

An Analysis of Spotter Plane Use in the ABT Fishery

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TABLE OF CONTENTS

TABLE OF CONTENTS.....	2
LIST OF TABLES	5
INTRODUCTION.....	14
METHODS	17
SURVEY INSTRUMENTS	17
DATA COLLECTION AND SAMPLING	17
DATA COLLECTION AND PROCESSING	19
DATA RE-WEIGHTING	20
EXECUTIVE SUMMARY	22
GOAL #1: QUANTIFICATION OF THE EXTENT OF SPOTTER PLANE USE IN THE ABT FISHERY, AND COLLECTION OF INFORMATION ABOUT THE PILOTS, PLANE OWNERS, AND VESSEL OPERATORS INVOLVED.	22
GOAL #2: TO GATHER ECONOMIC DATA RELATED TO THE USE OF SPOTTER PLANES IN THE ABT FISHERY.	22
GOAL #3: TO INVESTIGATE THE EFFECT SPOTTER PLANES HAVE ON CATCH RATES AND SEASON LENGTH IN THE ABT FISHERY.....	24
GOAL #4: TO INVESTIGATE THE SAFETY ISSUES RELATED TO THE USE OF SPOTTER PLANES IN THE ABT FISHERY.....	26
RESULTS.....	28
GOAL #1: QUANTIFY THE EXTENT OF SPOTTER PLANE USE IN THE ABT FISHERY AND COLLECT INFORMATION ABOUT THE PILOTS, PLANE OWNERS, AND VESSEL OPERATORS INVOLVED.	28
Objective A: Estimate the number of spotter pilots who participated in the fishery during the 1998 season, the average number of vessels each pilot was hired by, and the average number of ABT spotting days/hours per pilot in 1998	28
Objective B: Estimate the total number of ABT vessels that directly hired spotter planes during the 1998 ABT season, and the average number of days/hours spotter planes were hired per vessel during the 1998 season.	29
Objective C: Estimate the number of ABT vessels that indirectly made use of spotter planes in 1998 by following planes not hired by themselves in search of fish.....	29
GOAL #2: TO GATHER ECONOMIC DATA RELATED TO THE USE OF SPOTTER PLANES IN THE ABT FISHERY.	30
GOAL #3: TO INVESTIGATE THE EFFECT SPOTTER PLANES HAVE ON CATCH RATES AND SEASON LENGTH IN THE ABT FISHERY.	36
Objective A: Compare the relative success rates of trips targeting ABT with the aid of spotter planes versus trips targeting ABT without the aid of spotter planes.....	36
Objective B: Determine if vessels (or individual trips) that use planes indirectly experience higher relative success rates than vessels (or individual trips) that did not use spotter planes at all.	38

Objective C: Estimate the percent of the 1998 catch related to the direct use of spotter planes, the indirect use of spotter planes, and completely unrelated to spotter plane use.....	39
GOAL #4: TO INVESTIGATE THE SAFETY ISSUES RELATED TO THE USE OF SPOTTER PLANES IN THE ABT FISHERY.....	40
Spotter Pilot Survey.....	40
Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.	40
Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.	40
Objective C: Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.....	41
Harpoon category Fishermen Survey	43
Harpoon category Fishermen Who Use Planes	43
Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.....	43
Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.....	43
Objective C: Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.....	45
Harpoon category Fishermen Who Do Not Use Planes	47
Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.....	47
Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.....	47
Objective C: Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.....	49
General category Fishermen Survey.....	50
General category Fishermen Who Target ABT and Use Spotter Planes.....	50
General category Fishermen Who Target ABT and Do Not Use Spotter Planes	50
Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.....	50
Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.....	51
Objective C: Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.....	54
General category Fishermen Who Do Not Target ABT and Do Not Use Spotter Planes ...	55
Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.....	55
Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.....	56

LIST OF TABLES

Table 1.	Disposition of telephone survey calls by group.....	18
Table 2.	Disposition of telephone survey respondent fishing types by group.	19
Table 3.	Estimated number of spotter pilots who participated in the ABT fishery during the 1998 season according to permit category.	28
Table 4.	Estimated average number of vessels each pilot was hired by.....	28
Table 5.	Estimated number of ABT days/hours flown per pilot in 1998 according to permit category, according to pilots. (Includes only those pilots who actually flew in each category).....	28
Table 6. Estimated average number of vessels assisted on a typical day according to permit category.....	29
Table 7. Estimated total number of ABT vessels that directly hired spotter planes, and estimated number of days spotter planes were hired per vessel during the 1998 season, according to vessel owners.	29
Table 8.	Estimated total number of ABT vessels that indirectly made use of spotter planes in 1998.....	29
Table 9.	Estimated percent of General category permit holders that made direct or indirect use of planes according to stated primary gear type, and gear type used to land ABT.....	30
Table 10.	Indirect use of spotter planes as reported by spotter pilots.	30
Table 11.	Average number of flight hours spent spotting fish, and average number of flight hours spent spotting ABT per pilot.....	30
Table 12.	Estimated total number of flight hours spent spotting ABT according to permit category.....	31
Table 13.	Estimated total operating costs for all spotter planes according to permit category...31	
Table 14.	Total value of fish landings for vessels in the Harpoon category, according to use of spotter planes.....	31
Table 15.	Number of ABT vessels, days spent fishing, and total costs to operate ABT vessels.	32
Table 16.	Total value of fish landings for vessels in the General category that indicated harpoon as their primary gear, or landed ABT using harpoon gear, according to use of spotter planes.	32
Table 17.	Percent of spotter pilots reporting they had collected aerial survey data on ABT.....	32
Table 18.	Percent of spotter pilots willing to consider flying as a paid aerial survey data collector if a ban on spotter planes in the ABT fishery reduces the hours they can currently fly.....	33
Table 19.	Percent of spotter pilots planning to fly as ABT spotter pilots during the 1999 ABT season if use of planes is not banned.....	33
Table 20.	Pilots expectation on how the number of hours they will fly in 1999 for commercial purposes other than spotting fish if spotting ABT is banned in the General category.....	33
Table 21.	Pilots expectation on how the number of hours they will fly in 1999 as a spotter pilot for fish other than ABT if spotting ABT is banned in the General category.	34
Table 22.	Pilots expectation on how the number of hours they will fly in 1999 as a spotter pilot for ABT in other categories (such as Harpoon or Purse Seine) if spotting ABT is banned in the General category.	34
Table 23.	Pilots expectation on how the number of hours they will fly in 1999 for commercial purposes other than spotting fish if spotting ABT is banned in the General and Harpoon Categories.....	34

Table 24.	Pilot's expectation on how the number of hours they will fly in 1999 as a spotter pilot for fish other than ABT if spotting ABT is banned in the General and Harpoon Categories.....	35
Table 25.	Pilot's expectation on how the number of hours they will fly in 1999 as a spotter pilot for ABT in other categories (such as Purse Seine) if spotting ABT is banned in the General and Harpoon Categories.	35
Table 26.	Comparison of relative success rates of vessels in the Harpoon category when they use spotter planes vs. when they do not use spotter planes.	36
Table 27.	Comparison of relative success rates of vessels in the General category (who list harpoon as their primary gear, or landed a ABT using harpoon gear) when they use spotter planes vs. when they do not use spotter planes.	37
Table 28.	Comparison of relative success rates of vessels in the General category (who do not list harpoon as their primary gear, nor landed a ABT using harpoon gear) when they indirectly use spotter planes vs. when they do not use spotter planes.....	38
Table 29.	Distribution of reported and estimated total (in parenthesis) ABT landed according to type of fishing and usage of spotter planes in General category.	39
Table 30.	Distribution of reported ABT caught according to type of fishing and usage of spotter planes in the Harpoon category.....	39
Table 31.	Estimated percent of the 1998 ABT catch related to the direct use, indirect use and no use of spotter planes according to permit category.	40
Table 32.	Extent that respondents are concerned about a mid-air collision with another spotter plane.	40
Table 33.	Frequency of spotter plane use during the 1998 season compared to the frequency of spotter plane use during the 1988 season.....	40
Table 34.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.....	41
Table 35.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.	41
Table 36.	Number of occasions respondents reported that they personally assisted in the rescue of any stranded vessels or persons while flying as a spotter pilot for ABT.	42
Table 37.	Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.	42
Table 38.	Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.....	42
Table 39.	Number of occasions respondents reported that they personally assisted in the rescue of marine mammals while flying as a spotter pilot for ABT.....	42
Table 40.	Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes.	43
Table 41.	Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.....	44
Table 42.	Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	44
Table 43.	Number of incidents heard of or seen incidents of territorial behavior over fishing location on the water per week during 1998 season between a vessel directly using a spotter plane and a vessel not directly using a spotter.	44

Table 44.	Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.....	44
Table 45.	Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	45
Table 46.	Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	45
Table 47.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.....	46
Table 48.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.	46
Table 49.	Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.	46
Table 50.	Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.....	46
Table 51.	Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes.	47
Table 52.	Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.....	47
Table 53.	Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	48
Table 54.	Number of incidents heard of or seen incidents of territorial behavior over fishing location on the water per week during 1998 season between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	48
Table 55.	Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.	48
Table 56.	Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	49
Table 57.	Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	49
Table 58.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.....	49
Table 59.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.	49
Table 60.	Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.	50
Table 61.	Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.....	50
Table 62.	Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes.	51

Table 63.	Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.	51
Table 64.	Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	51
Table 65.	Number of incidents heard of or seen incidents of territorial behavior over fishing location on the water per week during 1998 season between a vessel directly using a spotter plane and a vessel not directly using a spotter.	52
Table 66.	Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.	52
Table 67.	Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	53
Table 68.	Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	53
Table 69.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.	54
Table 70.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.	54
Table 71.	Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.	54
Table 72.	Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.	55
Table 73.	Extent of respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes	55
Table 74.	Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.	56
Table 75.	Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	56
Table 76.	Number of incidents heard of or seen incidents of territorial behavior over fishing location on the water per week during 1998 season between a vessel directly using a spotter plane and a vessel not directly using a spotter.	56
Table 77.	Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.	57
Table 78.	Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	57
Table 79.	Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	57
Table 80.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.	58
Table 81.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.	58

Table 82.	Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.	58
Table 83.	Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.....	59
Table 84.	Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes.	59
Table 85.	Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.	59
Table 86.	Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	60
Table 87.	Number of incidents heard of or seen incidents of territorial behavior over fishing location on the water per week during 1998 season between a vessel directly using a spotter plane and a vessel not directly using a spotter.	60
Table 88.	Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.	60
Table 89.	Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	61
Table 90.	Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	61
Table 91.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.....	61
Table 92.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.	62
Table 93.	Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.	62
Table 94.	Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.....	62
Table 95.	Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes	62
Table 96.	Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.....	63
Table 97.	Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	63
Table 98.	Number of incidents heard of or seen incidents of territorial behavior over fishing location on the water per week during 1998 season between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	64
Table 99.	Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.....	64
Table 100.	Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.....	64

Table 101.	Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.	65
Table 102.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.....	65
Table 103.	Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.	65
Table 104.	Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.	65
Table 105.	Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.....	66
Table 106.	Awareness by General category fishermen who target ABT, and do not use spotter planes, of the National Marine Fisheries Service’s proposed rule in 1997 to ban the use of spotter planes in the General category.	66
Table 107.	Perception by General category fishermen who target ABT, and do not use spotter planes, on whether or not a ban on spotter planes in just the General Category would affect them in any way.	67
Table 108.	Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not they care if a ban were placed on spotter planes in just the General category.....	67
Table 109.	Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not a ban on spotter planes in both the General and Harpoon Categories would affect them in any way.	67
Table 110.	Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not they care if a ban were placed on spotter planes in both the General and Harpoon Categories.	67
Table 111.	Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 ABT season.	68
Table 112.	Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 ABT season.	68
Table 113.	Perception by General category fishermen who target ABT, and do not use spotter planes, of the effect the presence of spotter planes has on the likelihood of vessels not using spotter planes to catch ABT on the same fishing grounds.	69
Table 114.	Perception by General category fishermen who target ABT, and do not use spotter planes, of the length of the Harpoon category season if spotter planes were banned in the General category for the 1999 season.	69
Table 115.	Perception by General category fishermen who target ABT, and do not use spotter planes, of the length of the General category season if spotter planes were banned in the General category for the 1999 season.	69
Table 116.	Perception by General category fishermen who target ABT, and do not use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned in the General category for the 1999 season.	70
Table 117.	Perception by General category fishermen who target ABT, and do not use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned in the General category for the 1999 season.	70

Table 118.	Perception by General category fishermen who target ABT, and do not use spotter planes, of the length of the Harpoon category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.....	70
Table 119.	Perception by General category fishermen who target ABT, and do not use spotter planes, of the length of the General category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.....	71
Table 120.	Perception by General category fishermen who target ABT, and do not use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.	71
Table 121.	Perception by General category fishermen who target ABT, and do not use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.....	71
Table 122.	Awareness by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the National Marine Fisheries Service’s proposed rule in 1997 to ban the use of spotter planes in the General category.	72
Table 123.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not a ban on spotter planes in just the General category would affect them in any way.	72
Table 124.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not they care if a ban were placed on spotter planes in just the General category.....	72
Table 125.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not a ban on spotter planes in both the General and Harpoon Categories would affect them in any way.	73
Table 126.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not they care if a ban were placed on spotter planes in both the General and Harpoon Categories.....	73
Table 127.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 ABT season.	73
Table 128.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 ABT season.....	74
Table 129.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the effect the presence of spotter planes has on the likelihood of vessels not using spotter planes to catch ABT on the same fishing grounds.	74
Table 130.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on what they would do if spotter planes were banned from the General category in 1999.....	74

Table 131.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the length of the Harpoon category season if spotter planes were banned in the General category for the 1999 season.	75
Table 132.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the length of the General category season if spotter planes were banned in the General Category for the 1999 season.	75
Table 133.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned in the General category for the 1999 season.	75
Table 134.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned in the General category for the 1999 season.	76
Table 135.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the length of the Harpoon category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.	76
Table 136.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the length of the General category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.	76
Table 137.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.	77
Table 138.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.	77
Table 139.	Awareness by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the National Marine Fisheries Service’s proposed rule in 1997 to ban the use of spotter planes in the General category.	77
Table 140.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not a ban on spotter planes in just the General category would affect them in any way.	78
Table 141.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not they care if a ban were placed on spotter planes in just the General category.	78
Table 142.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not a ban on spotter planes in both the General and Harpoon Categories would affect them in any way.	78

Table 143.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not they care if a ban were placed on spotter planes in both the General and Harpoon Categories.	78
Table 144.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 ABT season.	79
Table 145.	Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 ABT season.	79
Table 146.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the effect the presence of spotter planes has on the likelihood of vessels not using spotter planes to catch ABT on the same fishing grounds.	80
Table 147.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the length of the Harpoon category season if spotter planes were banned in the General category for the 1999 season.	80
Table 148.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the length of the General category season if spotter planes were banned in the General category for the 1999 season.	80
Table 149.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned in the General category for the 1999 season.	81
Table 150.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned in the General category for the 1999 season.	81
Table 151.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the length of the Harpoon category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.	82
Table 152.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the length of the General category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.	82
Table 153.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.	83
Table 154.	Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.	84

INTRODUCTION

Segments of the U.S. north Atlantic Bluefin Tuna (ABT) fishery utilize the aid of spotter planes in locating these large, valuable, migratory pelagics. Spotter planes are used primarily by commercial fishermen fishing with purse seines or harpoon gear and only occasionally by vessels trolling with rod and reel gear. In 1996 there were approximately 30 active pilots (fish spotters) in this fishery. On March 4, 1997 the National Marine Fisheries Service (NMFS) proposed a rule which would prohibit the use of spotter aircraft except in the Purse Seine category. If this rule were enacted, spotter pilots would no longer be allowed to assist in the capture of ABT in the Harpoon category or the General category. The General category allows for harpoon, rod and reel, and handline gear types. In the final rule, NMFS amended this provision to ban spotter planes only in the General category and continue to allow them in the Purse Seine and Harpoon categories. However, since the General category has a larger total allowable catch quota, many harpoon fishermen chose to fish in this category instead of the Harpoon category. Also, since the Purse Seine category is restricted to only five boats, over 80% of the tuna spotters are hired by harpooners. The Atlantic Fish Spotters Association challenged this rule in a Massachusetts U.S. District Court.

The Atlantic Fish Spotters Association, composed of members primarily from Massachusetts to Maine, are clearly opposed to NMFS proposed restrictions on spotter plane use in the capture of ABT. They claimed that NMFS had no rationale or supportable justification for this action, and contended that the rule banning spotter planes in the General category was “arbitrary and capricious, and abuse of discretion, and not in accordance with law.”

After hearing the arguments, U.S. District Judge J. Tauro overturned the spotter plane ban regulation stating that “the enactment of the regulation, banning the use of spotter planes in the General category, was an arbitrary and capricious exercise of the NMFS’ authority.” The Court found that the rule adversely impacts harpoon fishermen holding General category permits.

The Court relied on the arbitrary and capricious standard of the Administrative Procedure Act in rendering its decision. The Court found NMFS negligent in showing a rational connection between the known facts and the choice (plane ban) made. In response to this decision, NMFS decided not to appeal but rather to gather more facts and relevant data in order to reach a satisfactory resolution.

The purpose of this study is to collect information relevant to spotter plane use in the ABT fishery. Four basic goals provided direction:

Goal #1: Quantify the extent of spotter plane use in the ABT fishery and collect information about the pilots, plane owners, and vessel operators involved.

Objectives:

- a) Estimate the number of spotter pilots who participated in the fishery during the 1998 season, the average number of vessels each pilot was hired by, and the average number of ABT spotting days/hours per pilot in 1998.
- b) Estimate the total number of ABT vessels that directly hired spotter planes during the 1998 season, and the average number of days/hours spotter planes were hired per vessel during the 1998 season.
- c) Estimate the number of ABT vessels that indirectly made use of spotter planes in 1998 by following planes not hired by themselves in search of fish.

Goal #2: To gather economic data related to the use of spotter planes in the ABT fishery.

Objectives:

- a) Investigate economic impacts (but not develop an I/O model) of a proposed spotter plane regulation on the spotter plane industry including pilots, plane owners, and supporting industry.

- b) Investigate economic impacts (but not develop an I/O model) of a proposed spotter plane regulation on the vessel operators that make use of spotter planes in the capture of ABT.

