Appendix III

Category B (regular)

DAS Pilot Program

FY 2004/FY 2005

Groundfish Plan Development Team

This report summarizes the first three quarters of the Category B (regular) DAS Pilot Project, as data was not available for the final quarter when it was prepared.

Category B (regular) DAS Trips

A total of 600 trips were taken in the Category B (regular) DAS pilot program from November 2004 through July 2005 (Table 1). Trips were evenly distributed throughout the three quarters: Nov-Jan (31%), Feb05-April 05 (36%) and May-July 05 (33%). Most trips (459) were taken on Multispecies (77%) and 141 were taken for monkfish (24%) on a Multispecies DAS. Trips for Multispecies appeared to be distributed uniformly across quarters: Nov-Jan (36%), Feb05-April 05 (38%) and May-July 05 (26%). Monkfish trips were not distributed uniformly with 56% of the total monkfish trips were taken in May-July 05 quarter.

Table 1 - Total number of B (regular) DAS trips by quarter

Number of B (regular) DAS trips for Northeast multispecies				
Quarter	Nov04-Jan 05	Feb 05-April 05	May 05-July 05	Total Nov 04-July 05
Total trips	164	175	120	459
Observed trips	49	77	37	163
% of trips observed	30%	44%	31%	36%
Number of B (regular) DAS trips for Monkfish using multispecies DAS				
Total trips	24	38	79	141
Observed trips	9	18	11	38
% of trips observed	38%	47%	14%	27%
Total number of B (regular) DAS trips				
Total trips	188	213	199	600
Observed trips	58	95	48	201
% of trips observed	31%	45%	24%	34%
% of total trips for multispecies	87%	82%	60%	77%
% of total trips for Monkfish	13%	18%	40%	24%

DAS usage

A total of 2,021 B (regular) DAS was used in the pilot B (regular) DAS program (Table 2). B (regular)-DAS usage was similar in Nov 04-Jan 05 (600 DAS) and Feb 05-April 05 (521 DAS) period but was higher in May05-July 05 (900 DAS).

Table 2 - Distribution of B DAS used in the pilot B (regular) DAS program

	Nov04-Jan 05	Feb 05-April 05	May 05-July 05	Nov 04-July 05
B (regular) DAS	600	521	900	2021
% of total B (regular) DAS	30%	26%	45%	

Overall, 34% of the B (regular) DAS trips were observed with 36% coverage of Multispecies trips and 27% coverage of Monkfish trips. The percentage of total trips observed by quarter ranged from 24% to 45%.

Catches on a B DAS

Total catches taken on a B (regular) DAS pilot program is listed by species in Table 3. These data are based on match between dealer data and VMS trip data in the DAS database. Estimated catch is dealer reported live lbs adjusted plus discards (stocks of concern) and adjusted by 15% for unmatched trips. Six species accounted for approximately 85% of the total catch: skates (21%), monkfish (16%), haddock (15%), yellowtail (13%) winter skate (11%) and winter flounder (9%).

Table 3 - Estimated catch (live pounds) from B (regular)-DAS pilot program for unflipped trips. Catch includes discards for cod, haddock, yellowtail, American Plaice, winter flounder, witch flounder, and white hake.

species	Multispecies	Multispecies/monkfish	total catch
SKATES	2,111,637	696,145	2,807,782
MONKFISH	1,768,599	472,597	2,241,195
HADDOCK	1,955,847	81,496	2,037,343
YELLOWTAIL FLOUNDER	1,702,956	282	1,703,238
WINTER SKATE	997,125	568,019	1,565,144
WINTER FLOUNDER	1,258,213	5,810	1,264,023
POLLOCK	711,855	27,644	739,500
SUMMER FLOUNDER (FLUKE)	132,970	140,836	273,806
SEA SCALLOP	232,619	7,721	240,340
COD	196,203	1,380	197,583
LOBSTER	132,962	261	133,223
OCEAN REDFISH	129,212	2,796	132,007
WITCH FLOUNDER (GRAY SOLE)	84,851	1,107	85,958
AMERICAN PLAICE (DAB)	73,980	329	74,310
WHITE HAKE	63,028	267	63,296
WINDOWPANE	28,940	0	28,940
HORSESHOE CRAB	0	7,412	7,412
ATLANTIC WOLFFISH	5,520	0	5,520
CUSK	5,084	21	5,104
THORNY SKATE	2,258	89	2,347
CHAIN DOGFISH	1,052	0	1,052
ATLANTIC HALIBUT	817	0	817
BLUEFISH	458	200	658
TILEFISH,UNC	81	0	81
TILEFISH (GOLDEN TILEFISH)	52	0	52
TAUTOG	0	16	16
FISH, OTHER	0	12	12
LONG FINNED SQUID (LOLIGO)	2	0	2
total	11,596,321	2,014,439	13,610,760

