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CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Seventeenth meeting of the Conference of the Parties
Johannesburg (South Africa), 24 September – 5 October 2016

COMMUNICATION FROM SRI LANKA REGARDING THE FAO EXPERT PANEL OUTCOMES

This document has been submitted by Sri Lanka, in relation to amendment proposal CoP 17 Prop. 43 on *inclusion of genus* Alopias *spp. in Appendix II*[*].

[*] *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

Review of FAO Expert Advisory Panel Assessment Report: COP17 Proposal 43

Species: Bigeye thresher shark, *Alopias superciliosus*.

Proposal:

To include bigeye thresher shark, *Alopias superciliosus* in Appendix II in accordance with Article II paragraph 2(a) of the CITES Convention. If listed, this would result in the inclusion of all other species of thresher sharks, genus *Alopias* spp. in accordance with Article II paragraph 2(b) of the Convention and satisfying Criterion A in Annex 2b of Resolution Conf. 9.24 (Rev. CoP14).

Assessment Summary	**Comments on Panel text**
Bigeye thresher are wide-ranging and globally distributed. The Panel considered this a low productivity species and determined that there is no reliable evidence of a decline of bigeye thresher that would meet Appendix II listing criteria. Related indices that did meet the criterion were not specific to bigeye thresher, suffered from methodological problems or were older analyses that were not consistent with recent studies using the same datasets. If CITES Parties did adopt an Appendix II listing of the bigeye thresher, it would include all other species of thresher sharks under 'look alike' provisions. If this listing was implemented effectively, this could act as a complementary measure for regulations implemented by Regional Fisheries Management Organisations, in particular, where these authorities have adopted measures prohibiting retention of thresher sharks. The Panel also noted that where a States' ability to complete CITES provisions for highly migratory species was limited, then trade might cease or continue without adequate CITES documentation.	The Panel determined that there is no evidence of a decline that would meet the CITES Appendix II listing criteria because they did not apply the decline criteria. Regardless, former Panels not confident about trends have concluded that "it was not possible to evaluate whether the populations meet the biological criteria". In contrast, the wording used by the 2016 Panel implies that this species does not meet the Appendix II listing criteria. While datasets often aggregate all thresher species, the bigeye is the most biologically-vulnerable member of this genus. It is unlikely that bigeye thresher stocks could be less depleted than other thresher shark stock caught in the same regions and by the same fisheries; aggregated declines may under represent bigeye thresher declines.

Scientific assessment in accordance with CITES biological listing criteria

Population distribution and productivity

Bigeye thresher, *Alopias superciliosus* (Lowe 1841), is a species with a worldwide circumglobal distribution in tropical and temperate oceanic and coastal seas. Bigeye thresher occurs in FAO fishing areas 21, 27, 31, 34, 37, 41, 47, 51, 57, 61, 67, 71, 77, 81, 87. Trejo (2005) conducted a global population genetic study of bigeye thresher from nine locations (n=64 samples) that supported links in the population structure between Indo-Pacific and Atlantic populations, but not among populations spanning the entire Indo-Pacific Ocean. However, due to the preliminary nature of these data, and low sample size throughout the study, these results cannot be relied upon to confirm one or more genetically distinct stocks of the common or bigeye thresher shark. There are no estimates of total population numbers for the species.

Bigeye thresher is highly migratory. Long-range horizontal movements were found in two bigeye thresher sharks tagged with pop-up satellite archival tags (PSAT) off Hawaii. Both sharks made movements towards Mexico, with one shark moving 2465.5 km in 181 days and the other 3014.3 km over 240 days (Musyl *et al.*, 2011). Two bigeye thresher sharks tagged in the Gulf of Mexico moved from the northeast coast of the United States to the southern Gulf of Mexico, a straight-line distance of 2,767 km and 51 km, respectively

<table>
<tr><td colspan="2">(Weng and Block, 2004; Carlson and Gulak, 2012). The largest satellite tagging study was conducted in the tropical northeast Atlantic where 12 bigeye threshers were tagged, showing up to 1439.9 km straight-line distances over 122 days (Coelho et al., 2015). Conventional tag and recapture studies have recorded movements from the US to and Central American (Kohler et al., 1998).</td></tr>
<tr><td colspan="2">Based on this information, the panel decided to use the following management areas as a basis to compare trends in abundance: i) the Atlantic Ocean, as there is no information to differentiate within it; ii) Indian Ocean and ii) Western Central Pacific. There was not information for the Eastern Pacific.</td></tr>
<tr><td>Generally there is good information about biological parameters. After reviewing the available parameter estimates for the species (Table 1), the Panel concluded that the species generally meets the low productivity criteria. Longevity estimates for the Atlantic and Pacific are consistent with a medium productivity. However, the Panel considered that the longevity estimates could be underestimated because of uncertainty in aging methods for sharks in general and also because the estimates of maximum age of the exploited populations are likely underestimates of the true longevity. Considering that the majority of the parameters points to very low productivity values, the Panel concluded that the species has a low productivity.
It should be noted, that because demographic parameters estimated using data from a fished population, the values reported for r (continuous rate of population increase) and lambda (the finite rate of population increase) are likely to be underestimates.</td><td>Table 1 does not reflect this text. It should note under the INFORMATION column that the estimates for T_{MAX} are for an exploited population. Under STATUS, ‘medium’ should be replaced with ‘low’.

The estimate of generation time should be addressed in the text, noting that since longevity could be underestimated, the generation time (estimates of 14.2 and 17.8 years are cited) could also be underestimated.