Goal #3: To investigate the effect spotter planes have on catch rates and season length in the ABT fishery.

Objectives:

- a) Compare the relative success rates of trips targeting ABT with the aid of spotter planes versus trips targeting ABT without the aid of planes.
- b) Determine if vessels (or individual trips) that use planes indirectly experience higher relative success rates than vessels (or individual trips) that did not use planes at all.
- c) Estimate the percent of the 1998 catch related to the direct use of spotter planes, the indirect use of spotter planes, and completely unrelated to spotter plane use.

Goal #4: To investigate the safety issues related to the use of spotter planes in the ABT fishery.

Objectives:

- a) Report on the perceptions of fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.
- b) Report on the frequency and nature of conflicts (either physical or psychological) as reported by the various ABT fishery participants.
- c) Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue and recovery efforts of stranded vessels and marine mammals.

METHODS

Survey Instruments

A survey was administered via a telephone interview to three populations; General category fishermen, Harpoon category fishermen, and spotter pilots. The three survey instruments used for the telephone interviews are provided in Appendix A (General category fishermen), Appendix B (Harpoon category fishermen) and Appendix C (spotter pilots). All three survey instruments contain screener questions asked up front to determine which specific questions would follow during the interview. General category respondents were in the end categorized into one of five fishing types based on responses to three screener questions: 1) they target ABT and use a spotter plane, 2) they target ABT but do not use a spotter plane, 3) they do not target ABT and do not use a spotter plane, 4) they indicated harpoon as their primary gear, or landed ABT using harpoon gear, and use spotter planes, and 5) they indicated harpoon as their primary gear, or landed ABT using harpoon gear, and do not use spotter planes. Likewise, Harpoon category respondents were categorized into one of two fishing types based on responses to two screener questions: 1) Harpoon category fishermen who use planes, or 2) Harpoon category fishermen who do not use planes. Pilots were screened to determine if they flew in the ABT fishery in 1998 and if they were pilot/owners or just pilots of ABT planes. The dialing and data collection period lasted approximately two weeks. The population size and disposition of telephone survey calls according to group is shown in Table 1.

Data Collection and Sampling

Data were collected through personal telephone surveys from the above identified groups of people associated with the ABT/spotter plane issue. A leader of the Atlantic Fish Spotters Association (AFSA), which represents most ABT spotter pilots, was contacted by phone to assist us in obtaining contact information for association members. A list of 22 active spotter pilot names and phone numbers was obtained from the AFSA which we were told

Table 1. Disposition of telephone survey calls by group

<u>Group</u>	<u>N</u>	<u>completed interviews</u>	<u>refused</u>
Pilots	22	9	1
General category, harpoon is not primary gear, and did not land ABT with harpoon	4469	416	201
General category, harpoon is primary gear, or landed ABT with harpoon	107	34	5
Harpoon category	55	29	7

included all possible ABT pilots for the 1998 season. Several attempts were made to contact every pilot on the list. A total of ten pilots were contacted during the one week dialing period. Of these, 8 complete interviews were obtained from pilots that spotted for ABT vessels in 1998. One pilot said he did not spot for ABT in 1998 and one refused to participate in the survey. All 8 pilots interviewed owned the plane they flew to spot for ABT.

The total number of ABT General category permit holders in 1998 residing in the study area states (Rhode Island, Massachusetts, New Hampshire, Maine) was 4,576. Complete lists with names, phone numbers, primary gear used and 1998 landings reported of these permit holders were obtained from NMFS. Previous information from NMFS indicated that only a small percent of the General category permit holders make use of spotter planes and that most of these use harpoon gear. In order to increase our probability of surveying permit holders that used spotter planes, this list was stratified into two sampling groups. The largest group (4,469) consisted of ABT General category permit holders who neither indicated harpoon as primary gear nor landed an ABT with harpoon in 1998. Random numbers were assigned to each permit holder in this group to create a random telephone sampling list. The smaller group (107) consisted of

ABT General category permit holders who either indicated harpoon as primary gear or landed an ABT with harpoon in 1998. This group had a higher probability of using a spotter planes and we therefore attempted to contact all 107.

ABT Harpoon category permit holders in 1998 made up the fourth group. A complete list of 55 names and phone numbers was obtained from NMFS. Since this group had a high probability of spotter plane use (compared to the General category) and was small, we attempted to contact the entire list. The disposition of completed interviews in the General category and Harpoon category is shown in Table 2.

Table 2. Disposition of telephone survey respondent fishing types by group.

<u>Group</u>	<u>Hired spotter Plane for ABT</u>	<u>Target ABT Without Plane</u>	<u>Did Not Target ABT</u>	<u>Did Not Fish in Cat.</u>
General category, harpoon is not primary gear, and did not land ABT with harpoon	3	268	75	70
General category, harpoon is primary gear, or landed ABT with harpoon	7	22	3	2
Harpoon category	14	9	--	6

Data Collection and Processing

Data were delivered from Teleforce, our hired telephone survey contractor, immediately following the dialing period. Data were converted from ASCII to SAS format for outlier analyses and data analyses. Frequency tables for all variables were studied to determine obvious outliers, key entry errors, and other anomalies in the data. Many of the questionable data elements were resolved by Teleforce checking the original coding sheets. If the source of the error could not be found on the coding sheets attempts were made to re-contact respondents to clarify responses. If

respondents could not be contacted the following rules were used to convert outliers to missing responses:

- a) For General category permit holders, if total days fished for ABT was less than the total reported number of ABT landed in 1998
- b) For General category permit holders, if total days fished for ABT exceeded the maximum number of possible days in the season (71, Brad McHale, personal communication NMFS)
- c) For Harpoon category permit holders, if total days fished for ABT exceeded the maximum number of possible days in the season (37, Brad McHale, personal communication NMFS)
- d) All categories, if average total weight (not dressed weight) of ABT was less than 200 pounds. Weight information, in general, was found to be unreliable due to confusion between total weight (with head) and dressed weight and was not used in any analyses.
- e) All categories, if price per pound for ABT seemed unreasonably low or high compared to other respondents within the same fishing group.

Data Re-weighting

For most of the data presented in the results section below the two groups within the General category (caught with or primary gear as harpoon versus all others) were analyzed separately. For separate analysis of stratified groups there is no need to re-weight the data. However, to determine the percent of the total catch related to spotter plane use (direct use and indirect use) within the General category as a whole, these two groups were combined, and re-weighting was therefore necessary. For each group the total population (N=4,469 for large group, N=107 for small group) was divided by the sample of respondents (n=416 large group, n=34 small group). The quotient for each group was multiplied by the number of fish reported landed

a) with plane, b) without plane, and c) with indirect use of in each group. This resulted in estimates of the number of ABT landed by group when using planes, when not using planes, and when using planes indirectly. These estimates were summed across groups to arrive at estimated percent of total landings (number of ABT) within the General category, when using planes, when not using planes, and when using planes indirectly.

EXECUTIVE SUMMARY

Goal #1: Quantification of the extent of spotter plane use in the ABT fishery, and collection of information about the pilots, plane owners, and vessel operators involved.

An estimated 20 spotter pilots participated in the ABT fishery during 1998. According to these pilots, they flew on average about 15.8 days for Harpoon category vessels during the 1998 ABT season. They flew about 10 days during the 1998 ABT season for General category vessels that listed harpoon as their primary gear or landed a ABT using harpoon gear. Our sample of pilots indicated they did not fly at all for any of the remaining General category vessels. On average, they flew for 6.4 different vessels during the season. On a daily basis, they flew for 1.3 different Harpoon category vessels each day, and 2.1 different General category vessels that listed harpoon as their primary gear or landed a ABT using harpoon gear.

Responses from vessel owners indicates that about 26 or 27 Harpoon category boats hired spotter planes for an average of 20.9 days each during the season. General category vessel owners reported that 54 of their boats hired spotter planes for an average of 8.6 days each during the season.

The vast majority of indirect use of spotter planes appears to be within the General category. An estimated 237 General category vessels made indirect use of planes, as compared to only 2 Harpoon category vessels.

Goal #2: To gather economic data related to the use of spotter planes in the ABT fishery.

There are about 20 active spotter pilots in the ABT fishery. Last year, the average pilot reported flying 244 flight hours spotting fish, of which 214 hours were spent spotting ABT. Nearly two-thirds of the ABT spotting is in the Harpoon category. Based on our estimates, pilots flew 2,782 hours spotting for Harpoon category fishermen, 899 hours for General category fishermen, and 599 for Purse Seine fishermen. Given an estimated hourly cost to operate a

spotter plane of \$57.50, the total cost to operate spotter planes in the Harpoon category was \$159,965, in the General category \$51,692, and in the Purse Seine Category \$34,443 in 1998.

The average ABT spotter plane share of revenues from landed fish was 25%. Spotter pilots also reported that on average they earn 42.5% of their annual family income from ABT spotting.

A series of questions was asked about how the pilots might adjust their distribution of flying hours if a ban on spotter planes was enacted. If there were a ban in the General category only, the hours spotter pilots fly commercially other than for spotting would likely stay the same, the hours they would spend spotting for other types of fish would likely decrease slightly, and the hours they would spend spotting ABT in another category (Harpoon or Purse Seine) would likely stay the same.

If there were a ban in both the General and Harpoon categories, the hours spotter pilots fly commercially other than for spotting would likely stay the same, the hours they would spend spotting for other types of fish would likely decrease slightly, and the hours they would spend spotting ABT in another category (e.g. Purse Seine) would likely stay the same.

We estimated the total vessel operating costs in 1998 in the Harpoon category to be \$130,234 for vessels that use spotter planes, and \$20,393 for vessels that do not use spotter planes. Estimated total vessel costs in the General category for boats that use harpoons were \$155,093 when they used spotter planes, and \$234,415 when they did not use spotter planes.

The total value of ABT landings in the Harpoon category were \$1,054,663 for boats that used spotter planes, and \$183,825 for boats that did not use spotter planes. For Harpoon category boats that used spotter planes an estimated 93% of their ABT landings value was attributed to the use of planes. Therefore about \$980,837 of the total landings in the Harpoon category is attributable to spotter planes. If spotter planes were paid on average 25% of the value of the ABT, this implies that the total income of all spotter planes derived from the Harpoon category was about \$245,209.

The total value of ABT landings for boats listing harpoon as their primary gear, or that landed an ABT using harpoon gear in the General category were \$277,041 for boats with spotter planes, and \$435,894 for boats without spotter planes. On average, a General category harpoon boat fished with an airplane 52 percent of the time. Thus, the total ABT catch from these vessels was estimated at \$144,061. Assuming the share received by the pilots was 25%, this means that pilots income from these vessels was \$36,015.

The general conclusion of the above is that pilots have negative net incomes when flying for harpoon boats in the General category (listing harpoon as their primary gear, or landing a ABT using harpoon gear), but positive net incomes in the Harpoon category. Note also that of the total pilot ABT spotting income of \$281,224 (not including income from Angling or Purse Seine categories) about 87% comes from assisting vessels in the Harpoon category, while 13% percent comes from harpoon boats in the General category.

Goal #3: To investigate the effect spotter planes have on catch rates and season length in the ABT fishery.

In order to investigate the effect spotter planes have on catch rates and season length in the ABT fishery it is necessary to compare the relative success rates of trips using spotter planes and trips not using spotter planes. However, in order to accurately assess the effect of using spotter planes on ABT catch rates, it is important to isolate the plane effect from as many of the other possible factors that could affect catch rates. For example, comparisons between trips using planes with harpoon gear and trips not using planes fishing with rod and reel gear may be inconclusive. The effect of planes may be masked by differences in catch rates between gear types. Likewise, comparisons between vessels that sometimes fish with spotter planes and vessels that never fish with spotter planes may be inconclusive. Vessels that sometimes fish with planes are likely to experience higher catch rates than vessels that never fish with planes. Pilots

would obviously prefer to fly for the most highly skilled ABT fishermen since they are paid by shares of the catch (Jonathan Mayhew, personal communication).

The best way to isolate the effect of spotter planes from all other effects is to compare trips using planes versus trips not using planes for the same vessel using the same gear. For each individual vessel that used a spotter plane at least part of the time a comparison can be made. Comparisons of relative success rate (with and without planes) by vessel in the Harpoon category indicate that planes have a positive effect on ABT catch rates (Table 26). Six out of seven vessels for which comparisons could be made caught more ABT per day on days when they fished with spotter planes (one vessel didn't land any ABT with or without a plane). Similarly, vessels fishing with harpoon gear in the General category had higher catch rates on days when they used spotter planes (6 out of 6, Table 27). Caution should be used in interpreting these results, (especially in calculating quantitative CPUE differences), due to small sample sizes. However, combining the General and Harpoon category results show that, at least qualitatively, a convincing 92% of vessels experienced more success on days when they fished with a spotter plane.

A similar analysis was conducted to determine differences in catch success on days when spotter planes were used indirectly (vessels following planes hired by other vessels) versus days when spotter planes were not used at all. Results indicate that indirect use of spotter planes did not result in any real advantage to vessels in terms of catch success (Table 28). As above, caution should be used in interpreting these results due to small sample size. In particular, most vessels used in this analysis reported only indirectly using spotter planes on a small fraction of their total ABT trips. Also, fishermen may be hesitant to admit they made indirect use of spotter planes on days when they landed ABT.

We calculated the estimated percent of the 1998 ABT catch (numbers of fish landed) related to direct use of planes, indirect use of planes, and not related to plane use for each permit category. In order to determine this we first had to determine the distribution of reported and

estimated total ABT landings by plane usage category (plane, indirect plane, no plane) and permit category (Tables 29 and 30). The method used to estimate the percent of catch attributed to plane use, indirect plane use, and no plane use is described in the methods section. Direct use of planes accounted for an estimated 6.4% of the total landing (numbers of ABT) in the General category and 86.8% of the total landings in the Harpoon category in 1998 (Table 31). The estimated total landings related to indirect use of planes were relatively insignificant for both categories.

Goal #4: To investigate the safety issues related to the use of spotter planes in the ABT fishery.

Seventy-five percent of the pilots responding to the survey indicated they were slightly or somewhat concerned about a mid-air collision with another spotter plane. However, this is not to say these pilots feel the situation is unsafe. Instead, it likely reflects a natural or wise concern over flight safety.

Fishermen in all categories were asked about the extent to which they were concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes. Every group of fishermen expressed at least some level of concern, with the greatest concern being voiced by General category fishermen who indicated harpoon as their primary gear and did not use spotter planes. The group with the least concern was the General category fishermen who indicated harpoon as their primary gear and did use spotter planes. In general, those who did not use spotter planes had the greatest concern, and those who did use spotter planes had less concern.

Two safety issues relating to the use of spotter planes in the ABT fishery were investigated in greater detail. The first concerned physical damage to vessels and/or gear, verbal confrontations, and territorial behavior over fishing location. Respondents were asked if they had ever seen, heard of, or personally been involved in any such events between vessels directly using a spotter plane and a vessel not directly using a spotter plane.

Fishermen in the Harpoon category were most likely to have seen, heard of, or been personally involved in verbal confrontations or territorial behavior over fishing locations. However, they had not seen, heard of or been personally involved in any events resulting in physical damage to a vessel or fishing gear. Fishermen least likely to have seen, heard of, or been personally involved in any of these conflicts were those not using a spotter plane. However, incidents were reported in nearly all categories of conflict by respondents in most forms of ABT fishing. It can be concluded from this data that there is some connection between the use of spotter planes and conflict on the water.

The second safety issue relates to spotter planes assisting in the rescue of stranded vessels, persons, or marine mammals. Respondents were asked if they had ever seen, heard of, or personally been involved in any such rescue efforts by spotter pilots. It should be no surprise that the groups most likely to be aware of such efforts are the spotter pilots. Between 62% and 87% of the spotter pilots interviewed had seen, heard of, or been personally involved with a rescue effort of stranded vessels or persons. Similarly, between 75% and 86% of the spotter pilots interviewed had seen, heard of, or been personally involved with a rescue effort of marine mammals. The majority of the other participants in the ABT fishery had not seen, heard of, or been personally involved with a rescue effort of marine mammals. Not surprisingly, again, the groups of fishermen least likely to have seen, heard of, or been personally involved with a rescue effort of marine mammals were those not using a spotter plane.

RESULTS

Goal #1: Quantify the extent of spotter plane use in the ABT fishery and collect information about the pilots, plane owners, and vessel operators involved.

Objective A: Estimate the number of spotter pilots who participated in the fishery during the 1998 season, the average number of vessels each pilot was hired by, and the average number of ABT spotting days/hours per pilot in 1998

Table 3. Estimated number of spotter pilots who participated in the ABT fishery during the 1998 season according to permit category.

<u>Permit Category</u>	<u>Number of Pilots*</u>
Harpoon	17
General	17
Purse Seine	3
Combination of categories	15

* Total number of pilots is estimated to be 20. The numbers above do not add to 20 since each pilot could fly for vessels in more than one category.

Table 4. Estimated average number of vessels each pilot was hired by.

<u>Number of Vessels*</u>	6.43
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*All permit categories combined.

Table 5. Estimated number of ABT days/hours flown per pilot in 1998 according to permit category, according to pilots. (Includes only those pilots who actually flew in each category).

<u>Permit Category</u>	<u>Avg. Days</u>	<u>Avg. Hours</u>
Harpoon	15.8	187.5
General (Harpoon Gear)	10.0	60.7
General (Rod and Reel)	0.0	0.0
Purse Seine	30.0	250.0

Objective B: Estimate the total number of ABT vessels that directly hired spotter planes during the 1998 ABT season, and the average number of days/hours spotter planes were hired per vessel during the 1998 season.

Table 6. Estimated average number of vessels assisted on a typical day according to permit category.

<u>Permit Category</u>	<u>Number of vessels</u>
Harpoon	1.3
General	2.1
Purse Seine	3.0

Table 7. Estimated total number of ABT vessels that directly hired spotter planes, and estimated number of days spotter planes were hired per vessel during the 1998 season, according to vessel owners.

<u>Permit Category</u>	<u>Total Number of Vessels</u>	<u>Number of Days</u>	<u>Average Number of Days</u>
Harpoon	26.6	554.8	20.9
General	54.2	466.5	8.6

Objective C: Estimate the number of ABT vessels that indirectly made use of spotter planes in 1998 by following planes not hired by themselves in search of fish.

