1st MEETING OF THE FAD MANAGEMENT OPTIONS INTERSESSIONAL WORKING GROUP

Stones Hotel, Bali, Indonesia

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STATEMENT TO THE WCPFC FAD MANAGEMENT OPTIONS WORKING GROUP

WCPFC-2015-FADMgmtOptionsIWG01-OP01

23 November 2015

Paper by The Pew Charitable Trusts and the World Wide Fund for Nature (WWF)

Statement to the WCPFC FAD Management Options Working Group

The Pew Charitable Trusts and the World Wide Fund for Nature (WWF) thanks the Western and Central Pacific Fisheries Commission (WCPFC) for the opportunity to provide comments to the FAD Management Options Working Group. We welcome and support the work of the FAD Working Group and note that five issues are specified in the group's terms of reference, including the provision of a recommendation on a way forward with respect to FAD management options.

Given the complexities of the fishery and the urgency required to end the overfishing of Pacific bigeye tuna, the FAD Working Group dialogue should begin discussing management options as soon as possible.

Enclosed is a brief that draws on prior studies submitted to the WCPFC to summarize a range of FAD management options and their relative efficacy for bigeye conservation and provides recommendations for further analysis by the FAD Working Group. We also urge the FAD Working Group to consider the ecosystem impacts of FADs. The WCPFC should work to minimize the contribution of FADs to marine debris and minimize their effects on other marine life, such as sharks.

We note the chair's paper recommending the FAD Working Group discuss the development of a FAD research plan and FAD marking and identification scheme (WCPFC-TCC-2015-24) at its meeting in Bali. Regarding the research plan, we support the chair's recommendation to collect additional data on FAD construction, FAD deployment, FAD use and loss throughout the Convention Area; collect data on school aggregation times; and task the WCPFC science provider to characterize bycatch in the FAD fishery. As additional research topics, the research plan should study the relationship between the number of FADs in the Western and Central Pacific Ocean and the size of tuna aggregations underneath them, and the average fish production (disaggregated by species) per FAD. Regarding FAD marking and identification, we support the development of a physical marking scheme that would be applied consistently throughout the Convention Area. However, we also urge the FAD Working Group to consider the electronic tracking and monitoring system for FADs that is being developed by the Parties to the Nauru Agreement and examine a complementary application of such a system to other portions of the purse seine fishery in the Western and Central Pacific Ocean.

THE PEW CHARITABLE TRUSTS

WWF

An Assessment of FAD Management Options in the Western and Central Pacific Ocean

KEY POINTS

- Urgent action is required to improve the management of the Fish Aggregating Device (FAD)-associated purse seine fishery in the Western and Central Pacific Ocean and reduce fishing mortality on Pacific bigeye.
- Closing the fishery to FAD sets during four months of the year has not achieved the WCPFC's objective of reducing the impact of purse seining on bigeye. According to the SPC, the impact of the purse seine fishery incidentally catching juvenile bigeye is now roughly the same as the impact of the longliners targeting adult bigeye.
- A new way of managing FADs is needed. In recommending a way forward, the FAD Working Group should take advantage of the information already presented to the WCPFC on a range of alternative options for managing the purse seine fishery.
- That scientific analysis shows that options that indirectly manage bigeye mortality – such as longer FAD closures, changes to the design of FADs, changes to how purse seiners set on FADs, and use of species discriminating buoy technologies – will not be successful in reducing the impact of the purse seine fishery on bigeye.
- Instead, the FAD Working Group should assess and recommend how to implement options that directly control fishing mortality – such as limits on the number of FAD sets or bigeye catch limits.

INTRODUCTION

The reliance of the purse seine fishery in the Western and Central Pacific Ocean on Fish Aggregating Devices, or FADs, has contributed to the depletion of Pacific bigeye tuna and led to other negative effects on the ecosystem. Bigeye tuna is at 16 percent or less of its historic unfished size. With purse seiners impacting the stock similarly to longliners, Pacific bigeye was declared overfished in 2014 and overfishing, a longstanding concern, continues. The unmanaged proliferation of FADs also contributes to marine litter. Most FADs are never set upon, sinking in the ocean or washing up on reefs and shorelines. Vulnerable species, such as sharks, may be entangled and killed by FADs (Filmalter, 2013). An overabundance of FADs may be changing the behavior and size of skipjack tuna (SPC, 2012a; Fonteneau, 2014).