The continuous rate of population increase will be an overestimate, not an underestimate, because r increases in a fished population.</td></tr>
<tr><td>Trends and application of the decline criterion</td><td>CoP14 Inf.64 was not applied.</td></tr>
<tr><td>Under the CITES criteria for commercially exploited aquatic species (Res. Conf. 9.24 Rev. CoP16), a decline to 15–20 percent of the historical baseline for a low-productivity species might justify consideration for an Appendix I listing. For listing on Appendix II, being “near” this level might justify consideration for a listing, which for a low-productivity species would be 20–30 percent of the historical level (15–20 percent + 5–10 percent precautionary measure).</td><td>FAO guidance (above) notes that “historical extent-of-decline” is most important, but should be considered in conjunction with “recent rate-of-decline”. The panel did not address either point. Most data points in Figure 1 (p 32) are declines over a one generation period, not declines from baseline.
Young et al 2016 stated: “In the NW Atlantic, several studies indicate large declines in combined common and bigeye thresher shark abundance (e.g., between 63-80% from 1996-2005); but recent analyses … indicate these populations have likely stabilized in recent years. However, fishing pressure on thresher sharks began over two decades prior to the start of this time series; thus the estimated declines are not from virgin biomass.”</td></tr>
<tr><td>In some cases, indices are species-specific for bigeye</td><td>Since the bigeye thresher is the most biologically</td></tr>
</table>

thresher, in others for common thresher (*A. vulpinus*) or a complex of thresher shark species (*Alopias* spp.). The Panel evaluated the information and trends for the bigeye thresher shark and commented on the others.	vulnerable of the three species, trend data for the whole genus are likely to be an under-estimate of trends for bigeye thresher sharks caught in the same fisheries.
Some of the references in relation to population decline presented in the Proposal are incomplete, outdated and/or mis-cited. The Panel updated this information to include scientific information on status of thresher stocks.	
Information evaluated by the Panel regarding population trends from different oceanic regions is summarized below and in Table 2.	Table 2 does not include a column for source reliability index. This should have been included, as in earlier Panel reports.
Atlantic Ocean	See Figure 1, Annex 1 (below) for regional trends.
In regards to trends in abundance, the Proposal noted declines of 70–80% for *Alopias* (not specific to *A. superciliosus*) for the period 1992–2003 in the northwest Atlantic Ocean from a commercial self-reported pelagic longline logbook program (Baum *et al.*, 2003). The Proposal also notes a 99% decline in thresher shark from the Mediterranean Sea (Ferretti *et al*., 2008). However, several studies (e.g. Cortes *et* al., 2007; Baum and Blanchard, 2010) have updated the former data series and the Panel thus considered the most recent analyses. Moreover, an examination of the species analyzed by Ferretti *et al*. (2008) indicates the decline in abundance was for *A. vulpinus* (common thresher) and did not present any information relative to bigeye thresher.	The analyses in Baum et al (2003) are based on standardized CPUE data (correspondence with FAO panel, August 2004). This is a reliability index of 4. Bigeye thresher is a rare bycatch of Mediterranean fisheries. It was not included in the Ferretti et al (2008) analyses because it did not occur more than 3 times in at least 2 of the 9 datasets analysed. Bigeye is significantly more biologically vulnerable to fisheries than common thresher. The panel could have inferred from the status of common thresher in the Mediterranean to that of the much rarer bigeye thresher, caught in similar fisheries.
In the more recent re-analysis of the same commercial fishery logbook dataset used by Baum *et al*. (2003), Cortés *et al.* (2007) reported a 63% decline from 1986–2005 for *Alopias* sp. (Figure 2) In addition, analysis of data collected by on-board observers from the same fishery found a 28% increase in *Alopias* spp. from 1992–2005.	These trends encompass just over one generation. CITES criteria consider a three-generation period, or trend from baseline. The Panel should have estimated the potential decline from the 1960s to 1986, to provide a total likely decline estimate to 2005. See Annex 1, Table 1 (below), also Young *et al* 2016 remarks (above) regarding declines from virgin biomass.
Baum and Blanchard (2010) also analyzed observer data from 1992– 2005 and <u>reported no change in the population trend over the time period, concluding that for thresher sharks the population has potentially stabilized</u>. A recent status review of bigeye thresher shark conducted by the US National Marine Fisheries Service (Young *et al.*, 2016) using an	The text (underlined) attributed to Baum & Blanchard 2010 does not exist. The authors actually wrote: "Thresher sharks were caught infrequently … the small estimated rate of decline (−0.024) masks differences in the trends among areas and over time. The problem arises because the change in catch rates was not monotonic over this time period, such that