Table 8. Estimated total number of ABT vessels that indirectly made use of spotter planes in 1998.

<u>Permit Category</u>	<u>Total Number of Vessels</u>
Harpoon	1.9
General	236.9

Table 9. Estimated percent of General category permit holders that made direct or indirect use of planes according to stated primary gear type, and gear type used to land ABT.

	Harpoon Gear Stated as Primary Gear, or Landed <u>Tuna Using Harpoon Gear</u>	Did Not State Harpoon as Primary Gear, nor Landed <u>Tuna Using Harpoon Gear</u>
Direct Use of Plane	20.6% (22/107) ¹	0.7% (32/4469) ²
Indirect Use of Plane	20.6% (22/107) ¹	4.8% (215/4469)

¹Of these 22 permit holders, an estimated six made both direct and indirect use of spotter planes.

²Of these 32 permit holders making direct use of spotter planes, an estimated 22 also made indirect use of spotter planes.

Table 10. Indirect use of spotter planes as reported by spotter pilots.

Estimated Number of Pilots Reporting Indirect Use by Vessels	17
Average Number of Vessels Reported to Have Made Indirect Use of Spotter Plane Per Day	8.3

Goal #2: To gather economic data related to the use of spotter planes in the ABT fishery.

Table 11. Average number of flight hours spent spotting fish, and average number of flight hours spent spotting ABT per pilot.

	<u>Number of Hours</u>
Hours spotting fish other than ABT per pilot	30
Hours spotting ABT per pilot	214
Total hours spotting fish per pilot	244

Table 12. Estimated total number of flight hours spent spotting ABT according to permit category.

<u>Permit Category</u>	<u>Hours</u>	<u>Percent</u>
Harpoon	2782	65%
General	899	21%
Purse Seine	599	14%
Total	4,280	100%

Table 13. Estimated total operating costs for all spotter planes according to permit category.

<u>Permit Category</u>	<u>Hours</u>	<u>Costs¹</u>
Harpoon	2782	\$159,965
General	899	\$51,692
Purse Seine	599	\$34443

¹ At \$57.50/hour operating expense, as reported by pilots.

Table 14. Total value of fish landings for vessels in the Harpoon category, according to use of spotter planes.

	<u>Total Landings</u>	<u>Average per Boat</u>		<u>ABT Total Value</u>
		<u>%ABT</u>	<u>ABT Landings</u>	
With Spotter Plane	\$59,178	67	\$39,649	\$1,054,663
Without Spotter Plane	43,000	25	10,750	183,825

Table 15. Number of ABT vessels, days spent fishing, and total costs to operate ABT vessels.

<u>Permit Category</u>	<u>Number of Vessels</u>	<u>Days Spent Fishing Per Vessel</u>		<u>Costs Per Day¹</u>	<u>Total Costs</u>
		<u>Total ABT</u>	<u>With Airplane</u>		
Harpoon					
Use Airplanes	26.6	25.5	20.9	\$192	\$130,234
No Airplanes	17.1	8.9	--	134	20,393
General Harpoon ²					
Use Airplanes	22.0	37.3	19.7	189	155,093
No Airplanes	69.2	27.1	--	125	234,415
Other ³	2,782	14.4	--	156	6,249,485
Total					\$6,789,620

¹ Based on daily costs (not cost per trip) to run boat. Does not include cost of hiring plane.

² Defined as General category fishermen who indicated harpoon as their primary gear, or landed a ABT using harpoon gear.

³ General category fishermen who did not indicate harpoon as their primary gear, and did not land a ABT using harpoon gear.

Table 16. Total value of fish landings for vessels in the General category that indicated harpoon as their primary gear, or landed ABT using harpoon gear, according to use of spotter planes.

	<u>Average per Boat</u>			
	<u>Total Landings</u>	<u>% ABT</u>	<u>ABT Landings</u>	<u>ABT Total Value</u>
With Spotter Plane	\$19,080	66	\$12,593	\$277,041
Without Spotter Plane	14,316	44	6,299	435,894

Table 17. Percent of spotter pilots reporting they had collected aerial survey data on ABT.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
	Yes	7	87.5	7
No	1	12.5	8	100.0

Table 18. Percent of spotter pilots willing to consider flying as a paid aerial survey data collector if a ban on spotter planes in the ABT fishery reduces the hours they can currently fly.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	7	87.5	7	87.5
No	1	12.5	8	100.0
Don't Know	0	0.0	8	100.0

Table 19. Percent of spotter pilots planning to fly as ABT spotter pilots during the 1999 ABT season if use of planes is not banned.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	8	100.0	8	100.0
No	0	0.0	8	100.0

Table 20. Pilots expectation on how the number of hours they will fly in 1999 for commercial purposes other than spotting fish if spotting ABT is banned in the General category.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease significantly	0	0.0	0	0.0
Decrease slightly	1	12.5	1	12.5
Stay the same	7	87.5	8	100.0
Increase slightly	0	0.0	8	100.0
Increase significantly	0	0.0	8	100.0

Table 21. Pilots expectation on how the number of hours they will fly in 1999 as a spotter pilot for fish other than ABT if spotting ABT is banned in the General category.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease significantly	1	12.5	1	12.5
Decrease slightly	0	0.0	1	12.5
Stay the same	6	75.0	7	87.5
Increase slightly	1	12.5	8	100.0
Increase significantly	0	0.0	8	100.0

Table 22. Pilots expectation on how the number of hours they will fly in 1999 as a spotter pilot for ABT in other categories (such as Harpoon or Purse Seine) if spotting ABT is banned in the General category.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease significantly	1	12.5	1	12.5
Decrease slightly	1	12.5	2	25.0
Stay the same	5	62.5	7	87.5
Increase slightly	1	12.5	8	100.0
Increase significantly	0	0.0	8	100.0

Table 23. Pilots expectation on how the number of hours they will fly in 1999 for commercial purposes other than spotting fish if spotting ABT is banned in the General and Harpoon Categories.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease significantly	2	25.0	2	25.0
Decrease slightly	0	0.0	2	25.0
Stay the same	6	75.0	8	100.0
Increase slightly	0	0.0	8	100.0
Increase significantly	0	0.0	8	100.0

Table 24. Pilots expectation on how the number of hours they will fly in 1999 as a spotter pilot for fish other than ABT if spotting ABT is banned in the General and Harpoon Categories.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease significantly	1	12.5	1	12.5
Decrease slightly	1	12.5	2	25.0
Stay the same	5	62.5	7	87.5
Increase slightly	1	12.5	8	100.0
Increase significantly	0	0.0	8	100.0

Table 25. Pilots expectation on how the number of hours they will fly in 1999 as a spotter pilot for ABT in other categories (such as Purse Seine) if spotting ABT is banned in the General and Harpoon Categories.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease significantly	0	0.0	0	0.0
Decrease slightly	1	12.5	1	12.5
Stay the same	7	87.5	8	100.0
Increase slightly	0	0.0	8	100.0
Increase significantly	0	0.0	8	100.0

Goal #3: To investigate the effect spotter planes have on catch rates and season length in the ABT fishery.

Objective A: Compare the relative success rates of trips targeting ABT with the aid of spotter planes versus trips targeting ABT without the aid of spotter planes.

Table 26. Comparison of relative success rates of vessels in the Harpoon category when they use spotter planes vs. when they do not use spotter planes.

With Plane		Without Plane	
<u>Days</u>	<u>ABT Landed/Day</u>	<u>Days</u>	<u>ABT Landed/Day</u>
18	0.67	2	--
37	--	0	--
20	1.05	5	--
9	0.89	5	0.80
28	1.43	2	0.00
15	1.07	15	0.13
12	1.58	3	0.67
20	--	10	--
30	--	7	--
20	0.80	5	0.00
31	--	0	--
3	0.00	9	0.00
20	--	0	--
20	0.45	10	.40

Note: Each row of information above represents one vessel. A comparison across the columns shows the success rates (ABT Landed/Day) when the vessel uses a spotter plane, and when the vessel does not use a spotter plane. A "--" denotes data is missing (either no days, respondent refused or did not know)

Table 27. Comparison of relative success rates of vessels in the General category (who list harpoon as their primary gear, or landed a ABT using harpoon gear) when they use spotter planes vs. when they do not use spotter planes.

With Plane		Without Plane	
<u>Days</u>	<u>ABT Landed/Day</u>	<u>Days</u>	<u>ABT Landed/Day</u>
3	.67	52	0.15
4	1.00	15	0.07
35	0.46	5	0.00
20	0.45	20	0.20
20	0.40	50	0.00
20	0.30	--	--
5	0.80	5	0.00

Note: Each row of information above represents one vessel. A comparison across the columns shows the success rates (ABT Landed/Day) when the vessel uses a spotter plane, and when the vessel does not use a spotter plane.

Objective B: Determine if vessels (or individual trips) that use planes indirectly experience higher relative success rates than vessels (or individual trips) that did not use spotter planes at all.

Table 28. Comparison of relative success rates of vessels in the General category (who do not list harpoon as their primary gear, nor landed a ABT using harpoon gear) when they indirectly use spotter planes vs. when they do not use spotter planes.

Indirectly With Plane		Without Plane	
<u>Days</u>	<u>ABT Landed/Day</u>	<u>Days</u>	<u>ABT Landed/Day</u>
5	0.00	10	0.00
2	0.00	23	0.09
1	0.00	9	0.11
4	0.00	16	0.00
6	0.50	0	--
3	0.67	27	0.67
1	0.00	49	0.00
2	0.00	38	0.05
1	1.00	14	0.21
6	0.00	0	--
2	0.00	38	0.00

Note: Each row of information above represents one vessel. A comparison across the columns shows the success rates (ABT Landed/Day) when the vessel uses a spotter plane, and when the vessel does not use a spotter plane.

Objective C: Estimate the percent of the 1998 catch related to the direct use of spotter planes, the indirect use of spotter planes, and completely unrelated to spotter plane use.

Table 29. Distribution of reported and estimated total (in parenthesis) ABT landed according to type of fishing and usage of spotter planes in General category.

<u>Type of Fishing</u>	<u>With Plane</u>	<u>No Plane</u>	<u>Indirect use of Plane</u>
Type A ¹	1 (12)	4 (48)	6 (71)
Type B ²	-- --	402 (4657)	3 (36)
Type C ³	-- --	0 (0)	0 (0)
Type D ⁴	107 (347)	13 (42)	0 (0)
Type E ⁵	-- --	118 (383)	13 (42)
Type F ⁶	-- --	4 (13)	1 (3)

¹ General category permit holders that hired spotter planes at least part of the time, and did not indicate harpoon as primary gear or landed ABT using harpoon gear.

² General category permit holders that targeted ABT, did not hire spotter planes, and did not indicate harpoon as primary gear or landed ABT using harpoon gear.

³ General category permit holders that did not target ABT, did not hire spotter planes, and did not indicate harpoon as primary gear or landed ABT using harpoon gear.

⁴ General category permit holders that indicated harpoon as primary gear or landed ABT using harpoon gear, and hired spotter planes at least part of the time.

⁵ General category permit holders that indicated harpoon as primary gear or landed ABT using harpoon gear, but did not hire spotter planes.

⁶ General category permit holders that indicated harpoon as primary gear or landed ABT using harpoon gear, did not target ABT, and did not hire spotter planes.

Table 30. Distribution of reported ABT caught according to type of fishing and usage of spotter planes in the Harpoon category.

<u>Type of Fishing</u>	<u>With Plane</u>	<u>No Plane</u>	<u>Indirect use of Plane</u>
Type A ¹	141	12	0
Type B ²	--	9	0

¹ Harpoon category permit holders that used spotter planes at least some of the time.

² Harpoon category permit holders that did not use spotter planes.

Table 31. Estimated percent of the 1998 ABT catch related to the direct use, indirect use and no use of spotter planes according to permit category.

<u>Permit Category</u>	<u>With Plane</u>	<u>No Plane</u>	<u>Indirect use of Plane</u>
General category	6.4%	91.0%	2.7%
Harpoon category	86.8%	13.2%	0.0%

Goal #4: To investigate the safety issues related to the use of spotter planes in the ABT fishery.

Spotter Pilot Survey

Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.

Table 32. Extent that respondents are concerned about a mid-air collision with another spotter plane.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Not concerned	2	25.0	2	25.0
Slightly concerned	3	37.5	5	62.5
Somewhat concerned	3	37.5	8	100.0
Very concerned	0	0.0	8	100.0
Extremely concerned	0	0.0	8	100.0

Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.

Table 33. Frequency of spotter plane use during the 1998 season compared to the frequency of spotter plane use during the 1988 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Less than	2	25.0	2	25.0
About the same	3	37.5	5	62.5
More than	3	37.5	8	100.0
Don't know	0	0.0	8	100.0

Objective C: Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.

Table 34. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	1	12.5	1	12.5
1	3	37.5	4	50.0
4	1	12.5	5	62.5
6	1	12.5	6	75.0
10	1	12.5	7	87.5
40	1	12.5	8	100.0

Table 35. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Cumulative Percent</u>	<u>Frequency</u>	<u>Cumulative Percent</u>
0	2	25.0	2	25.0
5	1	12.5	3	37.5
6	1	12.5	4	50.0
7	1	12.5	5	62.5
12	1	12.5	6	75.0
20	1	12.5	7	87.5
80	1	12.5	8	100.0

Table 36. Number of occasions respondents reported that they personally assisted in the rescue of any stranded vessels or persons while flying as a spotter pilot for ABT.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	3	37.5	3	37.5
1	1	12.5	4	50.0
2	1	12.5	5	62.5
3	2	25.0	7	87.5
10	1	12.5	8	100.0

Table 37. Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	2	25.0	2	25.0
4	3	37.5	5	62.5
5	1	12.5	6	75.0
6	1	12.5	7	87.5
20	1	12.5	8	100.0

Table 38. Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Cumulative Percent</u>	<u>Frequency</u>	<u>Cumulative Percent</u>
0	2	25.0	2	25.0
2	1	12.5	3	37.5
6	2	25.0	5	62.5
10	1	12.5	6	75.0
20	1	12.5	7	87.5
40	1	12.5	8	100.0

Table 39. Number of occasions respondents reported that they personally assisted in the rescue of marine mammals while flying as a spotter pilot for ABT.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	1	14.3	1	14.3
1	1	14.3	2	28.6
2	2	28.6	4	57.1
4	1	14.3	5	71.4
5	1	14.3	6	85.7
6	1	14.3	7	100.0

Harpoon category Fishermen Survey

Harpoon category Fishermen Who Use Planes

Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.

Table 40. Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Not concerned	10	71.4	10	71.4
Slightly concerned	1	7.1	11	78.6
Somewhat concerned	2	14.3	13	92.9
Very concerned	1	7.1	14	100.0
Extremely concerned	0	0.0	14	100.0

Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.

Table 41. Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	14	100.0	14	100.0

Table 42. Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	7	50.0	7	50.0
1	4	28.6	11	78.6
2	2	14.3	13	92.9
4	1	7.1	14	100.0

Table 43. Number of incidents heard of or seen per week during the 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	7	50.0	7	50.0
1	5	35.7	12	85.7
2	1	7.1	13	92.9
4	1	7.1	14	100.0

Table 44. Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	14	100.0	14	100.0

Table 45. Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	8	57.1	8	57.1
1	3	21.4	11	78.6
2	1	7.1	12	85.7
4	1	7.1	13	92.9
6	1	7.1	14	100.0

Table 46. Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	8	57.1	8	57.1
1	3	21.4	11	78.6
2	1	7.1	12	85.7
4	1	7.1	13	92.9
6	1	7.1	14	100.0

Objective C: Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.

Table 47. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	11	78.6	11	78.6
1	1	7.1	12	85.7
2	2	14.3	14	100.0

Table 48. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Cumulative Percent</u>	<u>Frequency</u>	<u>Cumulative Percent</u>
0	8	57.1	8	57.1
1	3	21.4	11	78.6
2	2	14.3	13	92.9
4	1	7.1	14	100.0

Table 49. Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	8	57.1	8	57.1
1	3	21.4	11	78.6
2	1	7.1	12	85.7
3	1	7.1	13	92.9
4	1	7.1	14	100.0

Table 50. Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	4	100.0	4	100.0

Harpoon category Fishermen Who Do Not Use Planes

Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.

Table 51. Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Not concerned	5	55.6	5	55.6
Slightly concerned	1	11.1	6	66.7
Somewhat concerned	2	22.2	8	88.9
Very concerned	0	0.0	8	88.9
Extremely concerned	1	11.1	9	100.0

Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.

Table 52. Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	8	88.9	8	88.9
3	1	11.1	9	100.0

Table 53. Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	2	22.2	2	22.2
1	2	22.2	4	44.4
2	2	22.2	6	66.7
4	2	22.2	8	88.9
12	1	11.1	9	100.0

Table 54. Number of incidents heard of or seen per week during 1998 of territorial behavior over fishing location on the water season between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	5	55.6	5	55.6
1	1	11.1	6	66.7
3	1	11.1	7	77.8
4	1	11.1	8	88.9
6	1	11.1	9	100.0

Table 55. Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	8	88.9	8	88.9
1	1	11.1	9	100.0

Table 56. Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	6	66.7	6	66.7
3	1	11.1	7	77.8
4	1	11.1	8	88.9
8	1	11.1	9	100.0

Table 57. Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	7	77.8	7	77.8
3	1	11.1	8	88.9
10	1	11.1	9	100.0

Objective C: Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.

Table 58. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	9	100.0	9	100.0

Table 59. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Cumulative Percent</u>	<u>Frequency</u>	<u>Cumulative Percent</u>
0	9	100.0	9	100.0

Table 60. Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	6	66.7	6	66.7
1	3	33.3	9	100.0

Table 61. Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	8	88.9	8	88.9
6	1	11.1	9	100.0

General category Fishermen Survey

General category Fishermen Who Target ABT and Use Spotter Planes

The sample size obtained for this group of General category fishermen (n=3) is insufficient to permit meaningful data analysis. Therefore, no results can be reported for this group, except to state that few General category fishermen use spotter planes.

General category Fishermen Who Target ABT and Do Not Use Spotter Planes

Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.