Charged with the precautionary management of the tuna stocks within its Convention Area, the Western and Central Pacific Fisheries Commission (WCPFC) has been unable to develop and agree on measures to adequately address the impacts of FADs to provide for their ongoing use in the purse seine skipjack fishery. The WCPFC, as the most modern of the tuna RFMOs, and with responsibility for the world's largest tuna fishery, should be at the forefront of sustainable conservation and management. It has a duty to take action to end the overfishing of Pacific bigeye and develop a rebuilding plan to reverse its overfished status.

Recognizing the need to discuss the development of a comprehensive measure to manage FADs, this paper assesses the state of FAD management concepts, such as spatial and temporal closures, changes

to gears and limits on the use of FADs. **The science already presented to the WCPFC provides some clarity on the path required**: **Only options that directly control the mortality of bigeye tuna, such as FAD set limits or bigeye catch limits, will end bigeye overfishing**.

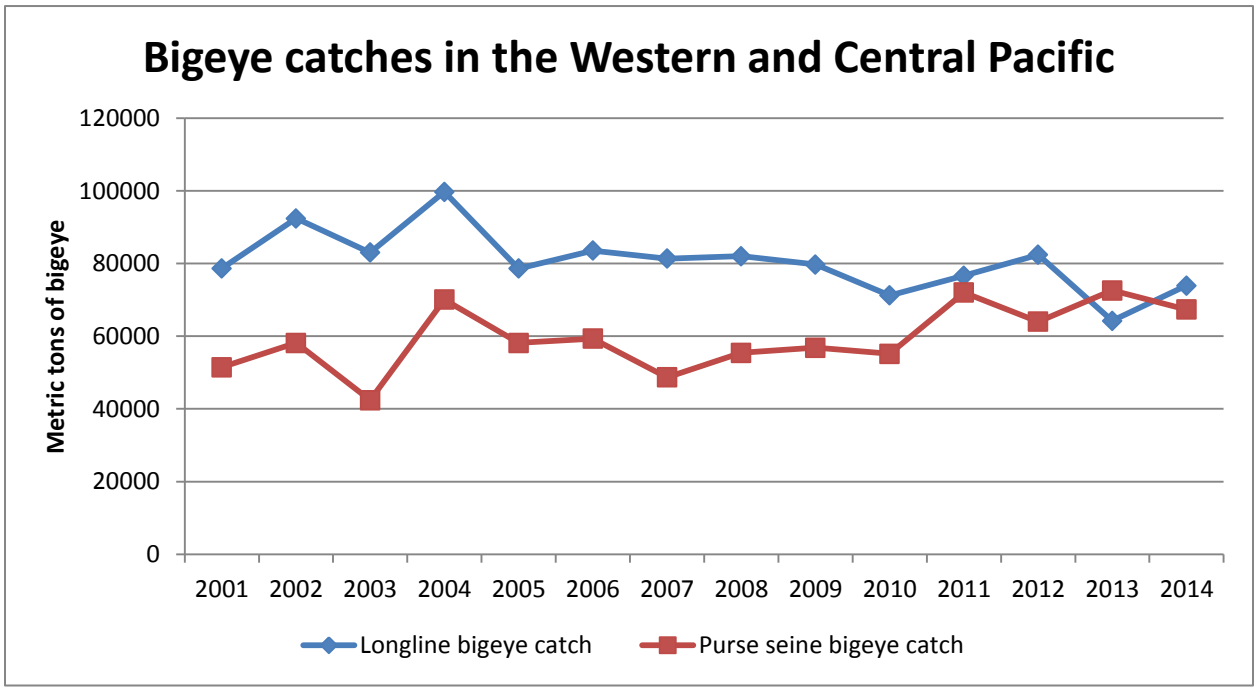

Figure 1 - A comparison of the most recent 10-year history of bigeye catches in metric tons by longline and purse seine gears. (Source: WCPFC-SC11-2015/ST IP-1, Tables 3 and 5.)

