow (3.000)</td>
</tr>
</tbody>
</table>

**Criterion 3 Assessment**

**SCORING GUIDELINES**

**Factor 3.1 - Harvest Strategy**

Seven subfactors are evaluated: Management Strategy, Recovery of Species of Concern, Scientific Research/Monitoring, Following of Scientific Advice, Enforcement of Regulations, Management Track Record, and Inclusion of Stakeholders. Each is rated as ‘ineffective,’ ‘moderately effective,’ or ‘highly effective.’

- 5 (Very Low Concern)—Rated as ‘highly effective’ for all seven subfactors considered
- 4 (Low Concern)—Management Strategy and Recovery of Species of Concern rated ‘highly effective’ and all other subfactors rated at least ‘moderately effective.’
- 3 (Moderate Concern)—All subfactors rated at least ‘moderately effective.’
- 2 (High Concern)—At minimum, meets standards for ‘moderately effective’ for Management Strategy and
Recovery of Species of Concern, but at least one other subfactor rated ‘ineffective.’

- 1 (Very High Concern)—Management exists, but Management Strategy and/or Recovery of Species of Concern rated ‘ineffective.’
- 0 (Critical)—No management exists when there is a clear need for management (i.e., fishery catches threatened, endangered, or high concern species), OR there is a high level of Illegal, unregulated, and unreported fishing occurring.

**Factor 3.1 Summary**

<table>
<thead>
<tr>
<th>Region / Method</th>
<th>Strategy</th>
<th>Recovery</th>
<th>Research</th>
<th>Advice</th>
<th>Enforce</th>
<th>Track</th>
<th>Inclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada / Northeast Pacific / Trolling lines / Canada</td>
<td>Moderately Effective</td>
<td>N/A</td>
<td>Highly Effective</td>
<td>Highly Effective</td>
<td>Highly Effective</td>
<td>Highly Effective</td>
<td>Highly Effective</td>
</tr>
<tr>
<td>Canada / Northeast Pacific / Hand-operated pole and lines / Canada</td>
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<td>N/A</td>
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<td>Highly Effective</td>
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<tr>
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</table>

This report focuses on albacore tuna caught by three nations within the North Pacific Ocean: Canada, Japan and the United States. These fisheries are independently managed by their respective nations fishery policies. Within US EEZ waters the Pacific Fishery Management Council has jurisdiction, in Canada, Fisheries and Oceans Canada has jurisdiction and within Japanese waters, the Ministry of Agriculture, Forestry and Fisheries is in charge. However, these fisheries target highly migratory species that have a range spanning into international waters. Albacore populations in the North Pacific Ocean are also managed through two Regional Fishery Management Organizations (RFMO’s), the Western and Central Pacific Fisheries Commission (WCPFC) in the Western and Central Pacific Ocean (WCPO) and the Inter-American Tropical Tuna Commission (IATTC) in the Eastern Pacific Ocean. Fleets must abide by the respective RFMO’s management measures when they are members of the RFMO’s. All three nations (Canada, Japan and the US) are members of both RFMO’s. For this report, we have scored the management sections according to the individual countries effectiveness. We consider all species to be kept due to the low bycatch rate in this fishery and therefore only the ‘harvest strategy’ section is scored.
Subfactor 3.1.1 – Management Strategy and Implementation

Considerations: What type of management measures are in place? Are there appropriate management goals, and is there evidence that management goals are being met? To achieve a highly effective rating, there must be appropriate management goals, and evidence that the measures in place have been successful at maintaining/rebuilding species.

**CANADA / NORTHEAST PACIFIC, TROLLING LINES, CANADA**

**CANADA / NORTHEAST PACIFIC, HAND-OPERATED POLE AND LINES, CANADA**

Moderately Effective

Albacore tuna in Pacific waters is managed by the Western and Central Pacific Fisheries Commission (WCPFC) in the western and central Pacific, and the Inter-American Tropical Tuna Commission (IATTC) in the eastern Pacific. These two commissions are Regional Management Organizations and Canada is a party to both, meaning they must abide by their management measures when fishing within the respective convention areas. While the IATTC’s convention area includes the entire eastern Pacific region up to the North American coastline, the WCPFC measures are designed primarily for the high seas, with the goal of compatible measures in each country’s EEZ (some measures do apply to EEZ waters).