update of the observer data used by Cortés *et al.* (2007) and Baum and Blanchard (2010) found the trend in bigeye thresher abundance to be relatively flat from 1992–2014.	models under-fit the earliest years, in order to better fit the data from recent years. Trend estimates also varied significantly among areas: a decrease (−0.068) in the Mid-Atlantic Bight (Area 5), where thresher sharks were most commonly caught, contrasts with the increasing trend estimated in offshore Area 8 where they were seldom caught. … Models of the 1992–2000 observer and 1986–2000 logbook data showed almost exactly the same significant rate of decline (Appendix A), which equates to an 80% decrease from 1986 to 2000." Stabilisation since 2000 does not reverse an 80% decrease from 1986 to present.
The Panel also noted that the Proposal draws a conclusion about a decline in bigeye thresher from a comparison in Beerkircher *et al.* (2002) involving Beerkircher *et al.* (2002)'s own data and a previous survey (Berkeley and Campos, 1998). However, the Beerkircher *et al.* (2002) paper expresses some caveats about the comparability of the two studies and presents the comparison for information rather than as a basis for drawing a firm conclusion about a population decline for bigeye thresher. Given these aspects of the Beerkircher *et al.* (2002) paper, this reference does not credibly support a decline of 70% from the historic baseline.	The proposal incorrectly cites a ~70% decline in bigeye thresher CPUE (Beerkircher et al. 2002) as a decline from historical baseline, rather than a decline during < 20 years, from 1981/83 to 1992/2002. The decline from historical baseline is much greater. Young *et al* 2016: "the sample size in the [Baum & Blanchard 2010] observer analysis was very small (n=14-84) compared to that in the logbook analysis (n=112-1292) (Kyne et al., 2012)". The caveat by Beerkircher et al (2002) concerns low sample size. It should equally apply to data used to infer population stabilization.
For the southwest Atlantic Ocean, the Proposal also reports a consistent decline in bigeye thresher CPUE over the preceding 30 years from the IUCN Red List assessment (Amorim *et al*., 1998). However, the Red List assessment actually reported that the landed catch and CPUE of bigeye thresher shark increased from 1971 to 1989, and then gradually decreased from 1990 to 2001. Amorim *et al*. (1998) further concluded the decrease does not necessarily reflect stock abundance because changes in the depth of fishing operations also occurred, which may have affected the catchability along the time series.	A more recent analysis is provided by Barreto et al. 2016. Trends in the exploitation of South Atlantic shark populations. *Conservation Biology*. This provides a species-specific analysis for bigeye thresher, using one of the longest datasets available, albeit with low catch rates (2% of all sharks). The authors estimate a 63% decline in bigeye thresher catch rates during the 19 years 1979-1997. Confidence levels are even lower for apparent increased catch rates from 1998.
Most catch rates (CPUEs) available for bigeye threshers in the Atlantic Ocean began in the late 1980s to early 1990s. However, it was noted that the exploitation of this stock began at least two decades prior to this time. The Panel suggested that the majority of bigeye thresher sharks were probably caught in association with bigeye tuna or swordfish	Tuna and swordfish are more resilient to fisheries than thresher sharks. Atlantic landings of tuna and swordfish increased steeply from 1960s to early 1990s. Swordfish SSB declined from >110,000t in the 1960s to <50,000t in the late 1990s/early 2000s. Bycatch mortality of bigeye thresher sharks would also have depleted this stock. The Panel should have

targeting fleets. As such the Panel looked at historical catches of these two species obtained from the ICCAT Task 1 nominal catch database (ICCAT, 2015) and noted that the peak of catches occurred in the early 1990s with declines in recent times implying that the start of the available abundance indices coincide with the peak of potential exploitation of the bigeye thresher species.	considered potential scenarios for stock decline since pelagic fisheries commenced, then applied available trend data from the 1980s onwards to already depleted stock. See Figure 1, Annex I. The Panel could have recognized here that ICCAT prohibited retention of bigeye thresher in 2009 due to concerns over its vulnerability and depletion, followed by the GFCM in 2010.
Indian Ocean	
The Panel considered and discussed the Fishstat statistics from Sri Lanka (FAO, 2016) that were listed in the Proposal. The Panel noted that the statistics represent only reported landings and do not include effort or discards information. The Panel also noted that no logbook or observer based information on this data were provided. This can be a problem in cases where there are changes in effort or fishery-dependent factors during the period that can affect the catches, including changes in targeting and operational patterns. The Panel also noted that the statistics are shown for the *Alopias* genus and are not species-specific, which can cause biased interpretations if there are changes in the species composition through time. Finally, the Panel noted that the two final years plotted and used in the analysis (Figure 2 of the Proposal, years 2012-2013) are represented as zeros but refer to data that is not available in FishStat (likely data that has not been submitted), and that those zero's at the end of the series are causing bias in the interpretation. The Panel agreed that the information provided for the Indian Ocean should not be used as evidence of the suggested declines. The Panel also noted that the Indian Ocean is the region with the largest deficiency of reliable catch and effort statistics.	Acknowledging poor catch and effort statistics in the Indian Ocean, the proponent presented the Panel in Rome with a surrogate for catch effort, using FishStat data for Order Scombroidei to encompass year-round effort by all fleets and vessels catching threshers (Annex 1, Figure 2). Thresher landings tracked scombroidei landings from 1990 to 1999, when they reached their maximum (0.83% of the weight of national scombrid catches). The ratio was >0.5% during 1994-2000, then fell steeply to <0.1% from 2005 onwards, with a slight rise in the last few years of the fishery. Overall, this surrogate measure of CPUE declined by over 80%. The Panel questioned the proponent about zero landings in 2012-2013; this explanation was given: In 2010, IOTC prohibited retention of all thresher sharks. Sri Lankan fishermen targeted threshers during 2012, the last year before the prohibition was implemented under Sri Lankan law. Despite greatly increased effort, catches only increased to 0.49% of total scombrid landings. The zero points in 2013 and 2014 are from the landings data submitted to FAO. The Panel could have referred here to the 2012 decision by the IOTC to prohibit retention of thresher sharks in all fisheries covered by the Convention, because of concerns over declining thresher shark catches in the Indian Ocean.
Western Central Pacific	
The Panel considered the most recent standardized CPUE series available from the Pacific. They included Rice *et al.* (2015), that reflects longline observer data for *Alopias* spp. across the entire Western and Central Pacific, and a recent standardized CPUE series specific to bigeye thresher for the Hawaii longline fishery presented in Young *et*	Young et al. (2016) was not available before the listing proposal was submitted to the Secretariat. Rice et al. (2015) state that, for thresher sharks, "both the Proportion-presence and High-CPUE time series [in] Regions 3 and 4 [where thresher sharks constitute up to 10% of shark bycatch] have dropped considerably over the past 5 years." and "The last