STATUS OF THE PURSE SEINE FISHERY

Purse seine catches of bigeye have caught up to longline catches

According to the Secretariat of the Pacific Community, the purse seine fishery now has a similar impact on the bigeye stock as the longline fishery. Pacific bigeye is caught at all age stages of its life cycle. Longliners target adult fish for the fresh fish and sashimi markets. Despite the fact that catch of bigeye in the purse seine fishery is incidental, nearly all bigeye is caught in association with FADs, rather than free school fishing operations.

Historic impacts on the stock of bigeye mainly came from the longline fishery. In recent decades, longline fishing for bigeye has declined, while purse seine mortality of bigeye has increased (See Figure 1). In 2013, for the first time, more tonnage of smaller bigeye was taken as non-targeted catch in the purse seine fishery than as targeted catch in the longline fishery. The purse seine catch of bigeye was the third highest on record, at 82,511 metric tons (Williams and Terawasi, 2014).

Purse seine days fished in international waters and waters under national jurisdiction in WCPFC									
2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
49,851	46,142	49,368	52,104	52,023	52,903	59,103	55,231	62,310	59,399

Figure 2 - Purse seine days fished in the WCPFC increased 20 percent in 10 years. (Source: WCPFC-TCC11-2015-IP08, Table 1.)

Catches of bigeye from the distant water longline fleets are managed through catch limits. Those limits will decline through 2017 in accordance with CMM 2014-01. The purse seine fishery, which lacks catch limits for skipjack or bigeye, experienced growth in the number of days fished on the high seas and in the waters under national jurisdiction (See Figure 2).

FAD management measures to date failed to address purse seine catches of bigeye

FAD management has focused on reducing juvenile bigeye mortality through closures of the FAD purse seine fishery. Unfortunately, as Figure 3 shows, the closures have not been effective. Despite doubling the FAD closure period to four months in 2013, up from two months in 2009, the purse seine fleet is catching more bigeye tuna than before and the number of FAD sets was the third highest on record in 2014 (Williams and Terawasi, 2014 and 2015). The closure affects the high seas and coastal State EEZs. Archipelagic waters are exempted from the closure in the tropical tuna conservation and management measure. The increased purse seine catch of bigeye catch coincides with greater effort levels in the fishery and vessels becoming more efficient at using FADs with sonar buoys. FADs also are not required to be removed from the waters prior to the start of the closure period, allowing them to aggregate tunas during the closure period. An effective measure would directly control bigeye mortality.