Table 62. Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Not concerned	13	51.7	134	51.7
Slightly concerned	35	13.5	169	65.3
Somewhat concerned	47	18.1	216	83.4
Very concerned	24	9.3	240	92.7
Extremely concerned	19	7.3	259	100.0

Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.

Table 63. Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	217	84.4	217	84.4
1	13	5.1	230	89.5
2	17	6.6	247	96.1
3	4	1.6	251	97.7
6	1	0.4	252	98.1
10	1	0.4	253	98.4
11	1	0.4	254	98.8
12	1	0.4	255	99.2
50	2	0.8	257	100.0

Table 64. Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	161	64.1	161	64.1
1	52	20.7	213	84.9
2	13	5.2	226	90.0
3	12	4.8	238	94.8
4	3	1.2	241	96.0
5	2	0.8	243	96.8
6	1	0.4	244	97.2
7	3	1.2	247	98.4
10	3	1.2	250	99.6
20	1	0.4	251	100.0

Table 65. Number of incidents heard of or seen per week during 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	172	67.2	172	67.2
1	43	16.8	215	84.0
2	15	5.9	230	89.8
3	3	1.2	233	91.0
4	4	1.6	237	92.6
5	6	2.3	243	94.9
6	2	0.8	245	95.7
7	3	1.2	248	96.9
8	1	0.4	249	97.3
10	4	1.6	253	98.8
12	1	0.4	254	99.2
14	1	0.4	255	99.6
20	1	0.4	256	100.0

Table 66. Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	248	95.8	248	95.8
1	6	2.3	254	98.1
2	3	1.2	257	99.2
4	1	0.4	258	99.6
14	1	0.4	259	100.0

Table 67. Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	220	85.6	220	85.6
1	22	8.6	242	94.2
2	5	1.9	247	96.1
3	4	1.6	251	97.7
4	2	0.8	253	98.4
5	2	0.8	255	99.2
10	1	0.4	256	99.6
25	1	0.4	257	100.0

Table 68. Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	216	84.0	216	84.0
1	16	6.2	232	90.3
2	9	3.5	241	93.8
3	4	1.6	245	95.3
4	5	1.9	250	97.3
5	1	0.4	251	97.7
6	2	0.8	253	98.4
12	1	0.4	254	98.8
14	1	0.4	255	99.2
30	1	0.4	256	99.6
50	1	0.4	257	100.0

Objective C: *Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.*

Table 69. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	250	96.9	250	96.9
1	5	1.9	255	98.8
2	3	1.2	258	100.0

Table 70. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Cumulative Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	247	96.9	247	96.9
1	4	1.6	251	98.4
2	4	1.6	255	100.0

Table 71. Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	247	95.7	247	95.7
1	9	3.5	256	99.2
2	2	0.8	258	100.0

Table 72. Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	244	97.2	244	97.2
1	5	2.0	249	99.2
2	2	0.8	251	100.0

General category Fishermen Who Do Not Target ABT and Do Not Use Spotter Planes

Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.

Table 73. Extent of respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Not concerned	37	49.3	37	49.3
Slightly concerned	15	20.0	52	69.3
Somewhat concerned	9	12.0	61	81.3
Very concerned	10	13.3	71	94.7
Extremely concerned	4	5.3	75	100.0

Objective B: *Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.*

Table 74. Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	70	100.0	70	100.0

Table 75. Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	52	70.3	52	70.3
1	7	9.5	59	79.7
2	7	9.5	66	89.2
3	1	1.4	67	90.5
4	2	2.7	69	93.2
5	1	1.4	70	94.6
6	3	4.1	73	98.6
12	1	1.4	74	100.0

Table 76. Number of incidents heard of or seen per week during 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	54	75.0	54	75.0
1	4	5.6	58	80.6
2	8	11.1	66	91.7
3	2	2.8	68	94.4
4	2	2.8	0	97.2
5	1	1.4	71	98.6
6	1	.4	72	100.0

Table 77. Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	75	100.0	75	100.0

Table 78. Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	70	93.3	70	93.3
1	1	1.3	71	94.7
2	2	2.7	73	97.3
3	1	1.3	74	98.7
10	1	1.3	75	100.0

Table 79. Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	66	89.2	66	89.2
1	3	4.1	69	93.2
2	1	1.4	70	94.6
3	2	2.7	72	97.3
4	1	1.4	73	98.6
10	1	1.4	74	100.0

Objective C: *Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.*

Table 80. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	75	100.0	75	100.0

Table 81. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	74	98.7	74	98.7
1	1	1.3	75	100.0

Table 82. Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	74	98.7	74	98.7
2	1	1.3	75	100.0

Table 83. Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	72	96.0	72	96.0
1	1	1.3	73	97.3
2	1	1.3	74	98.7
5	1	1.3	75	100.0

General category Fishermen Who Indicated Harpoon as Their Primary Gear, or Who Landed ABT Using Harpoon Gear, and Use Spotter Planes

Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.

Table 84. Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Not concerned	6	85.7	6	85.7
Slightly concerned	0	0.0	6	85.7
Somewhat concerned	1	14.3	7	100.0
Very concerned	0	0.0	7	100.0
Extremely concerned	0	0.0	7	100.0

Objective B: Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.

Table 85. Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	7	100.0	7	100.0

Table 86. Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	5	71.4	5	71.4
1	2	28.6	7	100.0

Table 87. Number of incidents heard of or seen per week during 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	7	100.0	7	100.0

Table 88. Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	6	85.7	6	85.7
2	1	14.3	7	100.0

Table 89. Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	5	71.4	5	71.4
2	2	28.6	7	100.0

Table 90. Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	5	71.4	5	71.4
2	1	14.3	6	85.7
3	1	14.3	7	100.0

Objective C: *Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.*

Table 91. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	7	100.0	7	100.0

Table 92. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Cumulative Percent</u>	<u>Frequency</u>	<u>Cumulative Percent</u>
0	7	100.0	7	100.0

Table 93. Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	6	85.7	6	85.7
1	1	14.3	7	100.0

Table 94. Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	5	71.4	5	71.4
1	1	14.3	6	85.7
2	1	14.3	7	100.0

General category Fishermen Who Indicated Harpoon as Their Primary Gear, or Who Landed ABT Using Harpoon Gear, and Do Not Use Spotter Planes

Objective A: Report on the perceptions of the fishermen and pilots regarding the level of safety in the ABT fishery as it relates to the use of spotter planes.

Table 95. Extent that respondents are concerned about a collision between vessels pursuing ABT that are either directly working with spotter planes or indirectly following spotter planes

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Not concerned	8	36.4	8	36.4
Slightly concerned	2	9.1	10	45.5
Somewhat concerned	6	27.3	16	72.7
Very concerned	2	9.1	18	81.8
Extremely concerned	4	18.2	22	100.0

Objective B: *Report on the frequency and nature of conflicts as reported by the various ABT fishery participants.*

Table 96. Number of incidents heard of or seen during the full 1998 season of physical damage occurring to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	16	72.7	16	72.7
1	2	9.1	18	81.8
2	1	4.5	19	86.4
3	2	9.1	21	95.5
5	1	4.5	22	100.0

Table 97. Number of incidents heard of or seen per week during the 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	10	45.5	10	45.5
1	6	27.3	16	72.7
2	3	13.6	19	86.4
3	1	4.5	20	90.9
5	1	4.5	21	95.5
6	1	4.5	22	100.0

Table 98. Number of incidents heard of or seen per week during 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	11	50.0	11	50.0
1	5	22.7	16	72.7
2	2	9.1	18	81.8
6	3	13.6	21	95.5
20	1	4.5	22	100.0

Table 99. Number of incidents personally involved in during the full 1998 season of physical damage to vessels or fishing gear when caused by other vessels where at least one of the vessels was directly using a spotter plane.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	20	90.9	20	90.9
2	2	9.1	22	100.0

Table 100. Number of incidents personally involved in during the full 1998 season of verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	14	63.6	14	63.6
1	1	4.5	15	68.2
2	2	9.1	17	77.3
4	3	13.6	20	90.9
7	2	9.1	22	100.0

Table 101. Number of incidents personally involved in during the full 1998 season of territorial behavior over fishing location on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	11	50.0	11	50.0
2	4	18.2	15	68.2
3	2	9.1	17	77.3
4	4	18.2	21	95.5
7	1	4.5	22	100.0

Objective C: Investigate perceptions of spotter pilots and ABT fishermen on the value and importance of spotter planes in rescue efforts of stranded vessels and marine mammals.

Table 102. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	22	100.0	22	100.0

Table 103. Number of rescue efforts of stranded vessels or persons by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Cumulative Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	22	100.0	22	100.0

Table 104. Number of rescue efforts of marine mammals by ABT spotter pilots seen during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	20	100.0	20	100.0

Table 105. Number of rescue efforts of marine mammals by ABT spotter pilots heard of during the 1998 season.

<u>Number</u>	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
0	20	100.0	20	100.0

General category Fishermen Who Indicated Harpoon as Their Primary Gear, Who Landed ABT Using Harpoon Gear, Do Not Target ABT, and Do Not Use Spotter Planes

The sample size obtained for this group of General category fishermen (n=3) is insufficient to permit meaningful data analysis. Therefore, no results can be reported for this.

Awareness and Impact of Spotter Plane Ban on Fishermen

General category Fishermen Who Target ABT and Do Not Use Spotter Planes

Table 106. Awareness by General category fishermen who target ABT, and do not use spotter planes, of the National Marine Fisheries Service's final rule in 1997 to ban the use of spotter planes in the General category.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	202	78.0	202	78.0
No	57	22.0	259	100.0

Table 107. Perception by General category fishermen who target ABT, and do not use spotter planes, on whether or not a ban on spotter planes in just the General category would affect them in any way.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	75	29.0	75	29.0
No	184	71.0	259	100.0

Table 108. Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not they care if a ban were placed on spotter planes in just the General category.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	117	45.2	117	45.2
No	142	54.8	259	100.0

Table 109. Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not a ban on spotter planes in both the General and Harpoon Categories would affect them in any way.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	87	33.6	87	33.6
No	172	66.4	259	100.0

Table 110. Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not they care if a ban were placed on spotter planes in both the General and Harpoon Categories.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	113	43.6	113	43.6
No	146	56.4	259	100.0

Table 111. Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 ABT season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
In favor	187	72.2	187	72.2
Opposed to	40	15.4	227	87.6
Don't know	32	12.4	259	100.0

Table 112. Distribution of responses by General category fishermen who target ABT, and do not use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 ABT season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
In favor	186	71.8	186	71.8
Opposed to	41	15.8	227	87.6
Don't know	32	12.4	259	100.0

Table 113. Perception by General category fishermen who target ABT, and do not use spotter planes, of the effect the presence of spotter planes has on the likelihood of vessels not using spotter planes to catch ABT on the same fishing grounds.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Significantly decreased likelihood	43	16.6	43	16.6
Slightly decreased likelihood	39	15.1	82	31.7
Has no effect on likelihood	66	25.5	148	57.1
Slightly increased likelihood	59	22.8	207	79.9
Significantly increased likelihood	48	18.5	255	98.5
Don't know	4	1.5	259	100.0

Table 114. Perception by General category fishermen who target ABT, and do not use spotter planes, of the length of the Harpoon category season if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	26	10.0	26	10.0
Stay about the same	77	29.7	103	39.8
Increase	133	51.4	236	91.1
Don't know	23	8.9	259	100.0

Table 115. Perception by General category fishermen who target ABT, and do not use spotter planes, of the length of the General category season if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	22	8.5	22	8.5
Stay about the same	63	24.3	85	32.8
Increase	160	61.8	245	94.6
Don't know	14	5.4	259	100.0

Table 116. Perception by General category fishermen who target ABT, and do not use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	16	6.2	16	6.2
Stay about the same	102	39.4	118	45.6
Increase	118	45.6	236	91.1
Don't know	23	8.9	259	100.0

Table 117. Perception by General category fishermen who target ABT, and do not use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	21	8.1	21	8.1
Stay about the same	103	39.8	124	47.9
Increase	121	46.7	245	94.6
Don't know	14	5.4	259	100.0

Table 118. Perception by General category fishermen who target ABT, and do not use spotter planes, of the length of the Harpoon category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	18	6.9	18	6.9
Stay about the same	45	17.4	63	24.3
Increase	181	69.9	244	94.2
Don't know	5	5.8	259	100.0

Table 119. Perception by General category fishermen who target ABT, and do not use spotter planes, of the length of the General category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	9	3.5	9	3.5
Stay about the same	62	23.9	71	27.4
Increase	177	68.3	248	95.8
Don't know	11	4.2	259	100.0

Table 120. Perception by General category fishermen who target ABT, and do not use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	9	3.5	9	3.5
Stay about the same	102	39.4	111	2.9
Increase	128	49.4	239	92.3
Don't know	20	7.7	259	100.0

Table 121. Perception by General category fishermen who target ABT, and do not use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	12	4.6	12	4.6
Stay about the same	113	43.6	125	48.3
Increase	117	45.2	242	93.4
Don't know	17	6.6	259	100.0

General category Fishermen Who Indicated Harpoon as Their Primary Gear, or Who Landed ABT Using Harpoon Gear, and Use Spotter Planes

Table 122. Awareness by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the National Marine Fisheries Service’s final rule in 1997 to ban the use of spotter planes in the General category.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	7	100.0	7	100.0
No	0	0.0	7	100.0

Table 123. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not a ban on spotter planes in just the General category would affect them in any way.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	5	71.4	5	71.4
No	2	28.6	7	100.0

Table 124. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not they care if a ban were placed on spotter planes in just the General category.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	5	71.4	5	71.4
No	2	28.6	7	100.0

Table 125. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not a ban on spotter planes in both the General and Harpoon Categories would affect them in any way.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	6	85.7	6	85.7
No	1	14.3	7	100.0

Table 126. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not they care if a ban were placed on spotter planes in both the General and Harpoon Categories.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	6	85.7	6	85.7
No	1	14.3	7	100.0

Table 127. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 ABT season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
In favor	0	0.0	0	0.0
Opposed to	5	71.4	5	71.4
Don't know	2	28.6	7	100.0

Table 128. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 ABT season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
In favor	0	0.0	0	0.0
Opposed to	6	85.7	6	85.7
Don't know	1	14.3	7	100.0

Table 129. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the effect the presence of spotter planes has on the likelihood of vessels not using spotter planes to catch ABT on the same fishing grounds.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Significantly decreased likelihood	0	0.0	0	0.0
Slightly decreased likelihood	0	0.0	0	0.0
Has no effect on likelihood	4	57.1	4	57.1
Slightly increased likelihood	3	42.9	7	100.0
Significantly increased likelihood	0	0.0	7	100.0
Don't know	0	0.0	7	100.0

Table 130. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on what they would do if spotter planes were banned from the General category in 1999.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Continue to fish as frequently in the General category without the aid of planes	5	71.4	5	71.4
Continue to fish in the General Category without the aid of planes but less frequently than in 1998	1	14.3	6	85.7
Other	1	14.3	7	100.0

Table 131. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the length of the Harpoon category season if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	1	14.3	1	14.3
Stay about the same	6	85.7	7	100.0
Increase	0	0.0	7	100.0
Don't know	0	0.0	7	100.0

Table 132. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the length of the General category season if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	0	0.0	0	0.0
Stay about the same	5	71.4	5	71.4
Increase	2	28.6	7	100.0
Don't know	0	0.0	7	100.0

Table 133. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	3	42.9	3	42.9
Stay about the same	3	42.9	6	85.7
Increase	1	14.3	7	100.0
Don't know	0	0.0	7	100.0

Table 134. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	3	42.9	3	42.9
Stay about the same	4	57.1	7	100.0
Increase	0	0.0	7	100.0
Don't know	0	0.0	7	100.0

Table 135. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the length of the Harpoon category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	0	0.0	0	0.0
Stay about the same	5	71.4	5	71.4
Increase	2	28.6	7	100.0
Don't know	0	0.0	7	100.0

Table 136. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, of the length of the General category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	0	0.0	0	0.0
Stay about the same	5	71.4	5	71.4
Increase	2	28.6	7	100.0
Don't know	0	0.0	7	100.0

Table 137. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	3	42.9	3	42.9
Stay about the same	3	42.9	6	85.7
Increase	1	14.3	7	100.0
Don't know	0	0.0	7	100.0

Table 138. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	4	57.1	4	57.1
Stay about the same	2	28.6	6	85.7
Increase	1	14.3	7	100.0
Don't know	0	0.0	7	100.0

General category Fishermen Who Indicated Harpoon as Their Primary Gear, or Who Landed ABT Using Harpoon Gear, and Do Not Use Spotter Planes

Table 139. Awareness by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the National Marine Fisheries Service's final rule in 1997 to ban the use of spotter planes in the General category.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	19	86.4	19	86.4
No	3	13.6	22	100.0

Table 140. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not a ban on spotter planes in just the General category would affect them in any way.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	8	36.4	8	36.4
No	14	63.6	22	100.0

Table 141. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not they care if a ban were placed on spotter planes in just the General category.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	7	31.8	7	31.8
No	15	68.2	22	100.0

Table 142. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not a ban on spotter planes in both the General and Harpoon Categories would affect them in any way.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	10	45.5	10	45.5
No	12	54.5	22	100.0

Table 143. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not they care if a ban were placed on spotter planes in both the General and Harpoon Categories.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Yes	7	31.8	7	31.8
No	15	68.2	22	100.0

Table 144. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 ABT season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
In favor	17	77.3	17	77.3
Opposed to	4	18.2	21	95.5
Don't know	1	4.5	22	100.0

Table 145. Distribution of responses by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on whether or not they are in favor of or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 ABT season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
In favor	19	86.4	19	86.4
Opposed to	2	9.1	21	95.5
Don't know	1	4.5	22	100.0

Table 146. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the effect the presence of spotter planes has on the likelihood of vessels not using spotter planes to catch ABT on the same fishing grounds.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Significantly decreased likelihood	3	13.6	3	13.6
Slightly decreased likelihood	2	9.1	5	22.7
Has no effect on likelihood	7	31.8	12	54.5
Slightly increased likelihood	5	22.7	17	77.3
Significantly increased likelihood	5	22.7	22	100.0
Don't know	0	0.0	22	100.0

Table 147. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the length of the Harpoon category season if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	5	22.7	5	22.7
Stay about the same	12	54.5	17	77.3
Increase	4	18.2	21	95.5
Don't know	1	4.5	22	100.0

Table 148. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the length of the General category season if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	2	9.1	2	9.1
Stay about the same	6	27.3	8	36.4
Increase	13	59.1	21	95.5
Don't know	1	4.5	22	100.0

Table 149. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	2	9.1	2	9.1
Stay about the same	7	31.8	9	40.9
Increase	11	50.0	20	90.9
Don't know	2	9.1	22	100.0

Table 150. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned in the General category for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	0	0.0	0	0.0
Stay about the same	11	50.0	11	50.0
Increase	9	40.9	20	90.9
Don't know	2	9.1	22	100.0

Table 151. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the length of the Harpoon category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	0	0.0	0	0.0
Stay about the same	5	22.7	5	22.7
Increase	16	72.7	21	95.5
Don't know	1	4.5	22	100.0

Table 152. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, of the length of the General category season if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	0	0.0	0	0.0
Stay about the same	5	22.7	5	22.7
Increase	16	72.7	21	95.5
Don't know	1	4.5	22	100.0

Table 153. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on the change in their total income from the sale of ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	1	4.5	1	4.5
Stay about the same	6	27.3	7	31.8
Increase	12	54.5	19	86.4
Don't know	3	13.6	22	100.0

Table 154. Perception by General category fishermen who listed harpoon as their primary gear or landed an ABT using harpoon gear, and do not use spotter planes, on the change in their success rate in catching ABT if spotter planes were banned from the General and Harpoon Categories for the 1999 season.