al. (2016), which shows no trend in abundance. The Rice *et al.* (2015) *Alopias* spp. time series suggested a potential decline in the most recent years (3 most recent years in the standardized series and 5 most recent years in the nominal series) (Figure 3), acknowledging that, as in most observer time series, the recent years' data often suffer from incomplete reporting and the analysis excluded the important Hawaiian longline observer data (Rice *et al*, 2015).	three years of both the standardised and nominal CPUEs show a steep decline." They concluded: "The thresher shark complex appears to be declining though the last data point is based on relatively few data and may exaggerate the trend in the last year." See Figure 3, Annex 1, below, and Figure 3 in the FAO panel report.
Young *et al*. (2016) reported the standardized CPUE of bigeye thresher shark using Hawaiian longline observer data for the period between 1995 and 2014, which shows general flat trend with large increase of the nominal CPUE in most recent years (Figure 4). Given the fact that the standardized CPUE by Young *et al*. (2016) is specific to bigeye thresher shark and data collected from one of the areas where bigeye thresher shark is most abundant, the Panel recognized that standardized CPUE of bigeye thresher shark by Young *et al*. (2016) is better representing the dynamics of population of bigeye thresher shark in the WCPFC area.	The Hawaiian longline fishery is also unusual in the Pacific because it is managed. Young et al (2016) also presented standardized CPUE data from American Samoa, illustrating a 50% decrease in 11 years for 2003-2013. See Figure 4, Annex 1 (below). The results of the WCPFC stock assessment are needed to address these issues.
Given the species' very low productivity, the WCPFC decided to explore stock status further by initiating a Pacific-wide assessment for the bigeye thresher. This study will be completed in time for the next WCFPC Scientific Committee meeting in August 2016. If endorsed, this document can be provided as an information document to the CITES CoP17 in September 2016. The study incorporates data from Rice *et al*. (2015), Young *et al*. (2016) and new data from the Japanese observer programme.	Still not available at time of writing.
The Panel noted that the Proposal cites Ward and Myers (2005) finding of an 83% decline in biomass for all threshers between the 1950s and the 1990s. However, a close review of the Ward and Myers (2005) paper identified that there was an increase in nominal CPUE between the two periods and the details of how the standardization converted this nominal increase to a standardized decrease of 83% were not clear. It was also noted that the confidence interval for the thresher biomass estimate given in the appendix was very large and not shown in the paper itself. Furthermore, the sample sizes in the earlier period were very small, i.e. as few as n=2 for	As noted by Young et al (2016), Polacheck (2006) was concerned solely with estimating abundance declines in large pelagic teleosts, which are considerably more resilent to fisheries than large sharks. Polacheck's observations are not relevant to interpreting CPUE declines for thresher sharks. The report of the WCPFC SC in 2005 records the 'wide-ranging and spirited discussion" of the paper by Ward and Myers (2005). Records of the debate focused primarily on yellowfin tuna. Sharks are not mentioned. The SC also noted that the declines could be under-estimates.

