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SCIENTIFIC ADVISORY COMMITTEE

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**RECOMMENDATIONS BY THE STAFF FOR CONSERVATION
MEASURES IN THE EASTERN PACIFIC OCEAN, 2014**

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IATTC Resolution [C-13-01](#) on the conservation of tunas, paragraph 14, calls for the IATTC scientific staff to “...propose, if necessary, appropriate measures to be applied in future years.”

A. CONSERVATION OF TUNAS

The staff’s recommendations are based on its assessment of bigeye tuna (Document [SAC-05-08a](#)) and yellowfin tuna (Document [SAC-05-07](#)), which are updates of the 2013 assessments.

For bigeye, the staff’s conclusion from this year’s assessment is that fishing mortality (F) is slightly below F_{MSY} , the level corresponding to the maximum sustainable yield (MSY), as is indicated by the base-case point estimate for the F multiplier¹ of 1.04 ([SAC-05-8a](#), Table 1), and that the measures established in Resolution C-13-01 have had the intended effect of reducing the fishing mortality of bigeye to a level not exceeding the MSY . However, there is a considerable overlap between the target F multiplier of 1.0 and the 95% confidence intervals for the F multiplier of 1.04, indicating that the evidence supporting a conclusion that fishing mortality is below the level of F_{MSY} is not definitive. Nonetheless, the staff considers that the results support the continuation of Resolution [C-13-01](#). Another factor supporting this is the stock assessments of yellowfin and bigeye, which conclude that the base-case point estimate for the spawning stock is below the MSY level for both yellowfin and bigeye (Table 1 of [SAC-05-07](#) and [SAC-05-8a](#), respectively).

As of 2 May 2014, the capacity of the purse-seine fleet operating in the eastern Pacific Ocean² (EPO) was

¹ The ratio of the current fishing mortality ($F_{current}$, defined as the average fishing mortality for the three most recent years (2010-2012)) to the fishing mortality that will produce the maximum sustainable yield (F_{MSY}). An F multiplier of 1.0 means that $F_{current} = F_{MSY}$; if it is below 1.0, fishing mortality is excessive ($F_{current} > F_{MSY}$)

² Defined as the IATTC Convention Area, established in Article III of the Antigua Convention

215,608 cubic meters (m³) of well volume, which is close to the three-year (2011-2013) average of 214,337 m³. Consequently, the duration of closures of the fishery cannot be reduced on the basis of a reduction in fleet capacity.

1. YELLOWFIN, SKIPJACK, AND BIGEYE TUNAS

The staff recommends maintaining Resolution [C-13-01](#) for 2015. The offshore temporal and spatial closure (“*corralito*”) can be maintained as in the resolution because it has the effect of reducing bigeye catches by an amount equivalent to a three-day closure of the entire fishery (Appendix I).

2. PACIFIC BLUEFIN TUNA

A new assessment of Pacific bluefin tuna was completed during the last year. Projections in which Resolution [C-12-09](#) was extended into the future, with some reductions of catches in the western Pacific, indicate that it would likely lead to increases in stock abundance provided recruitment continues at average levels. For a low-recruitment scenario, more similar to the most recent years of recruitment estimates, juvenile catches in the EPO lower than those specified in C-12-09, and greater reductions in juvenile catches in the western Pacific, are required. The staff therefore recommends that the commercial catches in 2014 be limited below 3,154 t, which was the estimated commercial catch in 2013, and that the non-commercial catches in 2014 be limited below 208 t, which is based on the same method that was applied to commercial catch to determine that recommended limit.³

3. NORTHERN ALBACORE TUNA

The staff considers that the new assessment of northern albacore tuna, completed in April 2014, supports Resolution [C-05-02](#), and recommends the continuation of Resolutions [C-05-02](#) and [C-13-03](#).

B. PROVISION OF DATA

Catch-composition data provided to the IATTC should be disaggregated by the original unit of measurement (*e.g.* weight and length), fleet (including commercial and training vessels), and sex if available.