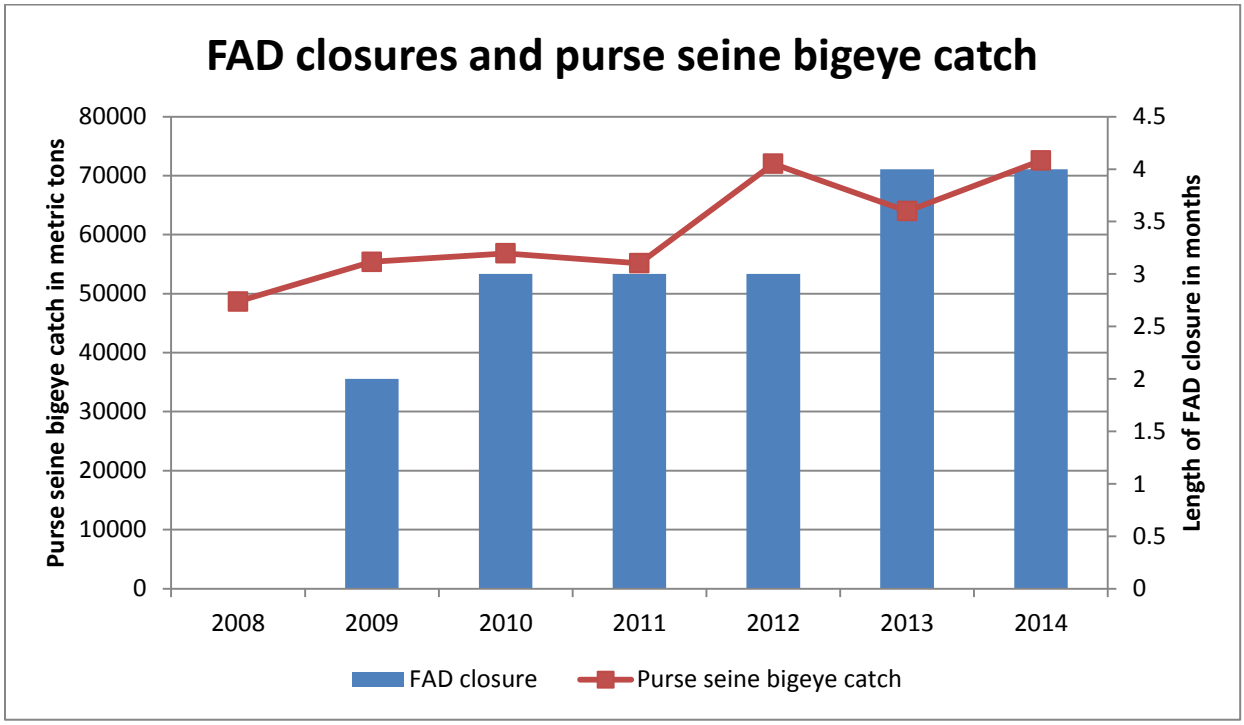

Figure 3 - Annual catches of bigeye from the purse seine fishery measured against the length of the FAD closure period in the WCPO. (Source: Bigeye catches from WCPFC-SC-2015/ST-IP-01)

ASSESSING ALTERNATIVE FAD MANGEMENT OPTIONS

A range of options has been considered to conserve bigeye in the purse seine fishery, including different iterations of FAD closures, changes to the construction of FADs, changes to purse seine nets and/or fishing practices, and limits on the catch of bigeye or the number of times vessels can set on FADs. Additional options are being studied, such as using sonar to identify species under a FAD and inform vessel behaviors. Each option should be assessed for the likelihood of conserving bigeye. The sections below outline the management options, and the information and research regarding their value to the

conservation of bigeye. Whichever option is chosen, the WCPFC should support the efforts of the Parties to the Nauru Agreement (PNA) in implementing electronic FAD tracking and monitoring. PNA fishery managers will receive the same data on FAD movements that is already transmitted to purse seine operators at no additional cost to industry. Complementary FAD tracking arrangements should be extended to other EEZs and the high seas.

1. Amending the existing FAD closure

Proposals: Several changes to the existing four-month FAD closure have been proposed. Under the tropical tuna conservation and management measure (CMM 2014-01), the FAD closure could be extended to a fifth month if the Commission adopts an arrangement to avoid transferring a disproportionate burden of conservation onto Small Island Developing States. On the high seas, CMM 2014-01 imposes a year-round ban on the use of FADs in 2017 – except for Kiribati-flagged vessels fishing in the adjacent high seas and any flag State that reduces its bigeye catch by 45 percent from current levels – unless the Commission decides on alternative measures at its annual meetings in 2015 or 2016. Meanwhile, some Parties to the WCPFC have suggested another type of closure – a total closure prohibiting both FAD and free school fishing during a portion of the year.

Findings: Lengthening the existing FAD closure is unlikely to generate any significant benefit for bigeye conservation. Making progress on the underlying issue of the disproportionate burden of conservation is important for the Commission to move forward on conservation measures, however. One reason is the Commission lacks a mechanism to prevent fishing effort from being displaced to other portions of the year. Vessels can fish with greater intensity during the non-closure months and deploy more and more FADs if they choose. A record 297 purse seine vessels fished in the western and central Pacific in 2013. That number was expected to grow to 305 purse seiners in 2014. Under current conditions, FAD closures will not benefit bigeye conservation. Even if the closure was extended, fish would continue to aggregate under FADs during the closure and the overall number of times FADs are set upon in the Convention Area may not be reduced (Sibert et al., 2011). In addition, advances in sonar buoy technology may undermine the effectiveness of FAD closures. FAD fishing is more efficient than ever before, allowing vessels to catch more fish more quickly, making the closure period less effective over time at retarding the impact of FADs. Implementing a total purse seine closure may be easier to monitor and enforce – VMS alone could identify fishing activity – but it offers little potential for additional conservation of bigeye. Nearly all bigeye in the purse seine fishery is caught on FADs. A total purse seine closure would significantly reduce catches of skipjack, penalizing the free school method of fishing that is not contributing to the depletion of bigeye (SPC, 2012b).