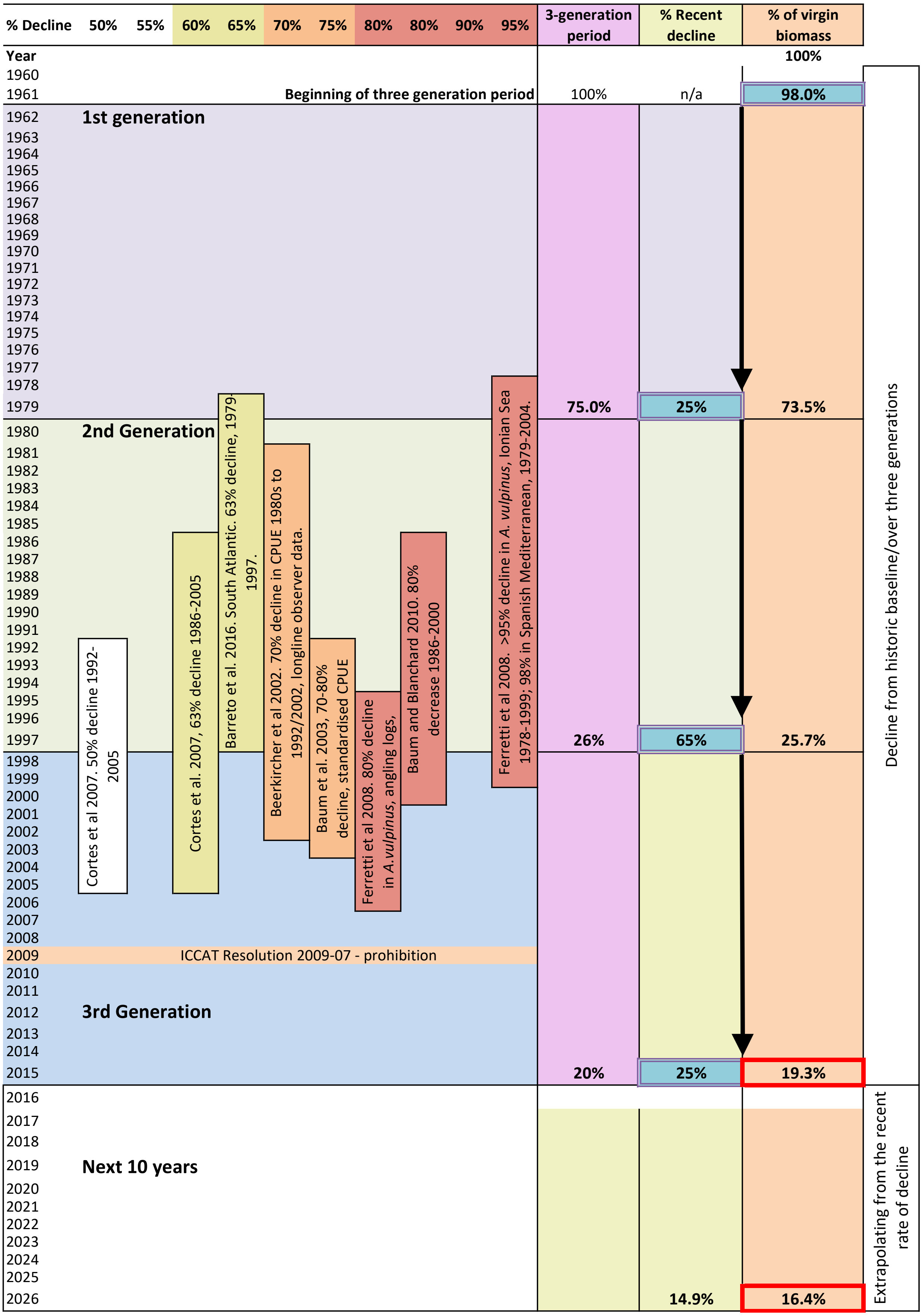
<table>
<tr><td>the size estimates, and the paper was inconsistent about whether thresher sharks should or shouldn't be analysed differently due to their potential association with land masses. For all of these reasons, the Panel had little confidence in confirming a decline in thresher sharks based on this paper. The Panel also recalled that the WCPFC scientific Committee critiqued the Ward and Myers (2005) paper in 2005, and noted the advice of Polachek (2006) regarding the tendency of long CPUE series to overestimate abundance declines in large pelagic species.</td><td>In 2012, the FAO Expert Panel assigned a high reliability rating (4-5) to the Ward and Myers (2005) paper regarding declines in oceanic whitetip sharks. See Annex 1 Figure 4.</td></tr>
<tr><td>One of the papers by Walsh et al. cited in the Proposal as "in press" was published in 2009. The Proposal states that this paper demonstrates a 9.5% decline in deep sets and 43% decline in shallow sets but the results in the published paper show a 28% decline in the deep sets and no catch of bigeye thresher sharks in the shallow set sector. The published paper also showed a significant increase in the mean size of bigeye threshers in the later period. While Walsh et al. (2009) does show a significant, species-specific decline for the bigeye thresher, the analysis is based on nominal catch rates only. The Panel noted that this same data series was updated and standardized in Young et al. (2016) and showed no discernible trend in bigeye thresher shark abundance.</td><td>Walsh et al. (2009) concluded that catch rates for blue shark, oceanic whitetip shark, bigeye thresher and crocodile shark were significantly lower in 2004–2006 than in 1995–2000. In the Hawaii-based longline fishery, bigeye thresher nominal CPUE in deep sets declined by 28% from 0.259/1000 hooks during 1995-2000, to 0.187 during 2004-2006. In shallow sets the decline in bigeye thresher was from 0.059 to 0.026 in these periods. The nominal CPUE values for bigeye thresher were significantly greater in the deep-set than the shallow-set sector (P < 0.001) and in 1995–2000 than during 2004–2006 (P < 0.01).

An approximately 50% decline in thresher CPUE was reported for 2004-2013 by US longline vessels landing in American Samoa (Young et al 2016).</td></tr>
<tr><td colspan="2">The Panel considered an unpublished manuscript on species composition in the shark fin trade and agreed that it provides a useful and novel baseline against which to monitor future changes in trade flows (Andrew Fields, in review, from State University of New York, Stony Brook, Demian Chapman Laboratory). However, the panel identified a number of important differences between the manuscript's "trimmings" samples and previous sampling by Clarke et al. (2006a,b) which were based on auction records classified by Chinese trade names and fin positions. These differences included the method of sample collection, estimates based on numbers versus weights, and potential differences in composition of trimmings given the extent of trimming needed for fins from different fisheries. For these reasons, the panel considered that comparisons between the two studies were problematic and could not be used as valid evidence for changes in population abundance.</td></tr>
<tr><td colspan="2">Modifying factors and risk</td></tr>
<tr><td colspan="2">Vulnerability factors such as life-history parameters and susceptibility to multiple threats, including to fisheries bycatch are addressed in the decline criterion threshold for a low productivity species. Circumglobal distribution could be a positive modifying factor, whereas the high at-vessel mortality could be negative. Panelists did not consider other potential biological or ecological factors that would alter the conclusions regarding biological listing criteria.</td></tr>
<tr><td colspan="2">Summary of evaluation and assessment of biological listing criteria</td></tr>
</table>