Measures were adopted by the WCPFC and IATTC in 2005. Those management measures included maintaining current catch levels in order to maintain the long-term sustainability of the stock and the WCPFC was to work with members of the IATTC to agree on consistent management measures for the North Pacific population (IATTC 2005)(WCPFC 2005). In 2013, IATTC adopted a new resolution requiring member countries to report the average catches of North Pacific albacore tuna between 2007 and 2012 by gear type, along with a list of vessels that fish for albacore in the North Pacific. In addition, the Commission plans to work towards the development of target and limit reference points as well as to develop harvest control rules for this species (IATTC 2013).

In addition to the IATTC and WCPFC measures, Canada has developed a management plan in the North Pacific that uses a risk averse and precautionary manner, based on the best scientific advice, to conserve albacore tuna populations (FOC 2012). Under this plan, there is a treaty between the United States and Canada, allowing Canadian fishermen to fish in US waters during certain times of the year, and there are a limited number of vessels allowed under this treaty. In addition, there are fishing seasons, area restrictions and catch and effort reporting requirements (FOC 2012) but no precautionary harvest guidelines or quotas are in place for albacore tuna. The majority of Canadian troll vessels fish in coastal waters of Canada and the United States but some fishing does occur in international waters.

**JAPAN / NORTHWEST PACIFIC, TROLLING LINES, JAPAN**

**JAPAN / NORTHWEST PACIFIC, HAND-OPERATED POLE AND LINES, JAPAN**

Moderately Effective

Albacore tuna in Pacific waters is managed by the Western and Central Pacific Fisheries Commission (WCPFC) in the western and central Pacific, and the Inter-American Tropical Tuna Commission (IATTC) in the eastern Pacific. These two commissions are Regional Fishery Management Organizations (RFMOs) and Japan is a party to both, meaning they must abide by their management measures when fishing within the respective convention areas. While the IATTC’s convention area includes the entire eastern Pacific region up to the North American coastline, the WCPFC measures are designed primarily for the high seas, with the goal of compatible measures in each country’s EEZ (some measures do apply to EEZ waters).

Measures were adopted by the WCPFC and IATTC in 2005. Those management measures included
maintaining current catch levels in order to maintain the long-term sustainability of the stock and the WCPFC was to work with members of the IATTC to agree on consistent management measures for the North Pacific population (IATTC 2005)(WCPFC 2005). In 2013, IATTC adopted a new resolution requiring member countries to report the average catches of North Pacific albacore tuna between 2007 and 2012 by gear type, along with a list of vessels that fish for albacore in the North Pacific. In addition, the Commission plans to work towards the development of target and limit reference points as well as to develop harvest control rules for this species (IATTC 2013).

Japan has both an offshore and distant water pole and line fisheries for albacore tuna (Brodziak and Ishimura 2010). The Ministry of Agriculture, Forestry and Fisheries is responsible for the management of albacore tuna in Japanese waters. In domestic waters, fisherman report catch and effort through a logbook program (Okamoto and Bayliff 2003) but there are no catch limits in place (Yagi 2002). We have awarded a moderately effective score because few management measures are in place at domestic level.

UNITED STATES OF AMERICA / NORTH PACIFIC, TROLLING LINES, UNITED STATES OF AMERICA
UNITED STATES OF AMERICA / NORTH PACIFIC, HAND-OPERATED POLE AND LINES, UNITED STATES OF AMERICA

Moderately Effective

Albacore tuna in Pacific waters is managed by the Western and Central Pacific Fisheries Commission (WCPFC) in the western and central Pacific, and the Inter-American Tropical Tuna Commission (IATTC) in the eastern Pacific. These two commissions are Regional Fishery Management Organizations (RFMOs) and the United States is a party to both, meaning they must abide by their management measures when fishing within the respective convention areas. While the IATTC’s convention area includes the entire eastern Pacific region up to the North American coastline, the WCPFC measures are designed primarily for the high seas, with the goal of compatible measures in each country’s EEZ (some measures do apply to EEZ waters).