2. Changing FAD construction and deployment

Proposals: Studies have examined shortening the length of the material that hangs under FADs, noting that bigeye tuna is thought to spend more time at deeper depths than skipjack and yellowfin while aggregated under FADs. Fishermen hang netting underneath FADs to attract fish and believe a relationship exists between the depth of the netting and the fish that aggregate under the FAD. Other studies have explored using two FADs in concert – one to aggregate bigeye away from the purse seine net and the other to aggregate skipjack tunas.

Findings: Shortening the length of the hanging material to date has been unsuccessful in dissuading bigeye from aggregating under a FAD. One reason may be that the swimming behavior of bigeye may not be as consistent when associated with FADs (Western Pacific Fishery Management Council, 2005). Japanese and Korean studies provide some real-world examples to test the hypothesis. A Japanese study examined data from 17 FAD sets recorded by port samplers and 65 sets recorded by observers. The

depth of the material hanging from the FADs ranged from 25 to 75 meters. The study found the depth of the material had no significant effect on the ratio of bigeye catch to total purse seine catch (Satoh, et al. 2007). Catches of skipjack and yellowfin also showed no correlation with the depth of the material. Similarly, the Korean study examined catches of tunas on anchored and drifting FADs with underwater netting that extended to depths of 40, 60 and 90 meters. Observers recorded the results of 14 FAD sets. The study also found no significant difference in the catch and size of bigeye associated with the depth of the netting (Moon et al., 2008). Similarly, studies using two FADs in tandem failed to produce results of statistical significance, although some reduction in the catch of bigeye was observed in some of the very limited tests that were conducted. Experiments either used different lengths of material under the two FADs or light stimulus in an effort to draw away bigeye tuna from the targeted aggregations of skipjack (AZTI-ISSF, 2012; Kawamoto et al., 2012; Satoh et al., 2012).

3. Changing purse seine netting and deployment

Proposals: If FADS cannot be altered with reliable results to mitigate the catch of bigeye, could changing the purse seine net or altering the depth at which it is set help vessels avoid bigeye? Experiments have tried to allow bigeye to swim out of the purse seine net through escape panels or avoid catching bigeye by deploying the net at shallower depths.

Findings: Studies showed that those types of changes did not reliably mitigate bigeye catches. Both methods rely on an understanding of bigeye tuna behaviors and swimming depth. However, complex interactions among several site-specific environmental factors and time of year may influence tuna behavior and undermine designing fishery-wide guidelines on net construction or deployment (Lennert-Cody et al., 2007). Of the research that has examined changes to the net design, one studied a modified purse seine net with openings large enough for small fish to pass through. When the net was tightened, cameras placed in the net found the fish recognized the walls of the net and did not try to escape, even though the openings were large enough for them to swim through (Hasegawa, 2010). Another study placed LED lights in the water column to try to guide fish through an escape panel, but scientists say more research is needed to assess its effectiveness (Hasegawa, 2010; Oshima, 2012.) Similarly, testing different net depths also did not produce a technical solution to the bigeye challenge. For instance, a Japanese study tracked 30 skipjack, 32 bigeye and 43 yellowfin after releasing them near two FADs in the Pacific. Although many fish swam away and did not return, several were observed for days around the FADs. The study found overlap in the swimming depths of the three species, though skipjack swam on average “a little shallower” than bigeye (Matsumoto et al., 2006). The study suggested site specific temperature and dissolved oxygen concentrations may be factors influencing behavior that would complicate guidance on using net depths to avoid catching bigeye. Another study used acoustic tagging and stationed divers inside a purse seine net. Skipjack, yellowfin and bigeye appeared to associate under a FAD in vertical groupings by species, but also size class. In contrast to some assumptions, the study found small bigeye tended to reside in the upper portion of the water column, in depths of 10 to 20 meters, and above aggregations of larger skipjack (Muir et al, 2012). In this case, setting a shallow net would not mitigate bigeye catches.

4. Species discrimination

Proposal: Industry is working to perfect a sonar buoy that would be able to identify the amount of bigeye aggregated around a FAD. If fishermen know the quantity of bigeye under their FADs in advance, they could choose to only set on FADs with profitable levels of skipjack and without significant aggregations of bigeye.