No global population estimates of bigeye thresher shark are available, however, the population is unlikely to be small. The species is wide-ranging and globally distributed so it does not meet the criteria for a restricted distribution. The Panel considered this a low productivity species and so considered that a decline of 70% or more over 2 generations (about 30 years) might meet the criteria for listing. Of the indices considered, most did not meet the CITES decline criterion. The indices that did meet the criteria were not specific to bigeye thresher shark, suffered from methodological problems or were older analyses that were not consistent with recent studies using the same datasets. Therefore, the Panel concluded that there is no reliable evidence to support a decline of bigeye thresher that would meet the CITES Appendix II listing criteria.	**Incorrect application of the criteria**: The listing criteria consider a recent-rate-of-decline to be over three, not two generations, but extent-of-decline from historical baseline is more important. The latter commenced in the 1950s–1960s. Table 1 of the Panel report provides two figures for generation time: 17.8 and 14.2 years. The Panel's report notes that these may be under-estimates. If 18 years is used, the recent-rate-of-decline is from 1962 to present. The Panel should have evaluated declines from baseline before extrapolating the recent-rate-of-decline over the next ten years. Figure 1, Annex 1 (below), presents an illustration of how the Panel might have applied the CITES decline criteria. These are very conservative figures – most decline data are higher than those used here. In contrast, Figure 1: Percent of baseline stock declines, on page 32 of the Panel Report, derived from data in Table 2 (page 31), provides data points that are mostly for one generation periods. Adding a column for the number of generation periods to Table 2 might have avoided this problem.

Annex 1, Bigeye thresher shark.

Figure 1. Evaluating *Alopias* decline trends, Atlantic Ocean, using the CITES listing criteria



If the figure in the upper red-bordered cell is 20-30% or less of historical baseline, or in the lower cell is 20% or less of historical baseline, stocks meet the criteria for consideration for Appendix II.

Figure 2. Scombroidei catches as a surrogate for thresher shark fishing effort, Indian Ocean.

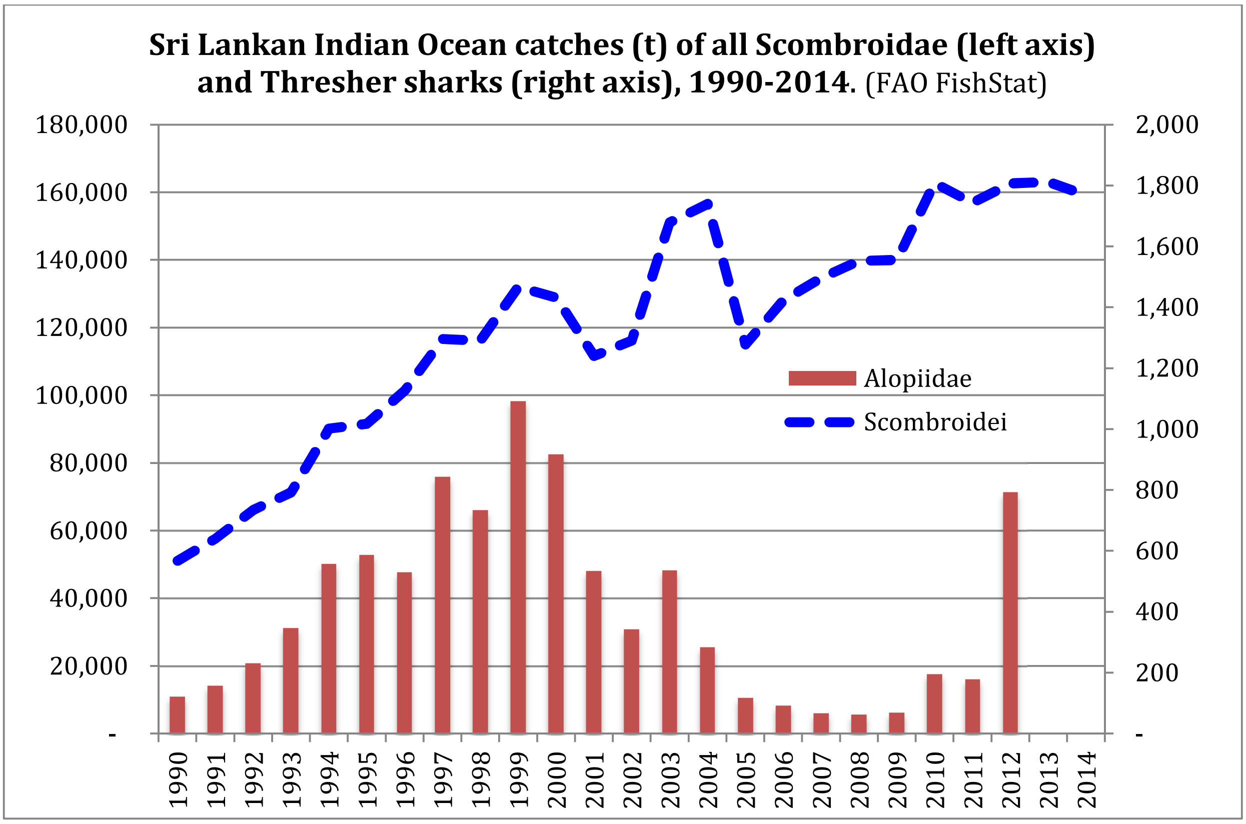


Figure 3. Relative nominal longline CPUE (numbers/1000 hooks standardised to a maximum value of 1) for thresher sharks, in six WCPC regions. (Source: Figure 32 in Rice et al. 2015.)