Measures were adopted by the WCPFC and IATTC in 2005. Those management measures included maintaining current catch levels in order to maintain the long-term sustainability of the stock and the WCPFC was to work with members of the IATTC to agree on consistent management measures for the North Pacific population (IATTC 2005)(WCPFC 2005). In 2013, IATTC adopted a new resolution requiring member countries to report the average catches of North Pacific albacore tuna between 2007 and 2012 by gear type, along with a list of vessels that fish for albacore in the North Pacific. In addition, the Commission plans to work towards the development of target and limit reference points as well as to develop harvest control rules for this species (IATTC 2013).

Domestically, albacore tuna are managed under the Pacific Fishery Management Council Fishery Management Plan for US West Coast Fisheries for Highly Migratory Species. This plan utilized precautionary measures to preserve albacore and other highly migratory stocks, but no precautionary harvest guidelines or quotas are in place for albacore tuna (PFMC 2011). In addition, there is a treaty between the US and Canada that allows for licensed vessels to fish in respective waters (PRFMC 2011). We have therefore awarded a moderately effective score.

Subfactor 3.1.2 – Recovery of Species of Concern

Considerations: When needed, are recovery strategies/management measures in place to rebuild overfished/threatened/ endangered species or to limit fishery’s impact on these species and what is their likelihood of success? To achieve a rating of Highly Effective, rebuilding strategies that have a high likelihood of
success in an appropriate timeframe must be in place when needed, as well as measures to minimize mortality for any overfished/threatened/endangered species.

**Subfactor 3.1.3 – Scientific Research and Monitoring**

Considerations: How much and what types of data are collected to evaluate the health of the population and the fishery's impact on the species? To achieve a Highly Effective rating, population assessments must be conducted regularly and they must be robust enough to reliably determine the population status.

**Highly Effective**

Albacore tuna stocks are monitored and assessed on a regular basis and the last assessment was conducted in 2011 (ISCAWG 2014). Information on catches, catch per unit effort, and catch at size data from multiple fisheries targeting albacore tuna in the North Pacific (ISAWG 2011). We have awarded a highly effective score because assessments, which include fishery dependent data, are conducted on a regular basis.

**Subfactor 3.1.4 – Management Record of Following Scientific Advice**

Considerations: How often (always, sometimes, rarely) do managers of the fishery follow scientific recommendations/advice (e.g. do they set catch limits at recommended levels)? A Highly Effective rating is given if managers nearly always follow scientific advice.

**Highly Effective**

There are no TAC's currently in place, either domestically or internationally, for albacore tuna. However we have awarded a high score because Canada has complied with all other international measures and scientific advice as well as developed domestic measures.

---

N/A

No recovery plan is needed because North Pacific albacore tuna are not overfished (ISCAWG 2014).
### JAPAN / NORTHWEST PACIFIC, TROLLING LINES, JAPAN

**Highly Effective**

The Japanese management system does allow for the use of total allowable catch or effort (TAC/TAE) system to be utilized. This system is not currently used for albacore tuna but the population is considered healthy at current fishing rates (Yagi 2002)(ISCAWG 2014). Japan is a cooperating member of the Western and Central Pacific Fisheries Commission and the Inter-American Tropical Tuna Commission that manage albacore tuna on the high seas, and appears to comply with required management measures. We have therefore awarded a highly effective score.

### UNITED STATES OF AMERICA / NORTH PACIFIC, TROLLING LINES, UNITED STATES OF AMERICA

**Highly Effective**

The United States fishery management plan for highly migratory species calls for the inclusion of scientific advice when species with international boundaries become overfished. Albacore tuna are not currently overfished so they do not fall under this category and the recent assessment did not call for any additional management measures to be put into place. We have awarded a high score because the United States has taken action for other highly migratory species (i.e. bigeye) for which this has occurred (PFMC 2011) and because they have adhered to international measures.