	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Decrease	1	4.5	1	4.5
Stay about the same	3	13.6	4	18.2
Increase	16	72.7	20	90.9
Don't know	2	9.1	22	100.0

APPENDIX A

General category Permit Holder's Questionnaire

This is _____ calling from Teleforce, may I please speak with _____

Hello, my name is _____ and I'm calling from Teleforce in _____. I'm calling on behalf of researchers from the University of Massachusetts who are conducting a study related to the ABT fishery and the use of spotter planes. The researchers conducting this study are fisheries survey specialists who have been chosen for their expertise and objectivity on this issue. They are in no way affiliated with any government agency, conservation organization, fishermen's association, or political lobby group. This survey is completely voluntary and your responses will remain completely confidential. If I come to any question that you would prefer not to answer, just let me know and I'll skip over it. Would you be willing to give us about _____ minutes of your time to participate in this important research?

Q1S., Q2S. and Q3S. are screener questions to determine which questionnaire to administer

Q1S. How many days in 1998 did you fish from a boat in saltwater?

_____Days (if none, thank and terminate)

Q2S. How many days in 1998 were you specifically targeting ABT? Please include days when ABT was the only fish you were after and also days when ABT was one of several fish you were after.

_____Days (if none go to "General Not Targeting" Section C)

Q3S. Did you hire a spotter plane to assist you in locating ABT during the 1998 fishing season?

YES (if yes go to "General with Plane" Section A)

NO (if no go to "General without Plane" Section B)

General category, Targeting ABT, and Using Plane

Q1A. How many days did you fish for ABT during the 1998 season with the aid of a spotter plane that you hired?

_____ Days

Q2A. Considering the days you fished for ABT during the 1998 season with the aid of a spotter plane that you hired, how many days did you fish primarily with:

Harpoon gear? ____ days

Rod and Reel? ____ days

Any Other Gear used (please specify)? _____gear ____ days

(if response to Q1A is less than response to Q2S then ask Q3A otherwise skip to Q4A)

Q3A. Considering the days you fished for ABT during the 1998 season without the aid of a spotter plane that you hired, how many days did you fish primarily with:

Harpoon gear? ____ days

Rod and Reel? ____ days

Any Other Gear used (please specify)? _____gear ____ days

Q4A. How many different spotter planes did you hire to assist you in locating ABT during the 1998 season?

_____ Planes

Q5A. Was the number of days that you hired a spotter plane to pursue ABT during the 1998 season fewer than, as many as, or more than the number of days you would have preferred?

- 1 Fewer than preferred (*go to Q6A*)
- 2 As many as preferred (*skip to Q7A*)
- 3 More than preferred (*skip to Q7A*)

Q6A. Next, we would like to know what were some of the main reasons you did not hire a spotter plane to fish for ABT as often as you would have preferred in 1998. Please indicate to what extent you agree or disagree with each of the following as possible reasons for not hiring a spotter plane (interviewer read scale to respondent for each new item):

1= completely disagree 2= somewhat disagree 3=neutral
4=somewhat agree 5= completely agree

Weather/wave conditions not good for spotting	1	2	3	4	5
Pilot not willing to fly for share being offered	1	2	3	4	5
Pilot not available		1	2	3	4
5					
Plane not available/or not in working condition	1	2	3	4	5
Other (please specify) _____	1	2	3	4	5

Q7A. Do you pay the spotter plane a percent share of the catch?

YES *if yes ask:* **What percent share went to the plane in 1998? _____%**

NO *if no ask:* **How did you pay the spotter plane in 1998? _____**
(if plane got paid a fixed rate find out what the rate was either per hour, day or season) Fixed rate \$ _____

Q8A. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you hired a spotter plane? Please provide information by gear type:

(Interviewer: if number landed is zero don't ask for pounds or value)

With Harpoon? _____ number landed _____ lbs. landed \$ _____ value of landings

With Rod and Reel or handline? _____ number landed _____ lbs. landed \$ _____ value of landings

(if response to Q1A is less than response to Q2S go to Q9A. Otherwise skip to Q11A)

Q9A. On days when you did not hire a spotter plane in 1998, did you make any indirect use of spotter planes to assist you in locating ABT? By "indirect" we mean following planes not hired by your vessel, or converging on areas where planes were assisting other vessels.

YES *If yes, ask:*

Q9.1A On how many days did you indirectly use spotter planes in 1998 when fishing with:
Harpoon? _____ days
Rod and Reel? _____ days
Any Other Gear used? (specify) _____ gear _____ days

NO *(skip to Q11A)*

Q10A. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you indirectly used a spotter plane to assist you? Please provide information by gear type:

(Interviewer: if number landed is zero don't ask for pounds or value)

With Harpoon? _____ number landed _____ lbs. landed \$ _____ value of landings

With Rod and Reel or handline? _____ number landed _____ lbs. landed \$ _____ value of landings

(If response to Q.2S is greater than the sum of responses to Q.1A plus Q9.1A then go to Q11A, otherwise skip to Q12A)

Q11A. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you did not use a spotter plane to assist you in any way? Please provide information by gear type:

(Interviewer: if number landed is zero don't ask for pounds or value)

With Harpoon? _____ number landed _____ lbs. landed \$_____ value of landings

With Rod and Reel or handline? _____ number landed _____ lbs. landed \$_____ value of landings

Q12A. How much difference did your hiring of a spotter plane in 1998 make in the likelihood of you landing a bluefin tuna on any given day?

- 1 No difference**
- 2 Slight difference**
- 3 Moderately difference**
- 4 Large difference**
- 5 Very large difference**

Q13A. To what extent do you believe that it is fair or unfair that some vessels use planes and some do not? Do you think it is: very unfair, somewhat unfair or fair?

- 1 very unfair**
- 2 somewhat unfair**
- 3 fair**

Q14A. Have you ever fished for ABT in the Harpoon Permit Category?

- YES**
- NO**

Q15A. Considering the number of vessels either directly working with spotter planes or indirectly following spotter planes, to what extent are you concerned about a collision between vessels pursuing ABT? Would you say you are: not concerned, slightly concerned, somewhat concerned, very concerned, or extremely concerned?

1=not concerned

2=slightly concerned

3=somewhat concerned

4= very concerned

5=extremely concerned

Q16A. Have you heard of or seen any of the following problems in the ABT fishery off of New England:

- a) **Physical damage to vessels or fishing gear caused by other vessels where at least one of the vessels was directly using a spotter plane**

YES *if yes, ask* **How many incidents did you hear of during the 1998 season?** _____
NO

- b) **Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* **On average, how many incidents did you hear of per week during the 1998 season?** _____
NO

- c) **Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* **On average, how many incidents did you hear of per week during the 1998 season?** _____
NO

Q17A. Have you personally been involved with any of the following problems in the ABT fishery off of New England:

- a) **Physical damage to vessels or fishing gear caused by other vessels where at least one of the vessels was directly using a spotter plane**

YES *if yes, ask* **How many incidents have you personally been involved with during the 1998 season?** _____
NO

- b) **Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* **How many incidents have you personally been involved with during the entire 1998 season?** _____
NO

- c) **Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* **How many incidents have you personally been involved with during the entire 1998 season?** _____
NO

Q18A. Have you seen or heard of any rescue efforts of stranded vessels or persons by ABT spotter pilots?

YES
NO

If yes : **How many did you see during the 1998 season?**

_____ **number seen**

How many did you hear of during the 1998 season?

_____ **number heard about**

Q19A. Have you seen or heard of any rescue efforts of marine mammals by ABT spotter pilots?

YES
NO

If yes : **How many did you see during the 1998 season?**

_____ **number seen**

How many did you hear of during the 1998 season?

_____ **number heard about**

Q20A. Please compare the current frequency of spotter plane use in the ABT fishery with the frequency of use ten years ago. Was the frequency of use during the 1998 season less than, about the same as, or greater than the frequency of use during the 1988 season?

- 1 less than
- 2 about the same
- 3 greater than
- 4 don't know

Q21A. In general, would you say that the number of spotter planes used for ABT has been decreasing, has stayed about the same, or has been increasing in recent years?

- 1 decreasing
- 2 stayed the same
- 3 increasing
- 4 don't know

Q22A. Do you feel that the use of spotter planes in the ABT harpoon fishery aids in the size selectivity of fish harvested? By size selectivity we are referring to the ability to selectively remove certain sized fish from the population that will have the least negative impact on the fish stock.

YES
NO
DON'T KNOW

Q23A. In your opinion, does the fishing method of chumming that is used in the ABT fishery change the fishes feeding and surfacing behavior in any way?

YES
NO
DON'T KNOW

Q24A. Are you aware of the National Marine Fisheries Service's proposed rule in 1997 to ban the use of spotter planes in the General bluefin tuna category?

YES
NO

Q25A. Would a ban on spotter planes in just the General ABT Category affect you in any way?

YES
NO

Q26A. Would you care whether or not a ban is placed on spotter planes in just the General category?

YES
NO

Q27A. Would a ban on spotter planes in both the General and Harpoon ABT Categories affect you in any way?

YES
NO

Q28A. Would you care whether or not a ban is placed on spotter planes in both the General and Harpoon ABT Categories?

YES
NO

Q29A. Would you be in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 bluefin tuna season?

- 1 In Favor
- 2 Opposed To
- 3 Don't Know

Q30A. Would you be in favor of or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 bluefin tuna season?

- 1 In Favor
- 2 Opposed To
- 3 Don't Know

Q31A. What effect do you think the presence of bluefin tuna spotter planes has on the likelihood of vessels not using spotter planes to catch bluefin tuna on the same fishing grounds? Does the presence of planes significantly decrease, slightly decrease, not effect, slightly increase or significantly increase the chances of other vessels?

- 1 significantly decreased likelihood
- 2 slightly decreased likelihood
- 3 has no effect on likelihood
- 4 slightly increased likelihood
- 5 significantly increased likelihood

Q32A. Do you plan to fish for ABT in the General category during the 1999 fishing season?

YES

NO *If no, ask*

Do you plan to fish for ABT in the Harpoon category during the 1999 fishing season? (Y,N,DK)

Q33A. If there is no ban on the use of spotter planes in 1999, will you try to hire any spotter planes to fish for ABT during the 1999 fishing season?

YES

NO

DON'T KNOW

Q34A. If the use of spotter planes were banned just from the General category in 1999, which of the following options would you most likely do? (respondent should select just one option from those provided or indicate some other option)

- a) Continue to fish as frequently in the General category without the aid of planes
- b) Continue to fish in the General category without the aid of planes but less frequently than in 1998
- c) Continue to fish in the General category without the aid of planes but more frequently than in 1998
- d) Switch to the Harpoon category and fish with spotter planes
- e) Not fish for ABT at all
- f) Some other option (please specify) _____

Q35A. If the use of spotter planes were banned only from the General category in 1999, please indicate what you expect the impact would be on each of the following :

a) Length of the Harpoon category season?

1 decrease 2 stay about the same 3 increase 4 don't know

b) Length of the General category season?

1 decrease 2 stay about the same 3 increase 4 don't know

c) Your total income from the sale of ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

d) Your success rate in catching ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

Q36A. If the use of spotter planes were banned from the General and Harpoon Categories in 1999, please indicate what you expect the impact would be on each of the following :

a) Length of the Harpoon category season?

1 decrease 2 stay about the same 3 increase 4 don't know

b) Length of the General category season?

1 decrease 2 stay about the same 3 increase 4 don't know

c) Your total income from the sale of ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

d) Your success rate in catching ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

Q37A. What was your average cost per day to run your boat on days when you fished for ABT during the 1998 season? Include such things as diesel, oil, bait, ice etc. Please do not include the cost to hire a spotter plane.

\$ _____

Q38A. What proportion of the income for your vessel from the sale of all fish in 1998 was derived from selling ABT caught in the General category?

_____ %

Q39A. What was the approximate total income for your vessel from the sale of all fish in 1998?

_____ \$

Q40A. What proportion of your total annual household income in 1998 (before taxes) did you get from selling fish?

_____ %

Q41A. What proportion of your total annual household income in 1998 (before taxes) did you get from the sale of ABT caught in the General category?

_____ %

Q42A. What was your total annual household income in 1998 before taxes?

\$ _____

That is all the questions we need to ask you. If you have any specific questions about this survey you can contact the principal investigator Dr. David Loomis at (413) 545-6641. Thank you for your time and cooperation.

General category, Targeting ABT, and Not Using a Plane

Q1B. Considering the days you fished for ABT during the 1998 season, how many of those days did you fish primarily with:

Harpoon gear? ____ days
 Rod and Reel? ____ days
 Other (please specify)? _____gear ____ days

Q2B. We would like to know what were some of the main reasons you did not hire a spotter plane to fish for ABT in 1998. Please indicate to what extent you agree or disagree with each of the following as possible reasons for not hiring a spotter plane (interviewer read scale to respondent for each new item) :

1= completely disagree 2= somewhat disagree 3=neutral
 4=somewhat agree 5= completely agree

Don't need a pilot	1	2	3	4	5
Planes give an unfair advantage to a select few	1	2	3	4	5
Planes are not part of the traditional fishery	1	2	3	4	5
Don't know any spotter pilots	1	2	3	4	5
Pilot not willing to fly for share being offered	1	2	3	4	5
Pilot was not available on days you wanted to hire one	1	2	3	4	5
Spotter pilots do not improve my catch rates enough to be financially advantageous	1	2	3	4	5
Other Reasons (please specify)	1	2	3	4	5

Q3B. To what extent do you believe that it is fair or unfair that some vessels use planes and some do not? Do you think it is: very unfair, somewhat unfair or fair?

1 very unfair
2 somewhat unfair
3 fair

Q4B. On days when you fished for ABT in 1998, did you make any indirect use of spotter planes to assist you in locating fish? By "indirect" we mean following planes not hired by your vessel or converging on areas where planes were assisting other vessels.

YES *If yes, ask:*

On how many days did you indirectly use spotter planes in 1998 when fishing with:

Harpoon? ____ days
 Rod and Reel? ____ days
 Other? (specify) _____ gear _____ days

NO *(skip to Q6B)*

Q5B. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you indirectly used a spotter plane to assist you? Please provide information by gear type:

(Interviewer: if number landed is zero don't ask for pounds or value)

With Harpoon? _____ number landed _____ lbs. landed \$ _____ value of landings

With Rod and Reel or handline? _____ number landed _____ lbs. landed \$ _____ value of landings

Q6B. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you did not use a spotter plane to assist you in any way? Please provide information by gear type:

(Interviewer: if number landed is zero don't ask for pounds or value)

With Harpoon? _____ number landed _____ lbs. landed \$ _____ value of landings

With Rod and Reel or handline? _____ number landed _____ lbs. landed \$ _____ value of landings

Q7B. Prior to 1998, had you ever directly hired a spotter plane to assist you in fishing for ABT?

YES
NO

Q8B. Have you ever fished for ABT in the Harpoon Permit Category?

YES
NO

Q9B. Considering the number of vessels either directly working with spotter planes or indirectly following spotter planes, to what extent are you concerned about a collision between vessels pursuing ABT? Would you say you are: not concerned, slightly concerned, somewhat concerned, very concerned, or extremely concerned?

1=not concerned

2=slightly concerned

3=somewhat concerned

4= very concerned

5=extremely concerned

Q10B. Have you heard of or seen any of the following problems in the ABT fishery off of New England:

- a) **Physical damage to vessels or fishing gear caused by other vessels where at least one of the vessels was directly using a spotter plane**

YES *if yes, ask* How many incidents did you hear of during the 1998 season? _____

NO

- b) **Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* On average, how many incidents did you hear of per week during the 1998 season? _____

NO

- c) **Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* On average, how many incidents did you hear of per week during the 1998 season? _____

NO

Q11B. Have you personally been involved with any of the following problems in the ABT fishery off of New England:

- a) **Physical damage to vessels or fishing gear caused by other vessels were at least one of the vessels was directly using a spotter plane**

YES *if yes, ask* How many incidents have you personally been involved with during the 1998 season? _____

NO

- b) **Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* How many incidents have you personally been involved with during the entire 1998 season? _____

NO

- c) **Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* How many incidents have you personally been involved with during the entire 1998 season? _____

NO

Q12B. Have you seen or heard of any rescue efforts of stranded vessels or persons by ABT spotter pilots?

YES
NO

If yes : How many did you see during the 1998 season?

_____ number seen

How many did you hear of during the 1998 season?

_____ number heard about

Q13B. Have you seen or heard of any rescue efforts of marine mammals by ABT spotter pilots?

YES
NO

If yes : How many did you see during the 1998 season?

_____ number seen

How many did you hear of during the 1998 season?

_____ number heard about

Q14B. Please compare the current frequency of spotter plane use in the ABT fishery with the frequency of use ten years ago. Was the frequency of use during the 1998 season less than, about the same as, or greater than the frequency of use during the 1988 season?