Flipping rates

Overall, 37% of all trips were flipped from a B (regular)-DAS to an A-DAS (Table 4). Flipping rates on observed trips (46% flipped, 90% CI= 405-52%) were higher than non-observed trips (32% flipped, 90% CI=28%-36%) during the entire Nov-July time period (Table 5 and

Table 6). The observed flipping rate was higher for observed trips than non-observed trips in every quarter. A contingency table analysis indicates that flipping rate was not independent of whether a trip was observed or not for the Nov-July data set (N=535 trips, P<0.0014) and November-January period (N=128, P=0.036). The flipping rate was substantially higher for observed than non-observed in May-July period (N-206, P=.058). The flipping rate in February-April period (N=201, P=.20) was not statistically significantly. See attachment 1 for details of this analysis.

Note that the PDT conducted a preliminary analysis comparing the flipping rate on observed trips and unobserved trips for three areas (open area, eastern area and western area) on a quarterly basis. In addition, the trips were divided into Multispecies and Monkfish/Multispecies. In this analysis, only significant difference was found in the Western Area in November-January for Multispecies trips. However, sample sizes for analyses conducted at this scale of resolution suggest that these tests lack statistical power to detect differences.

Overall, the available data suggests that flipping rates during the multispecies B-DAS reported from Nov-2004 to July 2005 were not independent of whether an observer is present on the trip. Further, the effect of having an observer onboard increased the observed flipping rate by a substantial amount in November-January and May-July period and a moderate amount in the February-April period.

Table 4 - Distribution of flipped and non-flipped trips for all trips.

	Total trips			
	Nov04-Jan 05	Feb 05-April 05	May 05-July 05	Total Nov 04-July 05
Number trips flipped	28	95	75	198
Trips not flipped	100	106	131	337
Total trips	128	201	206	535
% Flipped	21.9%	47.3%	36.4%	37.0%

Table 5 - Distribution of flipped and non-flipped trips for non-observed trips.

	Non-observed trips			
	Nov04-Jan 05	Feb 05-April 05	May 05-July 05	Total Nov 04-July 05
Number trips flipped	13	46	50	109
Trips not flipped	68	61	103	232
Total trips	81	107	153	341
% Flipped	16.0%	43.0%	32.7%	32.0%

Table 6 - Distribution of flipped and non-flipped trips for observed trips.

	Observed trips			
	Nov04-Jan 05	Feb 05-April 05	May 05-July 05	Total Nov 04-July 05
Number trips flipped	15	49	25	89
Trips not flipped	32	45	28	105
Total trips	47	94	53	194
% Flipped	31.9%	52.1%	47.2%	45.9%

Description of catch on flipped trips.

A total of 198 trips were flipped from an B-regular DAS to an A-DAS. The distribution of flipped trips and overages by stock of concern for a 182 flipped trips are shown in

Table 7. Flipped trips were highest in February-April period with 101 trips and lowest in November 2004-January 2005 with 16 trips. Overall overage totaled 773,904 lb with nearly 95% of the overages occurring in the February-July period. Total overages by species were GB cod (423, 017 lb), witch flounder (163,511 lb) white hake (76,188 lb), American Plaice (54,164 lb), SNE-MA winter flounder (48,444 lb), GOM cod (6,224) and SNE-MA yellowtail (2,356 lb).

Table 7 - Number of flipped trips and total overages for stocks of concern by quarter.

Stock	Nov 2004-Jan 2005	Feb-April 2005	May-July 05	Total Nov-July
GB cod	8 (20,616 lb)	46 (291,134 lb)	27 (111,267 lb)	81 (423,017 lb)
witch flounder	5 (5,850 lb)	35 (124,355 lb)	14 (33,306 lb)	54 (163,511 lb)
white Hake	3 (8,337 lb)	7 (13,972 lb)	7 (53,879 lb)	17 (76,188 lb)
American plaice		11 (15,741 lb)	11 (38,423 lb)	22 (54,164 lb)
SNE-MA winter fld			4 (48,444 lb)	4 (48,444 lb)
GOM cod		2 (6,224 lb)		2 (6,224 lb)
SNE_MA yellowtail			2 (2,356 lb)	2 (2,356 lb)
Total	16 (34,803 lb)	101 (451,426 lb)	65 (287,675 lb)	182 (773,904 lb)

Landing stocks of concern exceeding the trip limit on unflipped trips.
In addition to flipped trips, several vessels ended trips on a B (regular) DAS but landed overages of stocks of concern (Table 8). Note that these trips may not be unique: overages of multiple species may have occurred on a single trip. These trips should have been flipped to A-DAS trips. Overall, overages of Georges Bank cod were most frequent (23 trips) followed by witch flounder.