C. REFERENCE POINTS

The staff recommends that the Commission adopt the following target and limit reference points⁴, based in part on document [SAC-05-14](#), which defines two limit reference points, $F_{0.5R0}$ and $S_{0.5R0}$:

Stock	Target reference point	Limit reference point
Albacore tuna	$B_{MSY}; F_{MSY}$	$F_{0.5R0}$ and $S_{0.5R0}$, where $h = 0.75$
Bigeye tuna	$B_{MSY}; F_{MSY}$	$F_{0.5R0}$ and $S_{0.5R0}$, where $h = 0.75$
Skipjack tuna	$B_{MSY}; F_{MSY}$	$F_{0.5R0}$ and $S_{0.5R0}$, where $h = 0.75$
Yellowfin tuna	$B_{MSY}; F_{MSY}$	$F_{0.5R0}$ and $S_{0.5R0}$, where $h = 0.75$
Bluefin tuna	$B_{MSY}; F_{MSY}$	$F_{0.5R0}$ and $S_{0.5R0}$, where $h = 0.75$

D. HARVEST CONTROL RULE

The staff has consistently recommended the harvest control rule that, if fishing mortality exceeds the level corresponding to MSY, it be reduced to that level. The staff recommends that the Commission adopt this rule.

³ The commercial catch quota is a $1 - 3,154 / (10,000/2) = 37\%$ reduction from the previous quota, which was already reduced in 2012-2013 (Resolution C-12-09)

⁴ F_{MSY} : fishing mortality rate corresponding to the maximum sustainable yield; B_{MSY} : spawning biomass corresponding to the maximum sustainable yield; $S_{0.5R0}$: spawning biomass corresponding to that which produces a 50% reduction in recruitment as calculated in a Beverton-Holt spawner-recruit model with steepness of 0.75; $F_{0.5R0}$: fishing mortality that causes spawning biomass to be reduced to $S_{0.5R0}$; see SAC-05-14 for details.

In addition to that F_{MSY} -based management action, if the abundance of a stock falls below its limit reference point, further action should be taken to promote the rebuilding of the population towards its target reference point.

E. CONSERVATION OF SILKY SHARKS

An attempt to assess the status of the silky shark in the EPO using conventional stock assessment models has been severely handicapped by major uncertainties in the fishery data, mainly regarding catch levels in the early years. An alternative scientific basis for management advice is urgently needed and, for that purpose, a suite of stock status indicators (SSIs) are used (Document [SAC-05-11a](#)). For the northern stock, catch per set, the main indicator, shows an initial sharp decline over a wide spatial range (1994-1998), followed by a period of stability (1996-2006), and possibly increase (2006-2010). However, there are indications that any such increase has been reversed in recent years (2010-2013). For the southern stock, this indicator shows a sharp decline during 1994-2004, followed by a period of stability at much lower levels. The staff considers the above estimates reported in [SAC-05-11a](#) sufficient to warrant recommending the following precautionary measures, to promote the rebuilding of silky sharks stocks in the EPO:

1. For purse-seine vessels:
 - a. Prohibit retention of silky sharks by all vessels, and require that the sharks be promptly released unharmed, to the extent feasible.
 - b. Establish observer programs for capacity class 1-5 vessels, with technical assistance from IATTC staff, at a level of observer coverage adequate to reliably monitor silky shark bycatches.
 - c. Record, through observer programs for purse-seine vessels of all capacity classes, the number and status (dead/alive) of silky sharks caught and released.
2. For vessels other than purse-seiners, require that all silky sharks captured in fisheries that do not target this species be released as soon as they are seen in the net, on a hook, or on deck, to improve their chances of survival.
3. Close fisheries directed at silky sharks for a three-month period each year⁵, preferably during the first semester⁶. Fisheries not directed at silky sharks, but which catch the species incidentally, may continue to operate during the closure, but should not be allowed to use steel leaders on longlines for the duration of the closure.
4. Limit the catch of silky sharks of less than 100 cm total length during a trip to 20% of the total number of silky sharks caught during that trip.
5. Identify silky shark pupping grounds and prohibit fishing (with steel leaders) in them.
6. Change Paragraph 12 of Resolution [C-05-03](#) to read “Paragraphs 2-10 of this resolution apply to sharks caught in association with fisheries operating in the EPO” so that reporting of shark catches, by species, and of fishing effort, required by paragraph 11 of the resolution, is mandatory for all vessels.
7. Conduct experiments on mitigating shark catches, especially in longline fisheries, and on the survival of sharks captured by all gear types, with priority given to those gears with significant catches. Survival experiments should include studies of the effects on survival of shorter sets and of the use of circle hooks.

⁵ The three-month closure is based on the ratio of the best measure of average catch in 2008-2009 to that in 2011-2012.

⁶ The distribution of catches suggests that the predominant period of silky shark catch is the first half of the year.