### Subfactor 3.1.5 – Enforcement of Management Regulations

**Considerations:** Do fishermen comply with regulations, and how is this monitored? To achieve a Highly Effective rating, there must be regular enforcement of regulations and verification of compliance.

### CANADA / NORTHEAST PACIFIC, TROLLING LINES, CANADA

**Highly Effective**

Domestically, Canada has a compliance plan that includes the use of marine enforcement officers, public awareness campaigns, and aerial surveillance (FOC 2012). According to the latest assessment of Canada's conservation practices, the majority of vessels provided accurate and on time catch, effort and landings data in 2010. Canada also has a good compliance record with international reporting requirements (FOC 2012). We have awarded a highly effective score to account for domestic measures since the majority of fishing occurs in Canadian and US waters.

### JAPAN / NORTHWEST PACIFIC, TROLLING LINES, JAPAN

**Moderately Effective**

Domestically, Japan uses vessel monitoring and landing site inspections and air and sea surveillance (Yagi 2002). The effectiveness of domestic measures are not known, so we have awarded a moderately effective score.
Subfactor 3.1.6 – Management Track Record

Considerations: Does management have a history of successfully maintaining populations at sustainable levels or a history of failing to maintain populations at sustainable levels? A Highly Effective rating is given if measures enacted by management have been shown to result in the long-term maintenance of species overtime.

Highly Effective

Domestically, the Pacific Fishery Management Council is in charge of enforcement, such as air and sea surveillance (PFMC 2011) through the US Coast Guard and NOAA Office of Law Enforcement. We have therefore awarded a highly effective score.

Subfactor 3.1.7 – Stakeholder Inclusion

Considerations: Are stakeholders involved/included in the decision-making process? Stakeholders are individuals/groups/organizations that have an interest in the fishery or that may be affected by the management of the fishery (e.g., fishermen, conservation groups, etc.). A Highly Effective rating is given if the management process is transparent and includes stakeholder input.

Highly Effective

Domestically, Canada has conservation goals that include supporting the development of management practices based on the best scientific information (FAO 2012). Japan has a management system in place for the conservation and management of marine resources (Yagi 2002) and the United States has measures within its albacore tuna management plan to enact management measures once albacore become overfished (PFMC 2011). Albacore stocks are healthy so we have awarded a highly effective score.

Highly Effective

Domestically Canada has an open and transparent consultation process during the development of management measures (FOC 2012). An assessment of this consultation process during 2010, indicated that the objectives were meet (FOC 2012). We have awarded a high score for domestic measures.
Factor 3.2 - Bycatch Strategy

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Four subfactors are evaluated: Management Strategy and Implementation, Scientific Research and Monitoring, Record of Following Scientific Advice, and Enforcement of Regulations. Each is rated as ‘ineffective,’ ‘moderately effective,’ or ‘highly effective.’ Unless reason exists to rate Scientific Research and Monitoring, Record of Following Scientific Advice, and Enforcement of Regulations differently, these rating are the same as in 3.1.

- 5 (Very Low Concern)—Rated as ‘highly effective’ for all four subfactors considered
- 4 (Low Concern)—Management Strategy rated ‘highly effective’ and all other subfactors rated at least ‘moderately effective.’
- 3 (Moderate Concern)—All subfactors rated at least ‘moderately effective.’
- 2 (High Concern)—At minimum, meets standards for ‘moderately effective’ for Management Strategy but some other factors rated ‘ineffective.’
- 1 (Very High Concern)—Management exists, but Management Strategy rated ‘ineffective.’
- 0 (Critical)—No bycatch management even when overfished, depleted, endangered or threatened species are known to be regular components of bycatch and are substantially impacted by the fishery.