- 1 less than
- 2 about the same
- 3 greater than
- 4 don't know

Q15B. In general, would you say that the number of spotter planes used for ABT has been decreasing, has stayed about the same, or has been increasing in recent years?

- 1 decreasing
- 2 stayed the same
- 3 increasing
- 4 don't know

Q16B. Do you feel that the use of spotter planes in the ABT harpoon fishery aids in the size selectivity of fish harvested? By size selectivity we are referring to the ability to selectively remove certain sized fish from the population that will have the least negative impact on the fish stock.

YES
NO
DON'T KNOW

Q17B. In your opinion, does the fishing method of chumming that is used in the ABT fishery change the fishes feeding and surfacing behavior in any way?

YES

NO
DON'T KNOW

Q18B. Are you aware of the National Marine Fisheries Service's proposed rule in 1997 to ban the use of spotter planes in the General bluefin tuna category?

YES
NO

Q19B. Would a ban on spotter planes in just the General ABT Category affect you in any way?

YES
NO

Q20B. Would you care whether or not a ban is placed on spotter planes in just the General category?

YES
NO

Q21B. Would a ban on spotter planes in both the General and Harpoon ABT Categories affect you in any way?

YES
NO

Q22B. Would you care whether or not a ban is placed on spotter planes in both the General and Harpoon ABT Categories?

YES
NO

Q23B. Would you be in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 bluefin tuna season?

- 1 In Favor
- 2 Opposed To
- 3 Don't Know

Q24B. Would you be in favor or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 bluefin tuna season?

- 1 In Favor
- 2 Opposed To
- 3 Don't Know

Q25B. What effect do you think the presence of bluefin tuna spotter planes has on the likelihood of vessels not using spotter planes to catch bluefin tuna on the same fishing grounds? Does the presence of planes significantly decrease, slightly decrease, not effect, slightly increase or significantly increase the chances of other vessels?

- 1 significantly decreased likelihood
- 2 slightly decreased likelihood

- 3 has no effect on likelihood
- 4 slightly increased likelihood
- 5 significantly increased likelihood

Q26B. Do you plan to fish for ABT in the General category during the 1999 fishing season?

YES

NO *If no, ask*

Do you plan to fish for ABT in the Harpoon category during the 1999 fishing season? (Y,N,DK)

Q27B. If there is no ban on the use of spotter planes in 1999, will you try to hire any spotter planes to fish for ABT during the 1999 fishing season?

YES

NO

DON'T KNOW

Q28B. If you had hired a spotter plane every time you fished for ABT in the General category in 1998, how do you think your annual vessel landings value derived from ABT might have changed? Would it have:

- 1 Decreased significantly
- 2 Deceased slightly
- 3 Stayed about the same
- 4 Increased slightly
- 5 Increased significantly

If anything other than "Stayed about the same" then ask:

By what percent? _____%

Q29B. If the use of spotter planes were banned just the General category in 1999, please indicate what you expect the impact would be on each of the following :

a) Length of the Harpoon category season?

1 decrease 2 stay about the same 3 increase 4 don't know

b) Length of the General category season?

1 decrease 2 stay about the same 3 increase 4 don't know

c) Your total income from the sale of ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

d) Your success rate in catching ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

Q30B. If the use of spotter planes were banned from the General and Harpoon Categories in 1999, please indicate what you expect the impact would be on each of the following :

a) Length of the Harpoon category season?

1 decrease 2 stay about the same 3 increase 4 don't know

b) Length of the General category season?

1 decrease 2 stay about the same 3 increase 4 don't know

c) Your total income from the sale of ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

d) Your success rate in catching ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

Q31B. What was your average cost per day to run your boat on days when you fished for ABT during the 1998 season? Include such things as diesel, oil, bait, ice etc.

\$ _____

Q32B. What proportion of the income for your vessel from the sale of all fish in 1998 was derived from selling ABT caught in the General category?

_____ %

Q33B. What was the approximate total income for your vessel from the sale of all fish in 1998?

_____ \$

Q34B. What proportion of your total annual household income in 1998 (before taxes) did you get from selling fish?

_____ %

Q35B. What proportion of your total annual household income in 1998 (before taxes) did you get from the sale of ABT?

_____ %

Q36B. What was your total annual household income in 1998 before taxes?

\$ _____

That is all the questions we need to ask you.

If you have any specific questions about this survey you can contact the principal investigator Dr. David Loomis at (413) 545-6641.

Thank you for your time and cooperation.

General category, Not Targeting ABT, and Not Using a Plane

Q1C. Considering the days you fished during the 1998 season, how many of those days did you fish primarily with:

Harpoon gear? ____ days
Rod and Reel? ____ days
Other (please specify)? _____ gear ____ days

Q2C. To what extent do you believe that it is fair or unfair that some vessels use planes and some do not? Do you think it is: very unfair, somewhat unfair or fair?

1 very unfair
2 somewhat unfair
3 fair

Q3C. On days when you fished in 1998, did you make any indirect use of spotter planes to assist you in locating fish? By “indirect” we mean following planes not hired by your vessel or converging on areas where planes were assisting other vessels.

YES *If yes, ask:*

On how many days did you indirectly use spotter planes in 1998 when fishing with:

Harpoon? ____ days
Rod and Reel? ____ days
Any other gear? (specify) _____ gear _____ days

NO *(skip to Q5C)*

Q4C. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you indirectly used a spotter plane to assist you? Please provide information by gear type:

(Interviewer: if number landed is zero don't ask for pounds or value)

With Harpoon? ____ number landed ____ lbs. landed \$ ____ value of landings

With Rod and Reel or handline? ____ number landed ____ lbs. landed \$ ____ value of landings

Q5C. What was your total catch of ABT in terms of numbers, pounds and value in 1998 on days when you did not use a spotter plane to assist you in any way? Please provide information by gear type:

(Interviewer: if number landed is zero don't ask for pounds or value)

With Harpoon? ____ number landed ____ lbs. Landed \$ ____ value of landings

With Rod and Reel or handline? ____ number landed ____ lbs. landed \$ ____ value of landings

Q6C. Prior to 1998, had you ever directly hired a spotter plane to assist you in locating fish?

YES
NO

Q7C. Considering the number of vessels either directly working with spotter planes or indirectly following spotter planes, to what extent are you concerned about a collision involving vessels pursuing ABT? Would you say you are: not concerned, slightly concerned, somewhat concerned, very concerned, or extremely concerned?

1=not concerned

2=slightly concerned

3=somewhat concerned

4= very concerned

5=extremely concerned

Q8C. Have you heard of or seen any of the following problems in the ABT fishery off of New England:

- a) **Physical damage to vessels or fishing gear caused by other vessels where at least one of the vessels was directly using a spotter plane**

YES *if yes, ask* How many incidents did you hear of during the 1998 season? _____

NO

- b) **Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* On average, how many incidents did you hear of per week during the 1998 season? _____

NO

- c) **Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* On average, how many incidents did you hear of per week during the 1998 season? _____

NO

Q9C. Have you personally been involved with any of the following problems in the ABT fishery off of New England:

- a) **Physical damage to vessels or fishing gear caused by other vessels were at least one of the vessels was directly using a spotter plane**

YES *if yes, ask* **How many incidents were you personally involved with during the entire 1998 season?** _____

NO

- b) **Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* **How many incidents were you personally involved with during the entire 1998 season?** _____

NO

- c) **Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* **How many incidents were you personally involved with during the entire 1998 season?** _____

NO

Q10C. Have you seen or heard of any rescue efforts of stranded vessels or persons by ABT spotter pilots?

YES

NO

If yes : **How many did you see during the 1998 season?**

_____ **number seen**

How many did you hear of during the 1998 season?

_____ **number heard about**

Q11C. Have you seen or heard of any rescue efforts of marine mammals by ABT spotter pilots?

YES

NO

If yes : **How many did you see during the 1998 season?**

_____ **number seen**

How many did you hear of during the 1998 season?

_____ **number heard about**

Q12C. Please compare the current frequency of spotter plane use in the ABT fishery with the frequency of use ten years ago. Was the frequency of use during the 1998 season less than, about the same as, or greater than the frequency of use during the 1988 season?

- 1 less than
- 2 about the same
- 3 greater than
- 4 don't know

Q13C. In general, would you say that the number of spotter planes used for ABT has been decreasing, has stayed about the same, or has been increasing in recent years?

- 1 decreasing
- 2 stayed the same
- 3 increasing
- 4 don't know

Q14C. Do you feel that the use of spotter planes in the ABT harpoon fishery aids in the size selectivity of fish harvested? By size selectivity we are referring to the ability to selectively remove certain sized fish from the population that will have the least negative impact on the fish stock.

**YES
NO
DON'T KNOW**

Q15C. In your opinion, does the fishing method of chumming that is used in the ABT fishery change the fishes feeding and surfacing behavior in any way?

**YES
NO
DON'T KNOW**

Q16C. Are you aware of the National Marine Fisheries Service's proposed rule in 1997 to ban the use of spotter planes in the General bluefin tuna category?

**YES
NO**

Q17C. Would a ban on spotter planes in only the General ABT Category affect you in any way?

**YES
NO**

Q18C. Would you care whether or not a ban is placed on spotter planes in only the General category?

**YES
NO**

Q19C. Would a ban on spotter planes in both the General and Harpoon ABT Categories affect you in any way?

YES
NO

Q20C. Would you care whether or not a ban is placed on spotter planes in both the General and Harpoon ABT Categories?

YES
NO

Q21C. Would you be in favor of or opposed to a rule that bans the use of spotter planes in the General category for the 1999 bluefin tuna season?

1 In Favor
2 Opposed To
3 Don't Know

Q22C. Would you be in favor or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 bluefin tuna season?

1 In Favor
2 Opposed To
3 Don't Know

Q23C. What effect do you think the presence of bluefin tuna spotter planes has on the likelihood of vessels not using spotter planes to catch bluefin tuna on the same fishing grounds? Does the presence of planes significantly decrease, slightly decrease, not effect, slightly increase or significantly increase the chances of other vessels?

1 significantly decreased likelihood
2 slightly decreased likelihood
3 has no effect on likelihood
4 slightly increased likelihood
5 significantly increased likelihood

Q24C. Do you plan to apply for a General category bluefin tuna permit for the 1999 fishing season?

YES
NO

Q25C. If the use of spotter planes were banned just from the General category in 1999, please indicate what you expect the impact would be on each of the following :

a) Length of the Harpoon category season?

1 decrease 2 stay about the same 3 increase 4 don't know

b) Length of the General category season?

1 decrease 2 stay about the same 3 increase 4 don't know

c) Your total income from the sale of ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

d) Your success rate in catching ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

Q26C. If the use of spotter planes were banned from the General and Harpoon Categories in 1999, please indicate what you expect the impact would be on each of the following :

a) Length of the Harpoon category season?

1 decrease 2 stay about the same 3 increase 4 don't know

b) Length of the General category season?

1 decrease 2 stay about the same 3 increase 4 don't know

c) Your total income from the sale of ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

d) Your success rate in catching ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

Q27C. What was your average cost per day to run your boat on days when you fished during the 1998 season? Include such things as diesel, oil, bait, ice etc.

\$ _____

Q28C. What was the approximate total income for your vessel from the sale of all fish in 1998?

_____ \$

Q29C. What proportion of the income for your vessel from the sale of all fish in 1998 was derived from selling ABT caught in the General category?

_____ %

Q30C. What proportion of your total annual household income in 1998 (before taxes) did you get from selling fish?

_____ %

Q31C. What proportion of your total annual household income in 1998 (before taxes) did you get from the sale of ABT?

_____ %

Q32C. What was your total annual household income in 1998 before taxes?

\$ _____

That is all the questions we need to ask you.

If you have any specific questions about this survey you can contact the principal investigator Dr. David Loomis at (413) 545-6641.

Thank you for your time and cooperation.

APPENDIX B

Harpoon category Permit Holder's Questionnaire

This is _____ calling from Teleforce, may I please speak with _____

Hello, my name is _____ and I'm calling from Teleforce in _____. I'm calling on behalf of researchers from the University of Massachusetts who are conducting a study related to the use of spotter planes in the bluefin tuna fishery. The researchers conducting this study are fisheries survey specialists who have been chosen for their expertise and objectivity on this issue. They are in no way affiliated with any government agency, conservation organization, fishermen's association, or political lobby group. This survey is completely voluntary and your responses will remain completely confidential. If I come to any question that you would prefer not to answer, just let me know and I'll skip over it. Would you be willing to give us about _____ minutes of your time to participate in this important research?

Q1S. and Q2S. are screener questions to determine which questionnaire to administer

Q1S. Did you fish for ABT in the Harpoon category during the 1998 season?

YES

NO (if no, thank and terminate)

Q2S. Did you hire a spotter plane to assist you in locating ABT while fishing in the Harpoon category during the 1998 fishing season?

YES (*if yes, go to Harpoon With Plane Section A*)

NO (*if no, go to Harpoon Without Plane Section B*)

Harpoon category, Using a Plane

Q1A. How many days did you fish for ABT in the Harpoon category during the 1998 season?

_____ Days

Q2A. How many days did you fish for ABT in the Harpoon category during the 1998 season with the aid of a spotter plane that you hired?

_____ Days

Q3A. How many different spotter planes did you hire to assist you in locating ABT during the 1998 season?

_____ Planes

Q4A. Was the number of days that you hired a spotter plane to pursue ABT during the 1998 season fewer than, as many as, or more than the number of days you would have preferred?

- 1 Fewer than preferred (*go to Q5A*)
- 2 As many as preferred (*skip to Q6A*)
- 3 More than preferred (*skip to Q6A*)

Q5A. Next, we would like to know what were some of the main reasons you did not hire a spotter plane to fish for ABT as often as you would have preferred in 1998. Please indicate to what extent you agree or disagree with each of the following as possible reasons for not hiring a spotter plane (interviewer read scale to respondent for each new item):

1= completely disagree 2= somewhat disagree 3=neutral
4=somewhat agree 5= completely agree

Weather/wave conditions not good for spotting	1	2	3	4	5
Pilot not willing to fly for share being offered	1	2	3	4	5
Pilot not available (Not enough pilots)	1	2	3	4	5
Plane not available/or not in working condition	1	2	3	4	5
Other (please specify) _____	1	2	3	4	5

Q6A. Do you pay the spotter plane a percent share of the catch?

YES *if yes ask:* **What percent share went to the plane in 1998? _____%**

NO *if no ask:* **How did you pay the spotter plane in 1998? _____**
(if plane got paid a fixed rate find out what the rate was either per hour, day or season) Fixed rate \$ _____

Q7A. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you hired a spotter plane?

(Interviewer: if number landed is zero don't ask for pounds or value)

Total number of bluefin landed _____
Total pounds of bluefin landed _____
Total value of bluefin landed \$ _____

(If response to Q2A is less than response to Q1A ask Q8A. Otherwise skip to Q11A)

Q8A. On days when you did not hire a spotter plane in 1998, did you make any indirect use of spotter planes to assist you in locating ABT? By “indirect” we mean following planes not hired by your vessel, or converging on areas where planes were assisting other vessels.

YES If yes, ask: **Q8.1A. On how many days did you indirectly use spotter planes in 1998 ?**
_____ days (*go to Q9A*)

NO (*skip to Q10A*)

Q9A. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you indirectly used a spotter plane to assist you?

(Interviewer: if number landed is zero don't ask for pounds or value)

Total number of bluefin landed _____
Total pounds of bluefin landed _____
Total value of bluefin landed \$_____

(If response to Q.1A is greater than the sum of responses to Q.2A plus Q8.1A then go to Q10A, otherwise skip to Q11A)

Q10A. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you did not use a spotter plane to assist you in any way, either directly hiring one or indirectly following one?

(Interviewer: if number landed is zero don't ask for pounds or value)

Total number of bluefin landed _____
Total pounds of bluefin landed _____
Total value of bluefin landed \$_____

Q11A. How much difference did your hiring of a spotter plane in 1998 make in the likelihood of you landing a bluefin tuna on any given day?

- 1 No difference
- 2 Slight difference
- 3 Moderately difference
- 4 Large difference
- 6 Very large difference

Q12A. To what extent do you believe that it is fair or unfair that some vessels use planes and some do not? Do you think it is: very unfair, somewhat unfair or fair?

- 1 very unfair
- 2 somewhat unfair
- 3 fair

Q13A. Have you ever fished for ABT in the General Permit Category?

YES
NO

Q14A. Considering the number of vessels either directly working with spotter planes or indirectly following spotter planes, to what extent are you concerned about a collision between vessels pursuing ABT? Would you say you are: not concerned, slightly concerned, somewhat concerned, very concerned, or extremely concerned?

1=not concerned

2=slightly concerned

3=somewhat concerned

4= very concerned

5=extremely concerned

Q15A. Have you heard of or seen any of the following problems in the ABT fishery off of New England:

- a) **Physical damage to vessels or fishing gear caused by other vessels where at least one of the vessels was directly using a spotter plane**

YES *if yes, ask* How many incidents did you hear of during the 1998
season? _____

NO

- b) **Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* On average, how many incidents did you hear of per week during
the 1998 season? _____

NO

- c) **Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* On average, how many incidents did you hear of per week
during the 1998 season? _____

NO

Q16A. Have you personally been involved with any of the following problems in the ABT fishery off of New England:

- a) **Physical damage to vessels or fishing gear caused by other vessels were at least one of the vessels was directly using a spotter plane**

YES *if yes, ask* **How many incidents have you personally been involved with during the 1998 season?** _____

NO

- b) **Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* **How many incidents have you personally been involved with during the entire 1998 season?** _____

NO

- c) **Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane**

YES *if yes, ask* **How many incidents have you personally been involved with during the entire 1998 season?** _____

NO

Q17A. Have you seen or heard of any rescue efforts of stranded vessels or persons by ABT spotter pilots?

YES

NO

If yes : **How many did you see during the 1998 season?**

_____ **number seen**

How many did you hear of during the 1998 season?

_____ **number heard about**

Q18A. Have you seen or heard of any rescue efforts of marine mammals by ABT spotter pilots?

YES

NO

If yes : **How many did you see during the 1998 season?**

_____ **number seen**

How many did you hear of during the 1998 season ?