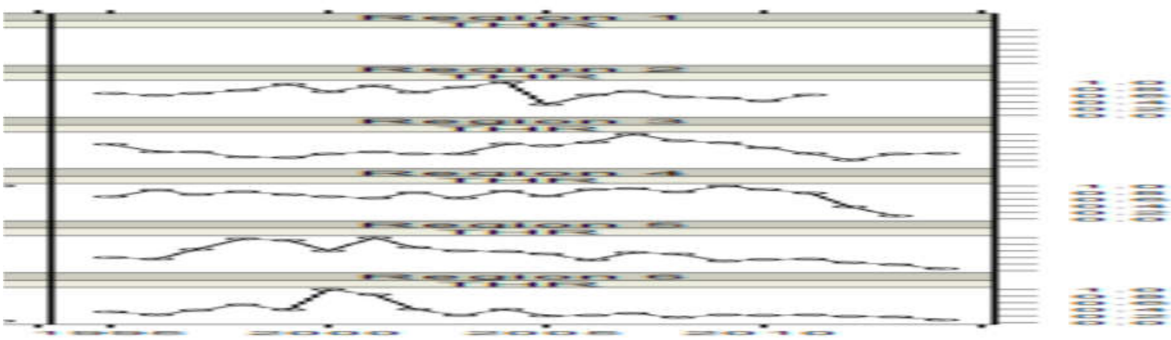


Figure 4. Thresher catch and CPUE in the American Samoa longline albacore tuna fishery, 2003-2013. Source: Figure 33 in Young et al. 2016.

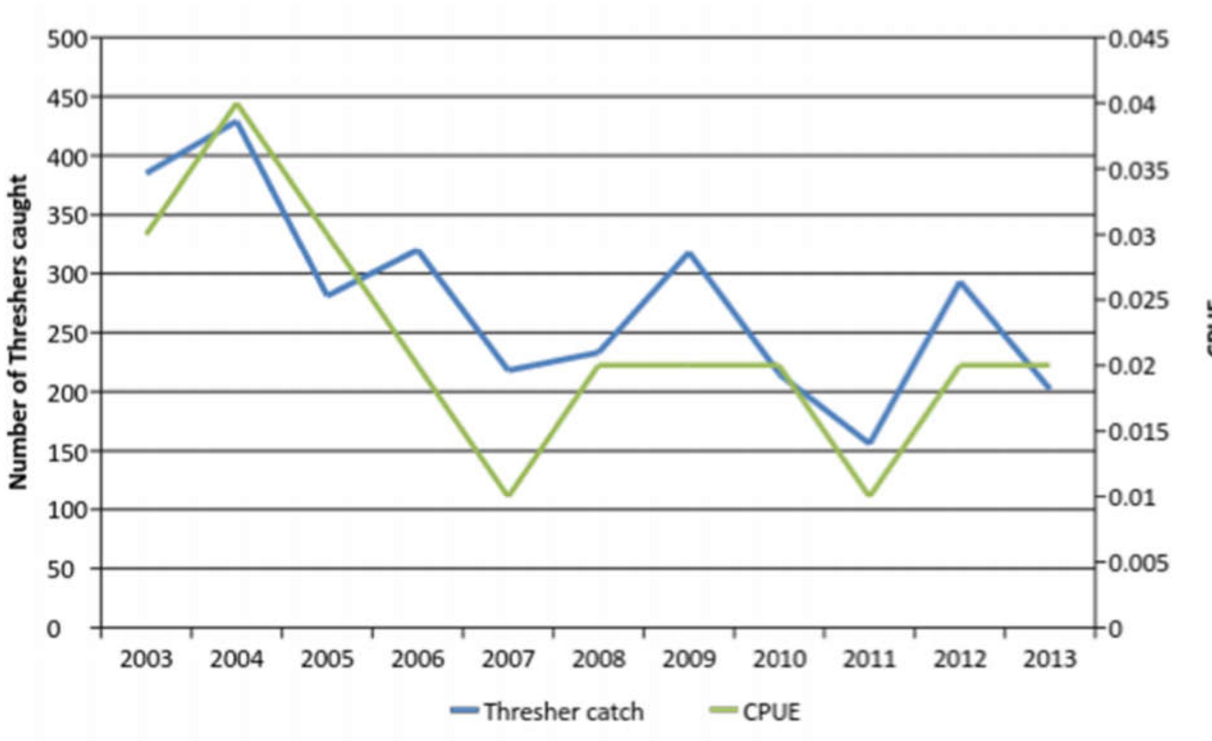


Figure 5. Change in indices of biomass (open circles) and abundance (solid circles) between 1950s and 1990s. (Source: Ward and Myers 2005.)