### Factor 3.2 - Bycatch Strategy

#### Region / Method

<table>
<thead>
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<th>Critical Strategy</th>
<th>Research</th>
<th>Advice</th>
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<td>Yes</td>
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<td></td>
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</table>
There is little bycatch in these fisheries, so we consider all species to be retained.

**Subfactor 3.2.3 – Scientific Research and Monitoring**

*Considerations: Is bycatch in the fishery recorded/documentated and is there adequate monitoring of bycatch to measure fishery's impact on bycatch species? To achieve a Highly Effective rating, assessments must be conducted to determine the impact of the fishery on species of concern, and an adequate bycatch data collection program must be in place to ensure bycatch management goals are being met.*

**Subfactor 3.2.4 – Management Record of Following Scientific Advice**

*Considerations: How often (always, sometimes, rarely) do managers of the fishery follow scientific recommendations/advice (e.g., do they set catch limits at recommended levels)? A Highly Effective rating is given if managers nearly always follow scientific advice.*

**Subfactor 3.2.5 – Enforcement of Management Regulations**

*Considerations: Is there a monitoring/enforcement system in place to ensure fishermen follow management regulations and what is the level of fishermen's compliance with regulations? To achieve a Highly Effective rating, there must be consistent enforcement of regulations and verification of compliance.*
**Criterion 4: Impacts on the habitat and ecosystem**

This Criterion assesses the impact of the fishery on seafloor habitats, and increases that base score if there are measures in place to mitigate any impacts. The fishery’s overall impact on the ecosystem and food web and the use of ecosystem-based fisheries management (EBFM) principles is also evaluated. Ecosystem Based Fisheries Management aims to consider the interconnections among species and all natural and human stressors on the environment.

The final score is the geometric mean of the impact of fishing gear on habitat score (plus the mitigation of gear impacts score) and the Ecosystem Based Fishery Management score. The Criterion 2 rating is determined as follows:

- Score >3.2=Green or Low Concern
- Score >2.2 and ≤3.2=Yellow or Moderate Concern
- Score ≤2.2=Red or High Concern

Rating cannot be Critical for Criterion 4.

**Criterion 4 Summary**

<table>
<thead>
<tr>
<th>Region / Method</th>
<th>Gear Type and Substrate</th>
<th>Mitigation of Gear Impacts</th>
<th>EBFM</th>
<th>Score</th>
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<tbody>
<tr>
<td>Canada / Northeast Pacific / Trolling lines / Canada</td>
<td>5.00: None</td>
<td>0.00: Not Applicable</td>
<td>3.00: Moderate Concern</td>
<td>Green (3.870)</td>
</tr>
<tr>
<td>Canada / Northeast Pacific / Hand-operated pole and lines / Canada</td>
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<td>Green (3.870)</td>
</tr>
</tbody>
</table>

Troll and pole gear has minimal impact or contact with bottom habitats.

**Criterion 4 Assessment**
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**Factor 4.1 - Impact of Fishing Gear on the Habitat/Substrate**

- 5 (None) - Fishing gear does not contact the bottom
- 4 (Very Low) - Vertical line gear
- 3 (Low) - Gears that contacts the bottom, but is not dragged along the bottom (e.g. gillnet, bottom longline, trap) and is not fished on sensitive habitats. Bottom seine on resilient mud/sand habitats. Midwater trawl that is known to contact bottom occasionally
- 2 (Moderate) - Bottom dragging gears (dredge, trawl) fished on resilient mud/sand habitats. Gillnet, trap, or bottom longline fished on sensitive boulder or coral reef habitat. Bottom seine except on mud/sand
- 1 (High) - Hydraulic clam dredge. Dredge or trawl gear fished on moderately sensitive habitats (e.g., cobble or boulder)
- 0 (Very High) - Dredge or trawl fished on biogenic habitat, (e.g., deep-sea corals, eelgrass and maerl)

Note: When multiple habitat types are commonly encountered, and/or the habitat classification is uncertain, the score will be based on the most sensitive, plausible habitat type.