_____ **number heard about**

Q19A. Please compare the current frequency of spotter plane use in the ABT fishery with the frequency of use ten years ago. Was the frequency of use during the 1998 season less than, about the same as, or greater than the frequency of use during the 1988 season?

- 1 less than
- 2 about the same as
- 3 greater than
- 4 don't know

Q20A. In general, would you say that the number of spotter planes used for ABT has been decreasing, has stayed about the same, or has been increasing in recent years?

- 1 decreasing
- 2 stayed the same
- 3 increasing
- 4 don't know

Q21A. Do you feel that the use of spotter planes in the ABT harpoon fishery aids in the size selectivity of fish harvested? By size selectivity we are referring to the ability to selectively remove certain sized fish from the population that will have the least negative impact on the fish stock.

YES
NO
DON'T KNOW

Q22A. In your opinion, does the fishing method of chumming that is used in the ABT fishery change the fishes feeding and surfacing behavior in any way?

YES
NO
DON'T KNOW

Q23A. Are you aware of the National Marine Fisheries Service's proposed rule in 1997 to ban the use of spotter planes in the General bluefin tuna category?

YES
NO

Q24A. Would a ban on spotter planes in only the General ABT Category affect you in any way?

YES
NO

Q25A. Would you care whether or not a ban is placed on spotter planes in just the General category?

YES
NO

Q26A. Would a ban on spotter planes in both the General and Harpoon ABT Categories affect you in any way?

YES

NO

Q27A. Would you care whether or not a ban is placed on spotter planes in both the General and Harpoon ABT Categories?

YES
NO

Q28A. Would you be in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 bluefin tuna season?

4 In Favor
5 Opposed To
6 Don't Know

Q29A. Would you be in favor of or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 bluefin tuna season?

4 In Favor
5 Opposed To
6 Don't Know

Q30A. What effect do you think the presence of bluefin tuna spotter planes has on the likelihood of vessels not using spotter planes to catch bluefin tuna on the same fishing grounds? Does the presence of planes significantly decrease, slightly decrease, not effect, slightly increase or significantly increase the chances of other vessels?

5 significantly decreased likelihood
6 slightly decreased likelihood
7 has no effect on likelihood
8 slightly increased likelihood
5 significantly increased likelihood

Q31A. Do you plan to fish for ABT in the Harpoon category during the 1999 fishing season?

YES
NO *If no, ask*

**Do you plan to fish for ABT in the General category during the 1999 fishing season?
(Y,N,DK)**

Q32A. If there is no ban on the use of spotter planes in 1999, will you try to hire any spotter planes to fish for ABT during the 1999 fishing season?

YES
NO
DON'T KNOW

Q33A. If the use of spotter planes were banned from the Harpoon and General Categories in 1999, which of the following options would you most likely do? (respondent should select just one option from those provided or indicate some other option)

- a) Continue to fish as frequently in the Harpoon category without the aid of planes
- b) Continue to fish in the Harpoon category without the aid of planes but less frequently than in 1998
- c) Continue to fish in the Harpoon category without the aid of planes but more frequently than in 1998

- d) Switch to the General category and fish with harpoon gear only
- e) Switch to the General category and fish with both harpoon and other gears
- g) Not fish for ABT commercially at all
- h) Some other option (please specify) _____

Q34A. If the use of spotter planes were banned from the General category in 1999, please indicate what you expect the impact would be on each of the following :

a) Length of the Harpoon category season?

1 decrease 2 stay about the same 3 increase 4 don't know

b) Length of the General category season?

1 decrease 2 stay about the same 3 increase 4 don't know

c) Your total vessel income from ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

d) Your success rate in catching ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

Q35A. If the use of spotter planes were banned from the General and Harpoon Categories in 1999, please indicate what you expect the impact would be on each of the following :

a) Length of the Harpoon category season?

1 decrease 2 stay about the same 3 increase 4 don't know

b) Length of the General category season ?

1 decrease 2 stay about the same 3 increase 4 don't know

c) Your total vessel income from ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

d) Your success rate in catching ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

Q36A. What was your average cost per day to run your boat on days when you fished for ABT during the 1998 season? Include such things as diesel, oil, bait, ice etc. Please do not include the cost to hire a spotter plane.

\$ _____

Q37A. What proportion of your total 1998 vessel landings value was derived from fishing for ABT in the Harpoon category?

_____ %

Q38A. What was your approximate 1998 total vessel landings value from all fishing, not just ABT?

_____ \$

Q39A. What proportion of your total annual household income in 1998 (before taxes) did you get from commercial fishing in general?

_____ %

Q40A. What proportion of your total annual household income in 1998 (before taxes) did you get from the sale of ABT?

_____ %

Q41A. What was your total annual household income in 1998 before taxes?

\$ _____

That is all the questions we need to ask you. If you have any specific questions about this survey you can contact the principal investigator Dr. David Loomis at (413) 545-6641. Thank you for your time and cooperation.

Harpoon category, Not Using a Plane

Q1B. How many days did you fish for ABT in the Harpoon category during the 1998 season?

_____ Days

Q2B. Next, we would like to know what were some of the main reasons you did not hire a spotter plane to fish for ABT in 1998. Please indicate to what extent you agree or disagree with each of the following as possible reasons for not hiring a spotter plane (interviewer read scale to respondent for each new item):

1= completely disagree 2= somewhat disagree 3=neutral
4=somewhat agree 5= completely agree

Don't need a pilot	1	2	3	4	5
Planes give an unfair advantage to a select few	1	2	3	4	5
Planes are not part of the traditional fishery	1	2	3	4	5
Don't know any spotter pilots	1	2	3	4	5
Pilot not willing to fly for share being offered	1	2	3	4	5
Pilot was not available on days you wanted to hire one	1	2	3	4	5
Spotter pilots do not improve my catch rates enough to be financially advantageous	1	2	3	4	5
Other Reasons (please specify)	1	2	3	4	5

Q3B. To what extent do you believe that it is fair or unfair that some vessels use planes and some do not? Do you think it is: very unfair, somewhat unfair or fair?

- 1** **very unfair**
- 2** **somewhat unfair**
- 3** **fair**

Q4B. On days when you fished for ABT with harpoon in 1998, did you make any indirect use of spotter planes to assist you in locating fish? By "indirect" we mean following planes not hired by your vessel or converging on areas where planes were assisting other vessels.

YES If yes, ask: **On how many days did you indirectly use spotter planes in 1998 ? _____ days (go to Q5B)**

NO (skip to Q6B)

Q5B. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you indirectly used a spotter plane to assist you?

(Interviewer: if number landed is zero don't ask for pounds or value)

Total number of bluefin landed _____
Total pounds of bluefin landed _____
Total value of bluefin landed \$_____

Q6B. What was your total catch during the 1998 season in terms of numbers, pounds and value of ABT on days when you did not indirectly use a spotter plane to assist you?

(Interviewer: if number landed is zero don't ask for pounds or value)

Total number of bluefin landed _____
Total pounds of bluefin landed _____
Total value of bluefin landed \$_____

Q7B. Prior to 1998, had you ever hired a spotter plane to assist you in fishing for ABT?

YES
NO

Q8B. Have you ever fished for ABT in the General Permit Category?

YES
NO

Q9B. Considering the number of vessels either directly working with spotter planes or indirectly following spotter planes, to what extent are you concerned about a collision between vessels pursuing ABT? Would you say you are: not concerned, slightly concerned, somewhat concerned, very concerned, or extremely concerned?

1=not concerned

2=slightly concerned

3=somewhat concerned

4= very concerned

5=extremely concerned

Q10B. Have you heard of or seen any of the following problems in the ABT fishery off of New England:

d) **Physical damage to vessels or fishing gear caused by other vessels where at least one of the vessels was directly using a spotter plane**

YES *if yes, ask* How many incidents did you hear of during the 1998
season? _____
NO

- e) Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane

YES *if yes, ask* On average, how many incidents did you hear of per week during
the 1998 season? _____
NO

- f) Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane

YES *if yes, ask* On average, how many incidents did you hear of per week
during the 1998 season? _____
NO

Q11B. Have you personally been involved with any of the following problems in the ABT fishery off of New England:

- a) Physical damage to vessels or fishing gear caused by other vessels were at least one of the vessels was directly using a spotter plane

YES *if yes, ask* How many incidents have you personally been involved
with during the 1998 season? _____
NO

- d) Verbal confrontations on the water between a vessel directly using a spotter plane and a vessel not directly using a spotter plane

YES *if yes, ask* How many incidents have you personally been involved with
during the entire 1998 season? _____
NO

- e) Territorial behavior over fishing location between a vessel directly using a spotter plane and a vessel not directly using a spotter plane

YES *if yes, ask* How many incidents have you personally been involved
with during the entire 1998 season? _____
NO

Q12B. Have you seen or heard of any rescue efforts of stranded vessels or persons by ABT spotter pilots?

YES

NO

If yes : How many did you see during the 1998 season?

_____ number seen

How many did you heard of during the 1998 season?

_____ number heard about

Q13B. Have you seen or heard of any rescue efforts of marine mammals by ABT spotter pilots?

YES

NO

If yes : How many did you see during the 1998 season?

_____ number seen

How many did you hear of during the 1998 season?

_____ number heard about

Q14B. Please compare the current frequency of spotter plane use in the ABT fishery with the frequency of use ten years ago. Was the frequency of use during the 1998 season less than, about the same as, or greater than the frequency of use during the 1988 season?

- 1 less than
- 2 about the same
- 3 greater than
- 4 don't know

Q15B. In general, would you say that the number of spotter planes used for ABT has been decreasing, has stayed about the same, or has been increasing in recent years?

- 5 decreasing
- 6 stayed the same
- 7 increasing
- 8 don't know

Q16B. Do you feel that the use of spotter planes in the ABT harpoon fishery aids in the size selectivity of fish harvested? By size selectivity we are referring to the ability to selectively remove certain sized fish from the population that will have the least negative impact on the fish stock.

YES

NO

DON'T KNOW

Q17B. In your opinion, does the fishing method of chumming that is used in the ABT fishery change the fishes feeding and surfacing behavior in any way?

YES

NO

DON'T KNOW

Q18B. Are you aware of the National Marine Fisheries Service's proposed rule in 1997 to ban the use of spotter planes in the General bluefin tuna category?

YES
NO

Q19B. Would a ban on spotter planes in only the General ABT Category affect you in any way?

YES
NO

Q20B. Would you care whether or not a ban is placed on spotter planes in just the General category?

YES
NO

Q21B. Would a ban on spotter planes in both the General and Harpoon ABT Categories affect you in any way?

YES
NO

Q22B. Would you care whether or not a ban is placed on spotter planes in both the General and Harpoon ABT Categories?

YES
NO

Q23B. Would you be in favor of or opposed to a rule that bans the use of spotter planes in just the General category for the 1999 bluefin tuna season?

1 In Favor
2 Opposed To
3 Don't Know

Q24B. Would you be in favor of or opposed to a rule that bans the use of spotter planes in both the General and Harpoon Categories for the 1999 bluefin tuna season?

1 In Favor
2 Opposed To
3 Don't Know

Q25B. What effect do you think the presence of bluefin tuna spotter planes has on the likelihood of vessels not using spotter planes to catch bluefin tuna on the same fishing grounds? Does the presence of planes significantly decrease, slightly decrease, not effect, slightly increase or significantly increase the chances of other vessels?

1 significantly decreased likelihood
2 slightly decreased likelihood
3 has no effect on likelihood

- 4 slightly increased likelihood
- 5 significantly increased likelihood

Q26B. Do you plan to fish for ABT in the Harpoon category during the 1999 fishing season?

- YES
- NO *If no, ask*

Do you plan to fish for ABT in the General category during the 1999 fishing season?
(YES NO DON'T KNOW)

Q27B. If there is no ban on the use of spotter planes in 1999, will you try to hire any spotter planes to fish for ABT during the 1999 fishing season?

- YES
- NO
- DON'T KNOW

Q28B. If you had hired a spotter plane every time you fished for ABT in the Harpoon category in 1998, how do you think your annual vessel landings value derived from ABT might have changed? Would it have:

- 6 Decreased significantly
- 7 Deceased slightly
- 8 Stayed about the same
- 9 Increased slightly
- 10 Increased significantly

*If anything other than "Stayed about the same" then ask:
By what percent? _____%*

Q29B. If the use of spotter planes were banned from the General category in 1999, please indicate what you expect the impact would be on each of the following :

- a) Length of the Harpoon category season?
1 decrease 2 stay about the same 3 increase 4 don't know
- b) Length of the General category season?
1 decrease 2 stay about the same 3 increase 4 don't know
- c) Your total vessel income from ABT?
1 decrease 2 stay about the same 3 increase 4 don't know
- d) Your success rate in catching ABT?
1 decrease 2 stay about the same 3 increase 4 don't know

Q30B. If the use of spotter planes were banned from the General and Harpoon Categories in 1999, please indicate what you expect the impact would be on each of the following :

- a) Length of the Harpoon category season?
1 decrease 2 stay about the same 3 increase 4 don't know
- b) Length of the General category season?
1 decrease 2 stay about the same 3 increase 4 don't know

c) Your total vessel income from ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

d) Your success rate in catching ABT?

1 decrease 2 stay about the same 3 increase 4 don't know

Q31B. What was your average cost per day to run your boat on days when you fished for ABT during the 1998 season? Include such things as diesel, oil, bait, ice etc. Please do not include the cost to hire a spotter plane.

\$ _____

Q32B. What proportion of your total 1998 vessel landings value was derived from fishing for ABT in the Harpoon category?

_____ %

Q33B. What was your approximate 1998 total vessel landings value from all fishing, not just ABT?

_____ \$

Q34B. What proportion of your total annual household income in 1998 (before taxes) did you get from commercial fishing in general?

_____ %

Q35B. What proportion of your total annual household income in 1998 (before taxes) did you get from the sale of ABT?

_____ %

Q36B. What was your total annual household income in 1998 before taxes?

\$ _____

That is all the questions we need to ask you.

If you have any specific questions about this survey you can contact the principal investigator Dr. David Loomis at (413) 545-6641.

Thank you for your time and cooperation.

APPENDIX C

Spotter Pilot / Owner Questionnaire

This is _____ calling from Teleforce, may I please speak with _____

Hello, my name is _____ and I'm calling from Teleforce in _____. I'm calling on behalf of researchers from the University of Massachusetts who are conducting a study related to the use of spotter planes in the bluefin tuna fishery. The researchers conducting this study are fisheries survey specialists who have been chosen for their expertise and objectivity on this issue. They are in no way affiliated with any government agency, conservation organization, fishermen's association, or political lobby group. This survey is completely voluntary and your responses will remain completely confidential. If I come to any question that you would prefer not to answer, just let me know and I'll skip over it. Would you be willing to give us about _____ minutes of your time to participate in this important research?

Q1S and Q2S are screeners to determine which questionnaire to administer

Q1S. Did you fly as a spotter pilot during the 1998 season for the purpose of assisting vessels in landing ABT?

Yes
No

Q2S. Are you the owner of an airplane that was flown during the 1998 season for the purpose of assisting vessels in landing ABT?

Yes
No

If Q1S=no and Q2S=no, thank and terminate

If Q1S=yes and Q2S=yes, skip to pilot/owner section Q1A

If Q1S=no and Q2S=yes, skip to owner only section Q1B

If Q1S=yes and Q2S=no, skip to pilot only section Q1C

Pilots Who Own Their Plane

Q1A. Approximately what is the total number of hours you have logged in your lifetime?
_____ hours

Q2A. How many total hours did you spend flying commercially in 1998 for purposes other than spotting fish?
_____ hours

Q3A. Please tell us how many days and hours you flew a spotter plane for the following purposes during the 1998 season?

Spotting for species other than ABT:
how many days _____, how many hours _____

Spotting ABT for Harpoon vessel in Harpoon category:
how many days _____, how many hours _____

Spotting ABT for Harpoon vessel in General category:
how many days _____, how many hours _____

Spotting ABT for Rod and Reel vessel in General category:
how many days _____, how many hours _____

Spotting ABT for Purse Seiners:
how many days _____, how many hours _____

Q4A. How many spotter planes do you own, in whole or in part, that were used in 1998 for the purpose of spotting ABT?
_____ spotter planes owned

Q5A. Considering the plane/planes that you own that was/were used in 1998 for the purpose of spotting ABT, how many total hours were logged in that/each plane in 1998?

_____ Plane #1 : total hours logged 1998
_____ Plane #2 : total hours logged 1998 (if necessary)
_____ Plane #3 : total hours logged 1998 (if necessary)
_____ Plane #4 : total hours logged 1998 (if necessary)

Q6A. Considering the plane/planes that you own that was/were used in 1998 for the purpose of spotting ABT, how many total hours were logged in that/each plane in 1998 while spotting ABT?

_____ Plane #1 : total hours logged 1998 **while spotting ABT**
_____ Plane #2 : total hours logged 1998 **while spotting ABT**
_____ Plane #3 : total hours logged 1998 **while spotting ABT**
_____ Plane #4 : total hours logged 1998 **while spotting ABT**

Q7A. What is the approximate value of the plane/planes that you own that was/were used in 1998 for the purpose of spotting ABT?

Value Plane # 1 _____\$
Value Plane # 2 _____\$
Value Plane # 3 _____\$
Value Plane # 4 _____\$

Q8A. Did you fly any planes in 1998 for the purpose of spotting ABT that you personally did not own?

YES (if yes, go to Q9A)
NO (if no, skip to Q10A)

Q9A. How many total hours did you log while spotting ABT in 1998 flying a plane owned by someone else?

_____ Hours

Q10A. Did any other pilots fly the plane/planes you own during the 1998 season for the purpose of spotting ABT?

YES if yes, ask: **How many pilots?** _____ pilots (go to Q11A.)
NO (if no, skip to Q12A.)

Q11A. How many total hours were logged by other pilots spotting ABT in 1998 flying a plane that you own?

_____ Hours

Q12A. Did you rent or lease for a fixed rate any of the planes that you own to another pilot in 1998 for the purpose of spotting ABT?

YES if yes ask: **What was that rate per hour?** _____\$
What was that rate per day? _____\$

NO

Q13A. Did any of the pilots that flew a plane that you own in 1998 fly for shares of the profit from bluefin tuna sold?