Table 8 - Overages of stocks of concern for trips that ended on a B DAS (unflipped trips). Note that trips may have an overage for more than one stock.

Stock	Total overage (lb)	Average overage (lb0	Trips with overage by species
GB cod	12,126	527	23
American Plaice	1,465	183	8
Winter Flounder	3,110	3,110	1
Witch Flounder	4,217	422	10
SNE yellowtail	2,755	1,378	2
White hake	3,595	514	7

Catches of stocks of concern compared with incidental TAC.
The catch for stocks of concern compared with the quarterly incidental TAC is shown in Table 9. The incidental TAC for cod was exceeded in the May-July 2005 quarter and a relatively high percentage of the incidental cod TAC was taken in Nov-Jan (55%) and February-April (95%). With the exception of Georges Bank cod , catches of species of concern remained below 50% in each quarter.

Table 9 - Catch of stocks of concern taken in the B (regular) DAS pilot program compared with incidental TAC in the November 2004-July 2005 period.

Stock	Nov 2004 – Jan 2005		Feb – April 2005		May – July 2005	
	Catch (lb)	% of TAC	Catch (lb)	% of TAC	Catch (lb)	% of TAC
GB cod	31,587	55	54,842	95	92,453	131
Plaice	14,683	7	26,342	13	30,635	15
SNE/MA winter	1,096	1	30,363	19	3,446	2
Witch	15,681	5	28,207	10	35,180	9
CC/GOM yellowtail	0	0	40	0	0	0
SNE/MA yellowtail	0	0	2,614	7	1,013	1
White hake	9,392	11	21,932	26	28,619	34
GOM cod	31	< 1	2,585	2	1,065	1

Attachment 1: Analyses of differences in flipping rates between observed and non-observed multispecies B DAS trips during Nov-2004 to Jul-2005

The question was raised whether there were significant differences between the observed flipping rates for B DAS fishing trips that were observed and not observed. In particular, this question came up at the last Groundfish PDT conference call on 3-October-2005. To address this question, the overall and quarterly total number of flipped versus non-flipped trips (see the file: Table III Flipping Rates.xls) were put into 2x2 contingency tables below for analyses. The raw data are shown in Table 1 below on the left. If the occurrence of a flipped trip was independent of an at-sea observer being present, then the expected number of flipped trips that would be the product of the probability of an observed trip times the probability of a flipped trip times the total sample size. These expected values are shown in Table 1 below on the right. For example, using the Nov-Jul raw data, the expected number of flipped and observed trips would be 72 = (194/535)*(198/535)*535.

There are several ways to test for independence of the two factors. Since the marginal total is fixed for the number of observed trips (the number of observed trips was set a priori) but the marginal total for the number of flipped trips was not (the number of flipped trips depended on fish catch amount and compliance), a recommended test for independence is the G-statistic (a.k.a., likelihood ratio test, see for example, Chapter 17 in Sokal and Rohlf. Biometry. 2nd Ed. Freeman and Co., NY). Chi-square and Fisher's exact test may also be used to evaluate the assumption of independence. However, the use of Fisher's exact test is not usually recommended in this case since the marginal total number of flipped trips is not set a priori (e.g., the number of flipped trips depends on both fish catch and fishermen's behavior which are not controllable in an experimental context). Nonetheless, this is a minor point since the likelihood ratio and Fisher's test generally produce similar inferences in practice.

The hypothesis that flipping and observation were independent was tested at the α=0.10 confidence level for the entire set of multispecies trips (Nov-Jul) as well as the quarterly totals (Nov-Jan, Feb-Apr, and May-Jul). At this confidence level, one would expect to see larger deviations than those observed roughly 1 out of 10 times due to chance alone. Computer output from SAS v8 contingency table analyses are shown below.

Table 1. Observed and expected counts of flipped trips by quarter.