**Factor 4.2 - Mitigation of Gear Impacts**

- +1 (Strong Mitigation) - Examples include large proportion of habitat protected from fishing (>50%) with gear, fishing intensity low/limited, gear specifically modified to reduce damage to seafloor and modifications shown to be effective at reducing damage, or an effective combination of ‘moderate’ mitigation measures.
- +0.5 (Moderate Mitigation) - 20% of habitat protected from fishing with gear or other measures in place to limit fishing effort, fishing intensity, and spatial footprint of damage caused from fishing.
- +0.25 (Low Mitigation) - A few measures are in place (e.g., vulnerable habitats protected but other habitats not protected); there are some limits on fishing effort/intensity, but not actively being reduced
- 0 (No Mitigation) - No effective measures are in place to limit gear impacts on habitats

**Factor 4.3 - Ecosystem-Based Fisheries Management**

- 5 (Very Low Concern) - Substantial efforts have been made to protect species’ ecological roles and ensure fishing practices do not have negative ecological effects (e.g., large proportion of fishery area is protected with marine reserves, and abundance is maintained at sufficient levels to provide food to predators)
- 4 (Low Concern) - Studies are underway to assess the ecological role of species and measures are in place to protect the ecological role of any species that plays an exceptionally large role in the ecosystem. Measures are in place to minimize potentially negative ecological effect if hatchery supplementation or fish aggregating devices (FADs) are used.
- 3 (Moderate Concern) - Fishery does not catch species that play an exceptionally large role in the ecosystem, or if it does, studies are underway to determine how to protect the ecological role of these species. OR negative ecological effects from hatchery supplementation or FADs are possible and management is not place to mitigate these impacts
- 2 (High Concern) - Fishery catches species that play an exceptionally large role in the ecosystem and no efforts are being made to incorporate their ecological role into management.
- 1 (Very High Concern) - Use of hatchery supplementation or fish aggregating devices (FADs) in the fishery is having serious negative ecological or genetic consequences, OR fishery has resulted in trophic cascades or other detrimental impacts to the food web.

Factor 4.1 - Impact of Fishing Gear on the Habitat/Substrate
Factor 4.2 - Mitigation of Gear Impacts

Vertical gear rarely impact bottom habitats.

Factor 4.3 - Ecosystem-Based Fisheries Management

Ecosystem impacts are not addressed in current management plans in Canada and it is unknown if they are addressed in Japan. One of the core articles of the WCPFC Convention is to assess the impacts of fishing on target and non target species. There are management measures in place to protect bycatch and target species, ecological risk assessments are being conducted there is an Ecosystem Monitoring and Analysis section within the Secretariat of the Pacific Community, which provides scientific assistance to the WCPFC (SPC 2010). IATTC has objectives which address incorporating ecosystem considerations into management and work has been done within IATTC to create ecosystem based models and other types of analysis. IATTC considered management measures aimed at protecting dolphins, sea turtles and sea birds as addressing ecosystem considerations (IATTC 2012c). However, troll and pole fisheries rely on live baitfish, which could include "exceptional species" such as anchovy or sardines, and the effect of the removal of these species on the ecosystem is unknown and few baitfish fisheries are managed (Gillet 2012)(FAO 2014).
The Pacific Fishery Management Council has developed a Pacific Coast Fishery Ecosystem Plan, which was developed by the council to enhance their current species specific management with broader ecosystem components. The draft was adopted in April of 2013, and will be reviewed again in 2015 (PFMC 2013). In addition, troll and pole fisheries rely on live baitfish, which could include "exceptional species" such as anchovy or sardines, which are managed off the US west coast but not necessarily under other jurisdictions (Gillet 2012)(FAO 2014).
Acknowledgements

Scientific review does not constitute an endorsement of the Seafood Watch® program, or its seafood recommendations, on the part of the reviewing scientists. Seafood Watch® is solely responsible for the conclusions reached in this report.

Seafood Watch would like to thank and thirteen anonymous reviewers for graciously reviewing this report for scientific accuracy.
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