



CALIFORNIA STATE SCIENCE FAIR 2009 PROJECT SUMMARY

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Project Title Tracking the Pacific Bluefin Tuna	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Using the Tagging of Pacific Predators Program (TOPP) tagging map satellite images, we plotted geolocations for eight Pacific bluefin tuna from January, 2004 through December, 2004. We compared the migratory patterns of the PBT to harvesting data released by the United Nations Food and Agriculture Organization in 2004 to draw conclusions regarding the effects of migratory movements and over-fishing on the bluefin tuna population related to the principles described by Biologist Garrett Hardin in 1968 as the Tragedy of the Commons or the depletion of commonly held resources.</p> <p>Methods/Materials We measured hundreds of geolocation images of eight bluefin tuna from January of 2004 through December of 2004 using the TOPP tracking program. We then created a tracking map illustrating the migratory patterns of the fish and then we compared the tracking map of the eight Pacific Bluefin Tuna over the course of one full year (1994) to data from the United Nations FAO report on international fish harvesting of that same year.</p> <p>Results We confirmed that Pacific bluefin tuna do demonstrate a migratory pattern from the Eastern Pacific Ocean to the Western Pacific Ocean and back to the the Eastern Pacific Ocean. We confirmed that the TOPP tracking system combined with geolocation position charting is a valid way of observing migratory patterns of the PBT. Data from the United Nations 1994 FAO report on tuna catches by nation in the Pacific Ocean confirmed that the greatest amount of harvesting of the PBT is occurring in the Western Pacific Ocean.</p> <p>Conclusions/Discussion The bluefin tuna is being heavily fished in the Western Pacific Ocean by several foreign nations and increasingly in the Eastern Pacific Ocean by foreign fishing fleets. We believe this is adversely affecting the survivability of the population as more fishing fleets resort to purse-seine fishing in attempts to gather as many of the remaining fish as possible before the collapse of the population. We believe this demonstrates the Tragedy of the Commons principle as suggested by Garrett Hardin. The value of the tuna is so great that fishing fleets in both the Western and Eastern Pacific Ocean are attempting to cash in by catching as many of the prized fish as possible before they are gone. We determined that there is a need for international treaties and protected marine sanctuaries to prevent the bluefin tuna from being over-fished to the point of collapse.</p>	
Summary Statement Use of Satellite Archival Tags and Online Tracking to Examine Migratory Patterns of Pacific Bluefin Tuna Compared to Fish Harvesting Data and the Tragedy of the Commons Principle	
Help Received Dr. Kochevar and Dr. Block provided access to and permission to use data from the TOPP program and provided guidance on the study, Dr. Matsumoto provided guidance on the Tragedy of the Commons principle and report edits, my father and mother helped with typing the reports and the board	