8. Support research on mitigation of shark bycatches and data collection projects.

F. SEABIRDS

The Commission should revise Resolution [C-11-02](#) consistent with the current state of knowledge regarding seabird mitigation techniques, as described in document [SAC-05 INF-E](#)⁷. The two-column menu approach in [C-11-02](#) should be replaced by a requirement to use at least two of the following three mitigation methods in combination: line weighting, night setting, and bird-scaring lines. Other mitigation methods should not be endorsed as until their effectiveness is proven. The three recommended mitigation measures should, at the very least, specify the minimum standards in Appendix II).

The Commission should take note of the updated seabird density information and consider expanding the area of application of measures to include additional waters in the North Pacific

G. HANDLING OF MOBULID RAYS IN PURSE-SEINE FISHERIES

The Commission should :

1. Prohibit the gaffing of rays.
2. Prohibit lifting rays by the gill slits or spiracles.
3. Prohibit the punching of holes through the bodies of rays (*e.g.* to pass a cable through for lifting the ray).
4. Prohibit the retention of Manta and Mobula rays caught incidentally during fishing operations.
5. Require that, to the extent possible, rays too large to be lifted safely by hand be brailed out of the net using methods such as those recommended in document WCPFC-SC8-2012/ EB-IP-12 (Poison *et al.* 2012, [Good practices to reduce the mortality of sharks and rays caught incidentally by the tropical tuna purse seiners](#)).
6. Require that large rays that cannot be released safely before being landed on deck, be returned to the water as soon as possible, preferably utilizing a ramp from the deck connecting to an opening on the side of the boat, or if no such ramp is available, lowered with a sling or net.

H. HANDLING OF SEA TURTLES IN LONGLINE FISHERIES

The Commission should encourage the use of the videos and other educational materials, such as those available on the IATTC [website](#), to train captains and crews of longline vessels on when and how to dehook or disentangle a turtle and familiarize them with the correct methods for doing so, illustrated in these materials. Fishermen should be provided with educational materials for identifying leatherback, loggerhead, and hawksbill turtles.

The Commission should also adopt the following additional measures:

1. Require every longline vessel operating in an area where sea turtles may be hooked or entangled to carry: a) a dipnet to safely lift sea turtles aboard the vessel, b) a line cutter that is long enough to reach the turtle without lifting it from the water, c) dehookers (both inverted-V-shaped and a pigtail-shaped), d) a bolt cutter capable of cutting hooks, and e) equipment capable of safely keeping the sea turtle's mouth open.
2. Prohibit lifting of turtles from the water using the fishing lines in which the turtles are hooked or entangled. If a turtle must be removed from the water, an appropriate basket lift or dipnet should be used. If a hooked turtle cannot be safely removed from the water, any remaining line should be cut as close as possible to the hook without inflicting additional harm on the turtle. In no case should the length of line left attached to the hook exceed the length of the turtle's carapace.

⁷ Prepared by ACAP and Birdlife International

3. Prohibit attempts to remove swallowed hooks from turtles, and instead require that the hook be left in place and the line cut as close to the hook as possible without further injury to the animal.
4. Vessel crew should be encouraged to assess the condition of any sea turtle brought aboard the vessel prior to releasing them. To the extent practicable, injured or unresponsive turtles should be kept on board and assisted in a manner consistent with methods described in the FAO's [Guidelines to Reduce Sea Turtle Mortality in Fishing Operations](#) and in the materials on the IATTC [website](#).

I. FISHING GEAR CONFIGURATIONS

The Commission should require that vessels submit the purse-seine and longline gear description forms appended to Document [SAC-05-05](#). The information provided will be treated as confidential by IATTC staff, and used only for scientific purposes. Any significant modifications made to the gear subsequently should be reported on these forms prior to departing port with the modified gear.

J. NON-ENTANGLING FADs

Hanging any materials, such as net webbing, that may entangle any fauna under FADs deployed in the EPO should be avoided. Any non-entangling materials, such as ropes, may be used, and observer records will be used to verify their performance. The Commission should support research on the effectiveness of various materials.

K. IDENTIFICATION AND MARKING OF FADs

Vessels should authorize the companies that operate the satellite systems used to track the FADs to provide to the IATTC, directly or through whatever mechanism the governments and vessel owners consider suitable, the positions of each buoy from the time of deployment until it is recovered, with a time lag of four months to protect the owner's proprietary information.

FADs with satellite buoys deployed after 1 January 2015, shall be marked on the upper surface with a five-digit numeric code, at least 50 mm high, in such a way as to avoid covering the solar cells used to power the equipment while allowing the best visibility possible by the observer on the vessel. If the observer cannot read the code from the vessel, a crew member should provide the code to the observer. IATTC staff at the port of departure will assign the codes for each trip, with enough notice to allow for the painting of the buoys. The observer will record the location of deployment and code of each marked buoy.

