Preliminary Report: Manta Harvest in Lamakera

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In May of 2002 the WWF Indonesia sponsored an exploratory venture to the Alor region of eastern Indonesia to conduct survey of local resources and identify critical management issues. Few expeditions have been made to this area and little information is available on the natural resources and their uses by the local villagers.

Alor is known for the traditional whaling villages of Lamalera and Lamakera. In addition to whales, both villages also hunt for manta rays although they have received less attention in the literature. The whales and mantas have been historically harvested by harpoon from homemade wooden boats powered by paddles and sails woven from palm fronds. While the fishing practices and subsistence economy have remained relatively unchanged in Lamalera, both have changed dramatically in Lamakera over the last few years. Here, the local people have shifted away from the traditional whale harvest and now focus primarily on manta rays (*Manta birostris*), locally known as belelang. Fewer numbers of two smaller species of mantas are also taken: bou (*Mobula tarapacana*) and moku (*Mobula thurstoni?*). The harvest for belelang has increased by an order of magnitude in just the past few years and the sustainability of this harvest is in question.

The increased rate of harvest of manta rays at Lamakera is due to a number of factors, both economic and technological, that have increased both effort and demand. The demand has been influenced by the recently developed trade in both the skin and brachial filter plates removed from the gills (hereafter referred to as gill plates). The skin is sent to Jakarta where it is used in the production of shoes and wallets. The dried gill plates are sent to Hong Kong where they are used in traditional medicines. The dried gill plates from one manta bring 1,400,000 Rupia (~140 US$) dried skin 60,000 Rupia (6US$). Even the meat, which used to be consumed in the village, is sold locally. A bundle of 20 dried rings of meat are sold for 35,000-40,000 Rupia. Where once most of the manta was utilized in the village, now the vast majority is sold and the harvest has transformed into a commercial venture.

The newly developed market for skin and gill plates has resulted in an expected increase in effort. Smaller vessels powered by 15 hp outboard motors have replaced the traditional whaling vessels. These new powered vessels have dramatically reduced transit time; a trip to the fishing grounds that previously took 4 –14 days now takes only one. As a result, the fishermen can make the same number of trips in one month (~12) that used to take the entire 6-month season. The total effort has also expanded due to an increase in the number of boats, which have increased in the last few years from around 18 to over 30. The boats are now owned individually rather than by clans and much of the crew comes from other villages. Due to the introduction of motors, greater number of boats, and the high price obtained for the gill plates, the local fishing pressure has increased by approximately an order of magnitude. Given the high commercial value, there is a strong possibility that the commercial manta harvest will spread beyond Lamakera to other local villages resulting in an even higher level of fishing pressure.

Based on interviews with a number of fishermen in Lamakera in May of 2002 it is possible to obtain a rough estimate for the total harvest per year as well as for the historic take. Efforts were made to determine a range of parameters to provide a number of independent estimates of total take. Parameters included the number of boats that fished, the number of days fished per week, the number of mantas caught per day, per week and over the season for both individual boats and for the village. Not all values were obtained from each fisherman. Compiling the information obtained from all the interviews provided a range of values for these parameters that were then used to estimate total take. The manta-fishing season is from May through October and stops in the rainy season because the meat can no longer be dried in the sun. Each week from 3 to 5 trips are made depending on the occurrence of mantas in the area. The average number of mantas landed per boat in a season ranges from 25-50, with the average take of the village in a given week ranging from 60-90. The catch per boat per day is approximately 0.5 mantas assuming 4 days of fishing per week (24 weeks total) and 30 boats fishing per fishing day. The total average take over the season is estimated at 1,500 mantas (range 1,050-2,400). This represents a considerable increase over historic levels that were around 200-300 per season, closer to the current level of take in the more traditional fishing village of Lamalera.

Although it has only been in the last few years that mantas have become the primary focus of fishing activities, there is some indication that local populations are being effected. Fishermen of Lamakera reported that previously mantas occurred in the channel near the village but now they must travel much farther to the fishing grounds. The boats of Lamalera whose fishing grounds overlap with those of Lamakera, caught almost no mantas in 2001, also suggesting a local decline in populations. For the fishermen of Lamakera, each year the harvest begins just southeast of Solor Island and moves progressively west. Although this may represent seasonal movements it is also possible evidence of serial depletion. The general strategy of the Lamakera fishing fleet is to find a group of mantas and then return to the same group on subsequent days until they are gone. Given the limited availability of data on manta rays it is difficult to determine whether changes observed represent natural fluctuations or reflect over-fishing. More information on the large-scale movements and population structure of manta rays in Indonesia is required to improve interpretation of the data and allow for the development of a management plan for the region.

Even if the effects of over-fishing are not yet apparent, it is highly unlikely that the harvest can continue at the current rate. Whereas shark populations are understood to be highly susceptible to fishing pressure, the closely related manta rays are at even greater risk. The fecundity of manta rays is among the lowest of any elasmobranch as they normally give birth to only one pup (twins are rare). The gestation period is thought to be nine months and it is not known whether females give birth every year. Mantas are also a long-lived species and likely reach reproductive maturity after 4 to 5 years, although this remains to be verified. For long-lived species with low reproductive rates commercial harvests have repeatedly resulted in the collapse of populations. There is no reason to think the mantas will be any different.

In conclusion, over the last few years the fishing efforts in Lamakera have shifted and now focus primarily on manta rays. The demand for manta rays has increased largely as a result of the lucrative market for dried gill plates that are destined for Hong Kong.

The introduction of motors and increased number of boats translates into dramatic increases in local effort. Consequently the manta take has escalated from a few hundred to over one thousand per year. While the signs of over-fishing may not yet be apparent, based simply on the natural history of the manta rays and the repeated collapse in shark populations around the globe in response to commercial fishing pressure, it is clear that the current level of harvest cannot be sustained. Of great concern is the potential for the manta fishery to expand into surrounding villages given their high value. Current efforts of the WWF and the Pfleger Institute of Environmental Research will focus on working with the local villagers, developing a management plan for the region, and conducting research to fill gaps in our understanding of the biology of manta populations in Indonesia.