Observed Counts of Flipped Trips by Quarter
Raw Data Derived from "Final" Spreadsheet Percentages

Observed Multispecies/Nov-Jul

	Observed	Not Observed	Marginal Totals
Flipped	89	109	198
Not Flipped	105	232	337
Marginal Totals	194	341	535

Observed Multispecies/Nov-Jan

	Observed	Not Observed	Marginal Totals
Flipped	15	13	28
Not Flipped	32	68	100
Marginal Totals	47	81	128

Observed Multispecies/Feb-Apr

	Observed	Not Observed	Marginal Totals
Flipped	49	46	95
Not Flipped	45	61	106
Marginal Totals	94	107	201

Observed Multispecies/May-Jul

	Observed	Not Observed	Marginal Totals
Flipped	25	50	75
Not Flipped	28	103	131
Marginal Totals	53	153	206

Expected Trip Counts Assuming Independence of Trip Flip Rate and Observation

Expected Multispecies/Nov-Jul

	Observed	Not Observed	Marginal Totals
Flipped	72	126	198
Not Flipped	122	215	337
Marginal Totals	194	341	535

Expected Multispecies/Nov-Jan

	Observed	Not Observed	Marginal Totals
Flipped	10	18	28
Not Flipped	37	63	100
Marginal Totals	47	81	128

Expected Multispecies/Feb-Apr

	Observed	Not Observed	Marginal Totals
Flipped	44	51	95
Not Flipped	50	56	106
Marginal Totals	94	107	201

Expected Multispecies/May-Jul

	Observed	Not Observed	Marginal Totals
Flipped	19	56	75
Not Flipped	34	97	131
Marginal Totals	53	153	206

For the entire set of multispecies trips the hypothesis of independence was rejected (Table 2, Likelihood Ratio Chi-Square Test, P<0.01) at the 10% significant level. The evidence indicates that the processes of having a trip flipped and observing a trip are dependent. That is, having an observer onboard affects the flipping rate. In particular, the proportion of observed trips that were flipped was 46% with an 90% confidence interval of (40%, 52%). In contrast, the proportion of non-observed trips that were flipped was 32% with an 90% confidence interval of (28%, 36%). This shows that the flipping rate was substantially higher on observed trips (+14%) when all multispecies B DAS trips (Nov-Jul) are considered.

Table 2. Contingency Table Analysis of Multispecies Overall (Nov-Jul) Trip Flipping Rates 1

Null hypothesis: Observed flipping rate is independent of at-sea observation

14:48 Wednesday, October 5, 2005

The FREQ Procedure

Table of a by b

a(FLIPPED TRIP) b(OBSERVED TRIP)

Frequency | YES	NO	Total
YES	89	109	198
NO	105	232	337
Total	194	341	535

Statistics for Table of a by b

Statistic	DF	Value	Prob
Chi-Square	1	10.2651	0.0014
Likelihood Ratio Chi-Square	1	10.1719	0.0014
Continuity Adj. Chi-Square	1	9.6770	0.0019
Mantel-Haenszel Chi-Square	1	10.2459	0.0014
Phi Coefficient		0.1385	
Contingency Coefficient		0.1372	
Cramer's V		0.1385	

Fisher's Exact Test

Cell (1,1) Frequency (F)	89
Left-sided Pr <= F	0.9995
Right-sided Pr >= F	9.732E-04
Table Probability (P)	4.601E-04
Two-sided Pr <= P	0.0015

Sample Size = 535

For the quarter 3 multispecies trips (Nov-Jan) the hypothesis of independence was also rejected (Table 3, P<0.05). Again, the conclusion based on the available data is that the processes of having a trip flipped and observing a trip are dependent. Since the proportion of observed quarter 3 trips that were flipped was 32% with a 90% confidence interval of (21%, 44%) and the proportion of non-observed trips that were flipped was 16% with a 90% confidence interval of (10%, 24%), it is apparent that the flipping rate was 2-fold higher on observed quarter 3 trips.