Findings: Echo-sounder technology certainly has advanced and fishermen are using it with greater

effect. Already, some fishermen say they can distinguish species within the aggregations of tunas under a FAD (Lopez et al., 2014; Fuller, 2014). But the state of the technology does not yet allow for most fishermen to ascertain the amount biomass of bigeye from that of other tunas with certainty or precision (ICCAT, 2015). More information from the study of tuna movements needs to be integrated with development of the buoy technology (Lopez et al, 2014).However, policy hurdles still stand in the way of so-called species discrimination becoming a realistic option to solving the bigeye problem. Even with perfect information, fishermen do not have incentives to forgo fishing on FADs with large amounts or high ratios of bigeye. Vessels mix juvenile bigeye with skipjack and are still able to sell the entire catch to the canneries, earning a similar level of profit regardless of the species composition of the catch (Restrepo et al., 2014). New policy interventions would be required to change the incentives of fishermen.

5. Purse seine bigeye catch limit

Proposal: Bigeye catch limits have been considered in the purse seine fishery either as a stand-alone measure or in concert with other measures, such as the FAD closure. The chief benefit of a catch limit system is the ability to manage the mortality of bigeye caught in the purse seine fishery in a way that could be directly tied to the scientific advice, rather than through a proxy. Vessels would have greater flexibility in choosing when to fish, unlike today when the FAD closure limits their decision-making.

Findings: Although several difficulties may arise in implementing and administrating a purse seine bigeye catch limit, none are insurmountable. The Commission would have to decide the relative contribution to ending bigeye overfishing from the longline and purse seine fisheries. A “sliding scale” concept has been used in the past, showing the relationship between measures in both fisheries to end bigeye overfishing. Such a system of individual fishing quotas, or IFQs, is not new. Several parties to the WCPFC have designed and implemented IFQs, including Australia, Canada, New Zealand and the United States. Prior concerns focused on the feasibility of obtaining bigeye catch estimates from the purse seine fishery with sufficient accuracy and timeliness to assess compliance with a catch limit. Significant progress in estimation methods has been made. Observer coverage on purse seiners is now 100 percent. Although vessel logbooks underestimate bigeye catches and observers using grab sampling techniques are prone to selectivity bias (Lawson, 2013), an additional estimation technique, called spill sampling, has been developed. Spill sampling is not yet used widely and would need to be expanded. A recent paper reviewing the catches from one fleet showed consistency between observers’ estimates using spill sampling and the data recorded separately by canneries for the purposes of paying vessels for their catch (Lawson, 2014). Due to a time-lag in receiving data, vessels could still fish if they exceeded their limit. Solutions could be a catch pay-back provision. Or, as the Secretariat described, a flag State could pay a financial penalty according to the tonnage of bigeye over the catch limit (WCPFC Secretariat, 2011).

6. Incentivizing reductions in FAD sets

Proposals: A FAD set limit offers the benefit of directly controlling bigeye mortality. Although potentially less precise as a management tool than a catch limit system, a FAD set limit regime could be tied to the scientific advice to reduce mortality on bigeye. As Figure 4 shows, the number of FAD sets made in the WCPO and the tonnage of bigeye caught on FADs are strongly related. As with catch limits, FAD set limits also offers vessels the flexibility of choosing when to fish.