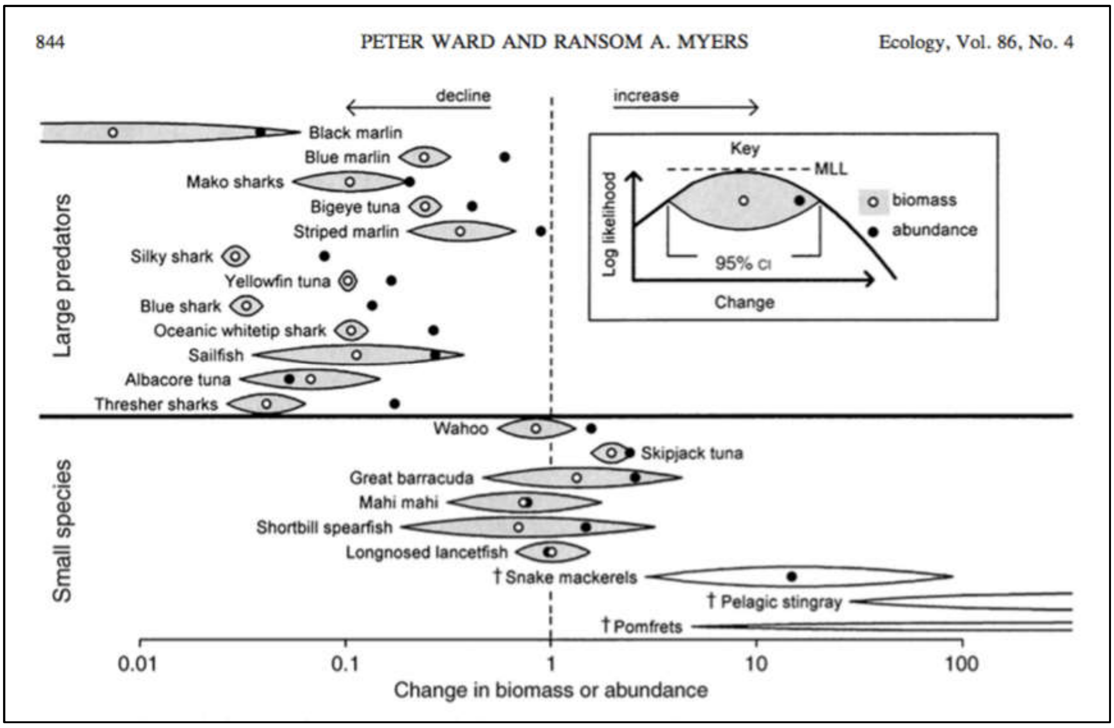
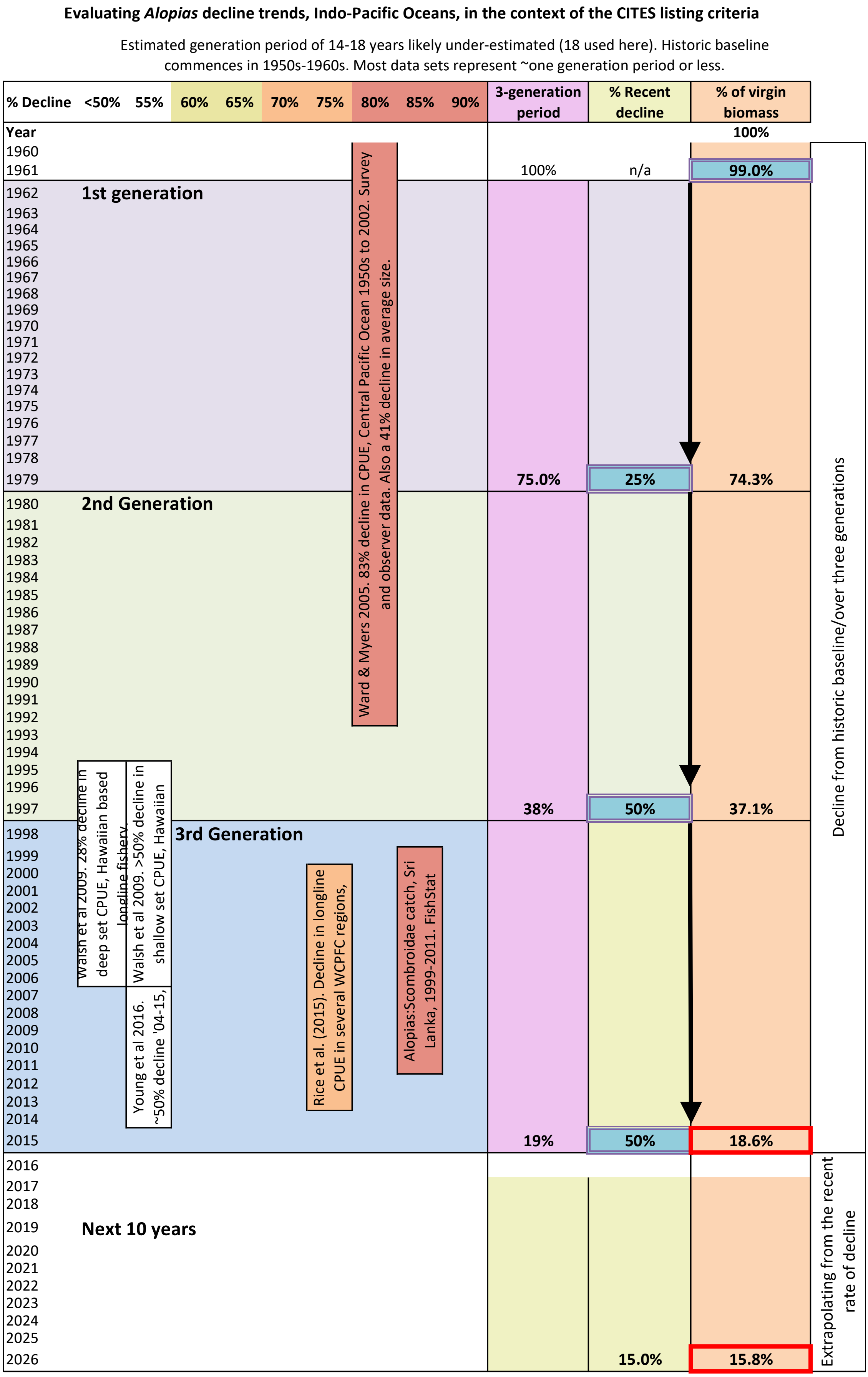


Figure 6. Evaluating *Alopias* decline trends, Indian Ocean, using the CITES listing criteria



If the figure in the upper red-bordered cell is 20-30% or less of historical baseline, or in the lower cell is 20% or less of historical baseline, stocks meet the criteria for consideration for Appendix II.