Table 3. Contingency Table Analysis of Multispecies Q3 (Nov-Jan) Trip Flipping Rates

Null hypothesis: Observed flipping rate is independent of at-sea observation

14:48 Wednesday, October 5, 2005

The FREQ Procedure

Table of a by b

a(FLIPPED TRIP) b(OBSERVED TRIP)

Frequency | YES	NO	Total
YES	15	13	28
NO	32	68	100
Total	47	81	128

Statistics for Table of a by b

Statistic	DF	Value	Prob
Chi-Square	1	4.3807	0.0363
Likelihood Ratio Chi-Square	1	4.2580	0.0391
Continuity Adj. Chi-Square	1	3.5015	0.0613
Mantel-Haenszel Chi-Square	1	4.3465	0.0371
Phi Coefficient		0.1850	
Contingency Coefficient		0.1819	
Cramer's V		0.1850	

Fisher's Exact Test

Cell (1,1) Frequency (F)	15
Left-sided Pr <= F	0.9889
Right-sided Pr >= F	0.0319
Table Probability (P)	0.0208
Two-sided Pr <= P	0.0465

Sample Size = 128

For the quarter 4 multispecies trips (Feb-Apr) the hypothesis of independence could not be rejected (Table 4, P=0.20) at the 10% confidence level. Further, the proportion of observed quarter 4 trips that were flipped was 52% with a 90% confidence interval of (43%, 61%) while the proportion of non-observed trips that were flipped was 43% with a 90% confidence interval of (35%, 51%). In this case, either there was no significant difference in flipping rates or there was insufficient power to detect a difference due to small sample size. Given the similarity in sample sizes between quarters 1, 3, and 4, it seems more likely that the flipping rates were not statistically different between observed and non-observed trips in quarter 4 although the observed flipping rate was somewhat higher (+9%).

Table 4. Contingency Table Analysis of Multispecies Q4 (Feb-Apr) Trip Flipping Rates 3

Null hypothesis: Observed flipping rate is independent of at-sea observation

14:48 Wednesday, October 5, 2005
The FREQ Procedure

Table of a by b

a(FLIPPED TRIP) b(OBSERVED TRIP)

Frequency	YES	NO	Total
YES	49	46	95
NO	45	61	106
Total	94	107	201

Statistics for Table of a by b

Statistic	DF	Value	Prob
Chi-Square	1	1.6760	0.1955
Likelihood Ratio Chi-Square	1	1.6777	0.1952
Continuity Adj. Chi-Square	1	1.3295	0.2489
Mantel-Haenszel Chi-Square	1	1.6677	0.1966
Phi Coefficient		0.0913	
Contingency Coefficient		0.0909	
Cramer's V		0.0913	

Fisher's Exact Test

Cell (1,1) Frequency (F)	49
Left-sided Pr <= F	0.9246
Right-sided Pr >= F	0.1244
Table Probability (P)	0.0490
Two-sided Pr <= P	0.2058

Sample Size = 201

For the quarter 1 multispecies trips (May-Jul) the hypothesis of independence was also rejected (Table 5, P=0.06) at the 10% confidence level. Similar to quarter 3, the evidence indicates that the processes of having a trip flipped and observing a trip are dependent. Further, since the proportion of observed quarter 3 trips that were flipped was 47% with a 90% confidence interval of (35%, 59%) and the proportion of non-observed trips that were flipped was 33% with a 90% confidence interval of (27%, 39%), it is apparent that the flipping rate was substantially higher (+14%) on observed quarter 3 trips.

Table 5. Contingency Table Analysis of Multispecies Q1 (May-Jul) Trip Flipping Rates 4

Null hypothesis: Observed flipping rate is independent of at-sea observation

14:48 Wednesday, October 5, 2005

The FREQ Procedure

Table of a by b

a(FLIPPED TRIP) b(OBSERVED TRIP)

Frequency | YES	NO	Total
YES	25	50	75
NO	28	103	131
Total	53	153	206

Statistics for Table of a by b

Statistic	DF	Value	Prob
Chi-Square	1	3.5698	0.0588
Likelihood Ratio Chi-Square	1	3.4988	0.0614
Continuity Adj. Chi-Square	1	2.9714	0.0847
Mantel-Haenszel Chi-Square	1	3.5525	0.0595
Phi Coefficient		0.1316	
Contingency Coefficient		0.1305	
Cramer's V		0.1316	

Fisher's Exact Test

Cell (1,1) Frequency (F)	25
Left-sided Pr <= F	0.9793
Right-sided Pr >= F	0.0433
Table Probability (P)	0.0226
Two-sided Pr <= P	0.0691

Sample Size = 206

Conclusions

Overall, the available data suggest that flipping rates during multispecies B DAS reported from Nov-2004 to Jul-2005 were not independent of whether there is an observer onboard. Further, the effect of having an observer onboard increased the observed flipping rate by a substantial amount in quarters 1 and 3 and by a moderate amount in quarter 4. These conclusions are robust to using either the likelihood ratio chi-square or Fisher's exact test for inference.