The information provided will be treated as confidential by IATTC staff, and used only for scientific purposes.

L. OBSERVER COVERAGE OF LONGLINE VESSELS

Four Member countries provided summary reports of their observer programs. The information provided is insufficient for a rigorous evaluation of the adequacy of 5% coverage for their longline fisheries. The data show that 5% is too low a level of coverage to allow accurate estimates of the catch of species caught infrequently in those fisheries. In other studies in which large amounts of information has been collected, a 20% level of coverage has been calculated to be adequate to provide reliable estimates of the infrequently-caught species.

The staff recommends 20% observer coverage of large longline vessels until sufficient information is available to justify a revision.

APPENDIX I: EFFECT OF THE “CORRALITO” CLOSURE ON BIGEYE TUNA CATCHES

Document [IATTC-77-04](#) evaluated the effect of a proposal for the conservation of bigeye and yellowfin tuna in the EPO.

For the purse-seine fishery in the EPO during 2008, 2009, and 2010, the proposal consisted of two components: a 12-week closure in the entire EPO from 20 June through 11 September, and a closure of an offshore area very similar to the “corralito” (Figure 1; proposal D2A in Document [IATTC-76-04](#)) during 12 September through 31 December (110 days).

Figure 5 of the document shows the impact of 12- and 6-week temporal closures at different times of the year (not including the effect of a closure of the area in Figure 1).

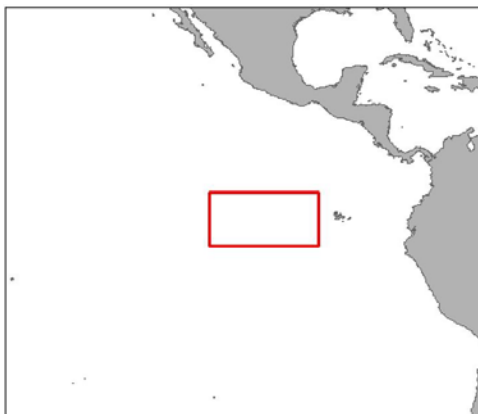


FIGURE 1. Offshore closure area between 94° and 110°W and from 3°N to 5°S

Table 1 of that document shows that, during 1995-2003, the proposal would have reduced the average purse-seine catch of bigeye by 29%. The 12-week closure starting on 20 June would have reduced the catch by 26%. Therefore, the estimated reduction in catch due solely to the 110-day *corralito* closure amounts to 3% or, over the 31-day period specified in Resolution [C-13-01](#), about 0.85%, the equivalent of a three-day closure of the entire fishery (0.03% per day; 0.85%*365).

APPENDIX II: MINIMUM STANDARDS FOR SEABIRD BYCATCH MITIGATION MEASURES FOR LONGLINE VESSELS

1. Branchline weighting configurations should consist of weights greater than 45 g attached within 1 m of the hook, or weights greater than 60 g attached within 3.5 m of the hook, or weights greater than 98 g weight attached within 4 m of the hook. Positioning the weight further than 4 m from the hook should not be deemed adequate.
2. All setting of longlines should be started and completed between nautical twilight and nautical dawn.
3. On longline vessels greater than 35 m length overall, two bird-scaring lines should be deployed in a configuration that maximizes their aerial extent, but with a minimum aerial extent of 100 m. Lines should be attached to the vessel at a height of at least 8 m above the water at the stern. Streamers should be brightly colored, a mix of long and short (<1 m), placed at intervals of no more than 5 m, and attached to the line with swivels that prevent streamers from wrapping around the line. All long streamers should reach the sea surface in calm conditions. Baited hooks should be deployed within the area bounded by the two bird-scaring lines, and bait-casting machines should be set so that the baited hooks hit the water within that area .
4. On vessels of less than 35 m length overall, a single bird-scaring line should be deployed in a manner that maximizes its aerial extent, but with a minimum aerial extent of 75 m. Lines should be attached to the vessel at a height of at least 7 m above the water at the stern. Streamers should be brightly colored and attached to the line with swivels that prevent streamers from wrapping around the line.

Short streamers (<1 m) should be placed at 1-m intervals along the entire length of the aerial extent. Longer streamers at 5-m intervals along the first 55 m of aerial extent, to complement the short streamers, could be added at the vessel's discretion. All long streamers should reach the sea surface in calm conditions.