YES if yes ask: **What was the pilot's share of the total?** _____%
What was your share of the total? _____%

NO

Q14A. Please estimate your annual costs to own and operate your plane/planes that was/were used to spot ABT during the 1998 season? This includes everything: fuel, maintenance, registration, payments, and any other expenses.

Annual Costs _____\$

Q15A. Please estimate your average hourly costs to operate your plane/planes that was/were used to spot ABT during the 1998 season? This includes fuel and oil costs.

Average hourly costs _____\$

Q16A. Considering the number of days you were able to fly as a spotter pilot for ABT during the 1998 season, was this amount fewer than the number of days you would have preferred, about the right amount, or more than the number of days you would have preferred?

- 1 Fewer than preferred
- 2 About right
- 3 More than preferred

Q17A. Considering days you did not fly as a spotter pilot for ABT during the 1998 season, how significant were each of the following reasons for not flying. Please rank each as being: not at all important, somewhat important, moderately important, very important, extremely important.

1= not at all important 2=somewhat important 3=moderately important
4=very important 5=extremely important

Weather/wave conditions	1	2	3	4	5
Plane not available/or not in working condition	1	2	3	4	5
Limited demand of spotters by vessels	1	2	3	4	5
Too many spotter pilots	1	2	3	4	5
Not enough financial incentive to fly	1	2	3	4	5
Limited by government regulations	1	2	3	4	5
Other reasons (specify) _____	1	2	3	4	5

Q18A. On a typical day spotting ABT in 1998, how many different vessels do you directly assist at one time? By “directly”, we mean vessels that you were hired by and intentionally assisting in locating ABT. Please respond by fishing category.

In the Harpoon category on a typical day how many different vessels
_____ vessels

In the General category on a typical day how many different vessels
_____ vessels

In the Purse Seine Category on a typical day how many different vessels
_____ vessels

Q19A. How many different vessels in pursuit of ABT did you directly spot for during the entire 1998 season?
_____ vessels

Q20A. When spotting for ABT during the 1998 season, which airports did you use most frequently. Please list the top three and the approximate percent of time each was used for ABT spotting.

Most Used Airport Name _____ City _____ State _____ Percent Used __%
Second Most Used Airport Name _____ City _____ State _____ Percent Used __%
Third Most Used Airport Name _____ City _____ State _____ Percent Used __%

Q21A. When spotting for ABT, do vessels that you are not directly spotting for follow your plane or converge in the vicinity of your plane?

Yes if yes, ask: **On average, how many vessels per day?** _____ vessels

No

Q22A. Considering the number of spotter planes flying in the ABT fishery, to what extent are you concerned about a mid-air collision with another spotter plane? Would you say you are: not concerned, slightly concerned, somewhat concerned, very concerned, or extremely concerned?

1=not concerned

2=slightly concerned

3=somewhat concerned

4= very concerned

5=extremely concerned

Q23A. Please compare the current frequency of spotter plane use in the ABT fishery with the frequency of use ten years ago. Was the frequency of use during the 1998 season less than, about the same as, or greater than the frequency of use during the 1988 season?

- 1 less than
- 5 about the same as
- 6 greater than
- 7 don't know

Q24A. In general, would you say that the number of spotter planes used for ABT has been decreasing, has stayed about the same, or has been increasing in recent years?

- 5 decreasing
- 6 stayed the same
- 7 increasing
- 8 don't know

Q25A. Do you feel that the use of spotter planes in the ABT harpoon fishery aids in the size selectivity of fish harvested? By size selectivity we are referring to the ability to selectively remove certain sized fish from the population that will have the least negative impact on the fish stock.

**YES
NO
DON'T KNOW**

Q26A. In your opinion, does the fishing method of chumming that is used in the ABT fishery change the fishes feeding and surfacing behavior in any way?

**YES
NO
DON'T KNOW**

Q27A. Have you seen or heard of any rescue efforts of stranded vessels or persons by ABT spotter pilots?

YES
NO

If yes : **How many have you seen?**

_____ number seen

How many have you heard about?

_____ number heard about

Q28A. Have you personally assisted in the rescue of any stranded vessels or persons while flying as a spotter pilot for ABT?

YES
NO

If yes : **On how many occasions?**

_____ occasions

Q29A. Have you seen or heard of any rescue efforts of marine mammals by ABT spotter pilots?

YES
NO

If yes : **How many have you seen?**

_____ number seen

How many have you heard of ?

_____ number heard about

Q30A. Have you personally assisted in the rescue of any marine mammals while flying as a spotter pilot for ABT?

YES
NO

If yes : **On how many occasions?** _____ occasions

Q31A. Have you ever collected aerial survey data on bluefin?

YES *If yes ask:* **For whom did you collect this data?** _____

NO

Q32A. If a ban on spotter planes in the ABT fishery reduces the number of hours you can currently fly, would you consider flying as a paid aerial survey data collector if that option were available?

YES

NO
DON'T KNOW

Q33A. Assuming the use of spotter planes is not banned, do you plan to fly as a spotter pilot for ABT during the 1999 fishing season?

YES (if yes, go to Q34A)
NO (if no, skip to Q36A)

Q34A. If spotting ABT is banned in the General category please indicate what your realistic expectation of how this will effect the number of hours you fly in 1999 for the following purposes.

Will your hours flying commercially for purposes other than spotting fish decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly from 1998?

Will your hours flying as a spotter pilot for fish other than ABT decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly 1998?

Will your hours flying as a spotter pilot for ABT in other categories, such as Harpoon or Purse Seine, decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly 1998?

(Interviewer: please record any additional comments made by respondent to any of the questions in 34A)

comments _____

Q35A. If spotting ABT is banned in the General and Harpoon Categories please indicate what your realistic expectation of how this will effect the number of hours you fly in 1999 for the following purposes.

Will your hours flying commercially for purpose other than spotting fish decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly from 1998?

Will your hours flying as a spotter pilot for fish other than ABT decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly from 1998?

Will your hours flying as a spotter pilot for ABT in other categories, such as Purse Seine, decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly from 1998?

(Interviewer: please record any additional comments made by respondent to any of the questions in 35A)
comments _____

Q36A. Do you plan to have other pilots fly a plane that you own to spot ABT during the 1999 fishing season?

YES
NO

Q37A. Are you a member of the Atlantic Fish Spotters Association?

YES
NO

Q38A. Do you work cooperatively with other spotter pilots in the any of the following ways:

Informal sharing of contacts such as vessels that work with spotter pilots? Y, N

Sharing of technical information about spotting including tips, advice, logs, know-how? Y, N

Sharing of information regarding location of fish? Y, N

Sharing of other information when flying such as weather and wave conditions? Y, N

Sharing of other information when flying such as altitude or location of plane for safety reason? Y, N

Q39A. Are you the owner of a boat that was used during the 1998 season for the purpose of landing ABT?

YES
NO

Q40A. When spotting for ABT in 1998 did you get paid a percent share based the value of the bluefin tuna landed?

YES *if yes ask:* **What was your percent of the catch? _____%**
NO

Q41A. What proportion of your total annual household income was derived from spotting ABT in 1998?

_____ %

Q42A. What was your approximate total annual household income before taxes in 1998?

_____ \$

**That is all the questions we need to ask you.
If you have any specific questions about this survey you can contact the principal investigator Dr. David Loomis at (413) 545-6641.
Thank you for your time and cooperation.**

Owner of Plane, but is Not The Pilot

Q1B. How many spotter planes do you own, in whole or in part, that were used in 1998 for the purpose of spotting ABT?

_____ spotter planes owned

Q2B. Considering the plane/planes that you own that was/were used in 1998 for the purpose of spotting ABT, how many total hours were logged in that/each plane in 1998?

_____ Plane #1 : total hours logged 1998
_____ Plane #2 : total hours logged 1998 (if necessary)
_____ Plane #3 : total hours logged 1998 (if necessary)
_____ Plane #4 : total hours logged 1998 (if necessary)

Q3B. Considering the plane/planes that you own that was/were used in 1998 for the purpose of spotting ABT, how many total hours were logged in that/each plane in 1998 while spotting ABT?

_____ Plane #1 : total hours logged 1998 **while spotting ABT**
_____ Plane #2 : total hours logged 1998 **while spotting ABT**
_____ Plane #3 : total hours logged 1998 **while spotting ABT**
_____ Plane #4 : total hours logged 1998 **while spotting ABT**

Q4B. What is the approximate value of the plane/planes that you own that was/were used in 1998 for the purpose of spotting ABT?

Value Plane # 1 _____ \$
Value Plane # 2 _____ \$
Value Plane # 3 _____ \$
Value Plane # 4 _____ \$

Q5B. How many other pilots flew the plane/planes you own during the 1998 season for the purpose of spotting ABT?

_____pilots

Q6B. Did you rent or lease for a fixed rate any of the planes that you own to another pilot in 1998 for the purpose of spotting ABT?

YES if yes ask: What was that rate per hour? _____ \$
What was that rate per day? _____ \$

NO

Q7B. When another pilot flew one of your planes as a spotter for ABT in 1998 did you get paid a percent share based the value of the bluefin tuna landed?

YES if yes ask: What was your percent of the catch? _____ %
NO

Q8B. Please estimate your annual costs to own and operate your plane/planes that was/were used to spot ABT during the 1998 season? This includes everything: fuel, maintenance, registration, payments, and any other expenses.

Annual Costs _____ \$

Q9B. Please estimate your average hourly costs to operate your plane/planes that was/were used to spot ABT during the 1998 season? This includes fuel and oil costs.

Average hourly costs _____\$

Q10B. Assuming the use of spotter planes is not banned, do you plan to have other pilots fly a plane that you own to spot ABT during the 1999 fishing season?

YES
NO

Q11B. Which airports did the pilots flying your plane/planes for the purpose of spotting Atlantic bluefin use most frequently. Please list the top three and the approximate percent of time each was used for ABT spotting.

Most Used Airport Name _____ City _____ State _____ Percent Used __%

Second Most Used Airport Name _____ City _____ State _____ Percent Used __%

Third Most Used Airport Name _____ City _____ State _____ Percent Used __%

Q12B. Have any of the planes that you own ever been used to assist in the collection aerial survey data on bluefin tuna?

YES *If yes ask: For whom did you collect this data? _____*
NO

Q13B. Would you consider hiring pilots to fly your planes as paid bluefin tuna aerial survey data collectors if that option were available?

YES
NO
DON'T KNOW

Q14B. Are you the owner of boat that was used during the 1998 season for the purpose of landing ABT?

YES
NO

That is all the questions we need to ask you.

If you have any specific questions about this survey you can contact the principal investigator Dr. David Loomis at (413) 545-6641.

Thank you for your time and cooperation.

Pilot, But is Not The Owner of the Plane

Q1C. Approximately what is the total number of hours you have logged in your lifetime?

_____ hours

Q2C. How many total hours did you spend flying commercially in 1998 for purposes other than spotting fish?

_____ hours

Q3C. Please tell us how many days and hours you flew a spotter plane for the following purposes during the 1998 season?

Spotting for species other than ABT:

how many days ____, how many hours ____

Spotting ABT for Harpoon vessel in Harpoon category:

how many days ____, how many hours ____

Spotting ABT for Harpoon vessel in General category:

how many days ____, how many hours ____

Spotting ABT for Rod and Reel vessel in General category:

how many days ____, how many hours ____

Spotting ABT for Purse Seiners:

how many days ____, how many hours ____

Q4C. How many different owners did you fly for during the 1998 season for the purpose of spotting ABT?

_____ Owners

Q5C. Considering the number of days you were able to fly as a spotter pilot for ABT during the 1998 season, was this amount fewer than the number of days you would have preferred, about the right amount, or more than the number of days you would have preferred?

1 *Fewer than preferred*

2 *About right*

3 *More than preferred*

Q6C. Considering days you did not fly as a spotter pilot for ABT during the 1998 season, how significant were each of the following reasons for not flying. Please rank each as being: not at all important, somewhat important, moderately important, very important, extremely important.

1= not at all important 2=somewhat important 3=moderately important
4=very important 5=extremely important

	1	2	3	4	5
Weather/wave conditions					
Plane not available/or not in working condition	1	2	3	4	5
Limited demand of spotters by vessels	1	2	3	4	5
Too many spotter pilots	1	2	3	4	5
Not enough financial incentive to fly	1	2	3	4	5
Limited by government regulations	1	2	3	4	5
Other reasons (specify) _____	1	2	3	4	5

Q7C. On a typical day spotting ABT in 1998, how many different vessels do you directly assist at one time? By "directly", we mean vessels that you were hired by and intentionally assisting in locating ABT. Please respond by fishing category.

In the Harpoon category on a typical day how many different vessels
_____ vessels

In the General category on a typical day how many different vessels
_____ vessels

In the Purse Seine Category on a typical day how many different vessels
_____ vessels

Q8C. How many different vessels in pursuit of ABT did you directly spot for during the entire 1998 season?

_____ vessels

Q9C. When spotting for ABT during the 1998 season, which airports did you use most frequently. Please list the top three and the approximate percent of time each was used for ABT spotting.

Most Used Airport Name _____ City _____ State _____ Percent Used ___%

Second Most Used Airport Name _____ City _____ State _____ Percent Used ___%

Third Most Used Airport Name _____ City _____ State _____ Percent Used ___%

Q10C. When spotting for ABT, do vessels that you are not directly spotting for follow your plane or converge in the vicinity of your plane?

Yes if yes, ask: **On average, how many vessels per days?** _____ vessels

No

Q11C. Considering the number of spotter planes flying in the ABT fishery, to what extent are you concerned about a mid-air collision with another spotter plane? Would you say you are: not concerned, slightly concerned, somewhat concerned, very concerned, or extremely concerned?

1=not concerned

2=slightly concerned

3=somewhat concerned

4= very concerned

5=extremely concerned

Q12C. Please compare the current frequency of spotter plane use in the ABT fishery with the frequency of use ten years ago. Was the frequency of use during the 1998 season less than, about the same as, or greater than the frequency of use during the 1988 season?

- 1 less than
- 8 about the same as
- 9 greater than
- 10 don't know

Q13C. In general, would you say that the number of spotter planes used for ABT has been decreasing, has stayed about the same, or has been increasing in recent years?

- 9 decreasing
- 10 stayed the same
- 11 increasing
- 12 don't know

Q14C. Do you feel that the use of spotter planes in the ABT harpoon fishery aids in the size selectivity of fish harvested? By size selectivity we are referring to the ability to selectively remove certain sized fish from the population that will have the least negative impact on the fish stock.

- YES**
- NO**
- DON'T KNOW**

Q15C. In your opinion, does the fishing method of chumming that is used in the ABT fishery change the fishes feeding and surfacing behavior in any way?

- YES**
- NO**
- DON'T KNOW**

Q16C. Have you seen or heard of any rescue efforts of stranded vessels or persons by ABT spotter pilots?

YES
NO

If yes : **How many have you seen?**

_____ number seen

How many have you heard of ?

_____ number heard about

Q17C. Have you personally assisted in the rescue of any stranded vessels or persons while flying as a spotter pilot for ABT?

YES
NO

If yes : **On how many occasions?**

_____ occasions

Q18C. Have you seen or heard of any rescue efforts of marine mammals by ABT spotter pilots?

YES
NO

If yes : **How many have you seen?**

_____ number seen

How many have you heard of ?

_____ number heard about

Q19C. Have you personally assisted in the rescue of any marine mammals while flying as a spotter pilot for ABT?

YES
NO

If yes : **On how many occasions?**

_____ occasions

Q20C. Have you ever collected aerial survey data on bluefin tuna?

YES *If yes ask:* **For whom did you collect this data?** _____

NO

Q21C. If a ban on spotter planes in the ABT fishery reduces the number of hours you can currently fly, would you consider flying as a paid aerial survey data collector if that option were available?

YES

NO
DON'T KNOW

Q22C. Assuming the use of spotter planes is not banned, do you plan to fly as a spotter pilot for ABT during the 1999 fishing season?

YES (if yes, go to Q23C)
NO (if no, skip to Q25C)

Q23C. If spotting ABT is banned in the General category please indicate what your realistic expectation of how this will effect the number of hours you fly in 1999 for the following purposes.

Will your hours flying commercially for purpose other than spotting fish decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly from 1998?

Will your hours flying as a spotter pilot for fish other than ABT decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly 1998?

Will your hours flying as a spotter pilot for ABT in other categories, such as Harpoon or Purse Seine, decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly 1998?

(Interviewer: please record any additional comments made by respondent to any of the questions in 23C)
comments _____

Q24C. If spotting ABT is banned in the General and Harpoon Categories please indicate what your realistic expectation of how this will effect the number of hours you fly in 1999 for the following purposes.

Will your hours flying commercially for purpose other than spotting fish decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly from 1998?

Will your hours flying as a spotter pilot for fish other than ABT decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly from 1998?

Will your hours flying as a spotter pilot for ABT in other categories, such as Purse Seine, decrease significantly, decrease slightly, stay the same, increase slightly, increase significantly from 1998?

(Interviewer: please record any additional comments made by respondent to any of the questions in 24C)
comments _____

Q25C. Are you a member of the Atlantic Fish Spotters Association?

YES
NO

Q26C. Do you work cooperatively with other spotter pilots in the any of the following ways:

Informal sharing of contacts such as vessels that work with spotter pilots? Y, N

Sharing of technical information about spotting including tips, advice, logs, know-how? Y, N

Sharing of information regarding location of fish? Y, N

Sharing of other information when flying such as weather and wave conditions? Y, N

Sharing of other information when flying such as altitude or location of plane for safety reason? Y, N

Q27C. Are you the owner of boat that was used during the 1998 season for the purpose of landing ABT?

YES
NO

Q28C. What proportion of the total airplane costs are you responsible for?

_____ %

Q29C. When spotting for ABT in 1998 did you get paid a percent share based the value of the bluefin tuna landed?

YES *if yes ask:* What was your percent of the catch? _____ %
NO

Q30C. What proportion of your total annual household income was derived from spotting ABT in 1998?

_____ %

Q31C. What was your approximate total annual household income before taxes in 1998?

_____ \$

That is all the questions we need to ask you.

If you have any specific questions about this survey you can contact the principal investigator Dr. David Loomis at (413) 545-6641.

Thank you for your time and cooperation.