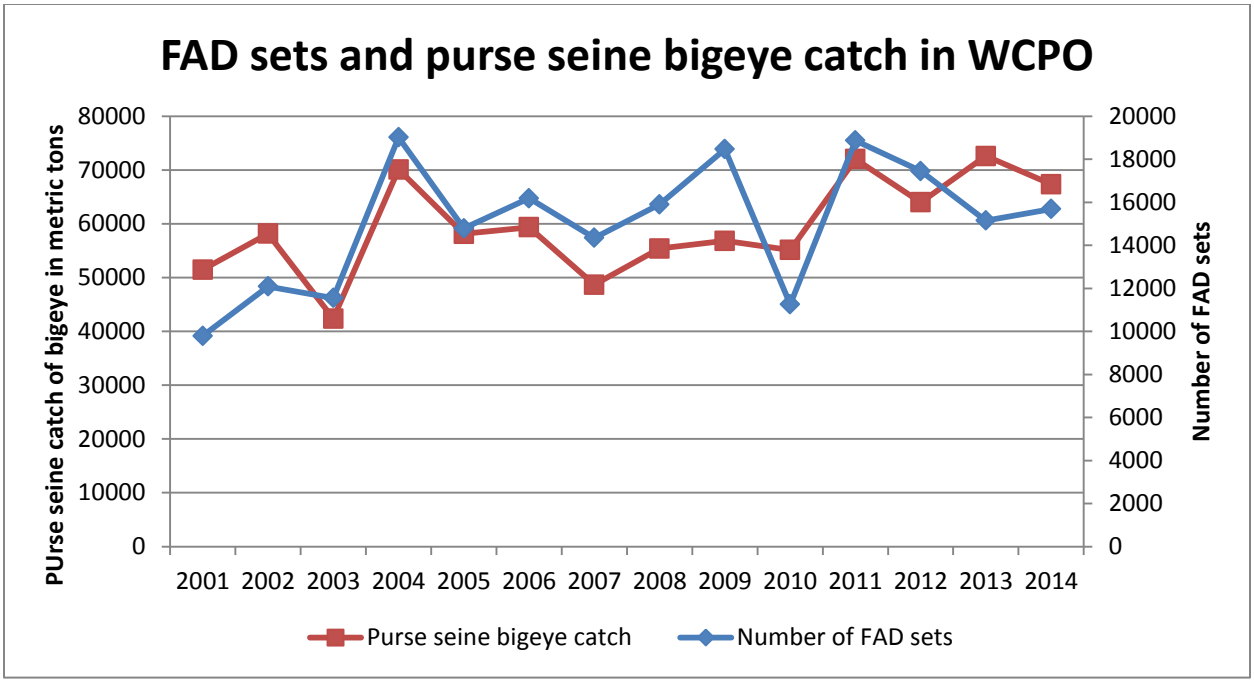

Figure 4 - A comparison of bigeye catches on FADs and the number of times vessels set their nets on FADs in the WCPO. (Source: Bigeye catches from WCPFC-SC-2015/ST-IP-01, Table 5. FAD set numbers from TCC-2015-IP08, Table 3.)

Findings: A science-based FAD set limit could be effective in ending overfishing of bigeye if implemented across the WCPO. Such a relationship has been observed by scientific studies and parties to the WCPFC, including Japan, which found in a regression analysis that a FAD limitation would be an effective measure to reduce bigeye catch from the purse seine fleet (Japan, 2013). Other studies found limiting FAD use would have a strong positive impact on bigeye stocks (Sibert et al., 2011) and regulating the ratio of the number of associated to unassociated sets also could be a conservation option (Satoh et al., 2012). During the formation of the Commission, a chief concern with FAD set limits was the ability to monitor purse seine activity. Since 2010, however, the Commission has mandated observers on all purse seine trips. Vessel captains also record purse seine set activity on logbooks. Electronic reporting mechanisms could be used to allow flag States and the Commission to monitor the number of FAD sets in near-real time. Beginning in 2016, Parties to the Nauru Agreement also intend to implement electronic FAD tracking and monitoring in their waters. As with a purse seine bigeye catch limit, allocating a FAD set limit presents allocation challenges. In the interim, the Commission could adapt the FAD set allocation key contained in CMM 2014-01, Appendix A, in accordance with the scientific advice.

7. Other types of FAD limits

Other types of FAD limitations are being discussed in RFMOs. The Indian Ocean Tuna Commission adopted a measure that limits purse seine vessels from monitoring more than 550 buoys at any one time. It's important to recognize that the issues facing each RFMO may be different. Bigeye is not overfished in the Indian Ocean, where concerns center on the catching of smaller skipjack and fewer free schools.

RECOMMENDATIONS

As the WCPFC examines the management of the purse seine fishery, members should:

- Review the relevant information from papers presented to the WCPFC on the use of FADs in the Western and Central Pacific Ocean;

- Note that since 2008, the WCPFC Scientific Committee has supported the reduction of FAD sets to a level no greater than 2010 levels.
- In consideration of their promise to reduce bigeye catches, assess and recommend how FAD set limits, bigeye quotas or other options that directly control fishing mortality of bigeye can be implemented;
- Such implementation should also include recommendations to the Commission to define appropriate bigeye catch levels with respect to the high seas and Exclusive Economic Zones; and
- Recommend ways the Commission can support the Parties to the Nauru Agreement's implementation of FAD tracking and monitoring, including the design of complementary measures for the high seas.

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