

False Killer Whale TRT – Data Analysis/Mining Work Group

Teleconference #1

March 8, 2010

Attendees:

Andy Read, Sharon Young, Robin Baird, Tory O’Connell, Ryan Steen, Karin Forney, Erin Oleson, Jamie Marchetti, Michael Marsik, Don Kobayashi, Scott McCreary, Nancy Young

A. Review of available observer data

- Work Group (WG) received several documents by email including:
 - Marine mammal biological data forms - completed observer forms from FKW and unidentified cetacean (UC) interactions with the longline fisheries;
 - Blank observer data forms and observer manual, indicating all of the variables and types of data that are collected by the observer program; and
 - Database fields spreadsheet containing a list of data fields in the current observer database that Karin used for the preliminary TRT analyses, and a list of species codes used in the database
- Jamie Marchetti confirmed that sets are almost always hauled from the end where the fishermen left off.
- Preparation and release of “scrubbed” datasets likely infeasible due to time constraints, because each scrubbing of the dataset (to aggregate confidential data) would need to be tailored to the question of interest.

B. Summary of tasks/analyses completed to date

Karin Forney prepared and distributed a handout (Attachment 1) with background materials and summaries of additional analyses and processing completed by Michael Marsik, Jamie Marchetti, and Karin Forney since the first TRT meeting. The WG discussed each of the six tasks/analyses listed in the handout.

1. Examination of hook type records and mixed hook type trips

- Errors in recording types/sizes/offsets from observer and manufacturer differences mean that hook type, as currently recorded in the database, cannot be used with any degree of certainty
- Several hook type grouping may be appropriate:
 - J-hook (combining 8/0 and 9/0)
 - Tuna hook (combining 3.8 and 3.6mm sizes), with potential to split into offset tuna hook and non-offset tuna hook
 - Large circle hook (18/0, required in shallow-set fleet)
 - Medium circle hooks (combine 14/0, 15/0, and 16/0; used by deep-set fleet only)
 - Possible “other” hook type category; unclear at present what is in this category in observer database, few sets used this code
- Karin will re-code hook type in the database to the above 4 or 5 categories/bins after Michael Marsik and Jamie Marchetti have finished evaluating hook type records, and will re-run the analysis for the 2nd TRT meeting
- Don Kobayashi confirmed logbooks do not record hook type
- The potential effect of the use of a swivel or ring was discussed; Michael Marsik stated that the presence of a ring on a hook is not recorded by observers, and swivels are not used in

these fisheries. The use of a ring appears to be relatively new to the fishery, but it would be good to confirm this with fishing representatives (see below).

- Examination of proportion of mixed hooks versus single hook type in deep-set trips is ongoing, and results will be reported to WG and full TRT
- Shallow sets are single hook, with required use of 18/0 circle hooks
- Hooks by different manufacturers have different characteristics; need to ask fishermen whether there has been a change in the use of hooks by different manufacturers over time;
- Ryan Steen has not heard from fishermen that there has been a switch in hook manufacturers, but agrees we should pose this question
- Weak hooks – Ryan Steen forwarded reports on weak hook experiments to HLA and is working to obtain information on the practicality of implementing weak hooks in the fisheries

2. Plots of cetacean take locations by year and fishery

- Increase in FKW takes in 2009 occur mainly at northern edge – might be due to increased fishing effort there (need to evaluate this)
- Inter-annual trend in interactions with shallow-set fishery appears to be more variable
- A question was raised about whether the take pattern and observed effort are representative of total effort. Karin responded that deep-set observer coverage may be lower in quarter 1 due to the ramping up of shallow-set fishery (which requires 100% coverage), but even 15% coverage for the deep-set fishery is still relatively good; procedures are in place for assigning observer coverage to ensure observed deep-set trips are as representative as possible of total the fishery

3. Depredation and bycatch data for FKWs and for FKWs & blackfish only

(August 2003 - December 2009, excluding vessels during/after experiments)

- Table has been updated from the one presented at the TRT meeting to include all 2009 data
- By including only FKWs and blackfish, the differences between sets with and without depredation were more disparate than before, because other cetaceans, which likely weren't depredating, were excluded
 - Strengthens the case that most takes are occurring during depredation
- Many blackfish interactions occurred in sets without depredation, but it is possible that there was depredation without evidence thereof (i.e., whole fish were removed from the hooks)

4. Vessel effects

- Karin found a few “outlier” vessels with much higher or much lower depredation and/or bycatch rates; Karin will continue this analysis ahead of the next WG calls and TRT meeting
- Data confidentiality may be an issue, particularly for vessels with very low bycatch rates there must be a suite of at least three boats to report an effect;
 - Magnuson Act reauthorization in 2007 led to a change in the definition and policy surrounding data confidentiality; new limitations are in place versus what has been done for other TRTs
 - Potential to pursue waivers from all vessel owners/captains, or just for vessels of interest
 - NMFS scientists can still look at data in the detail necessary to answer particular questions, and can relay the answers (with appropriate data aggregation) to the Team

- Karin hopes to have an update on the “outlier” vessels by the next WG call; if patterns are potentially meaningful, then go to next steps of pursuing waivers
5. Soak time and catch – Is the apparent soak time effect on depredation related to total catch?
- Karin added the total number of fish caught (total catch) as a predictor in the GAM presented at the TRT meeting
 - Remotely sensed variables, bathymetry, and distance to 200 fathom isobath were excluded from the model because the variables have not yet been incorporated into the updated dataset
 - Total catch and latitude are the most significant predictors of bycatch
 - Soak time is still significant after taking into account total catch
 - Suggestions/thoughts on meaning of the patterns:
 - Longer soak time could mean hauling extends into daylight hours (Karin will look into this)
 - Curious U-shaped catch curve – long soaks with high catch has a higher probability of depredation and likely higher probability of entanglement/hooks, but the data-rich left hand side of the curve indicates more depredation in sets with small catch
 - Could be related to abundance of fish in the area; if there are few fish in the area, the benefit to FKW of depredating could be high (difficult time finding food on their own, so take more fish off lines)
 - In many sets, lancetfish are the most frequently caught animal and they are occasionally depredated on. If sets with fewer lancetfish (and lower total catch) are in habitats where FKWs are more likely to be encountered, this could cause higher depredation when catch totals are lower. We do not presently know whether this might be the case; Don Kobayashi mentioned he is doing an analysis of bycatch species and could possibly see if there are any patterns.
 - Would be good to examine plots of the spatial/seasonal distribution of takes, depredation, and total catch or catch of species of interest (bigeye, mahi, maybe lancetfish)
 - Karin will re-run the generalized additive model (GAM) analyses
 - After the 2009 environmental variables have been added to the dataset (Don Kobayashi will try to extract these data during the next few weeks)
 - Further examine the U-shaped catch curve and potential causes
 - Run analysis for different combinations of individual catch species (bigeye, “all other”); need to identify meaningful groupings.
6. Within-set patterns of depredation/hooks – Within a set, are there any patterns regarding location along the line of depredation, hooked FKWs, and catch composition?
- Karin will continue her summaries of the remaining FKW and blackfish take events, and send a spreadsheet with details for each set to the WG as soon as possible.

C. Other

- Michael and Jamie are working on a way to graphically represent spatio-temporal movements of vessels, depredation, and bycatch in an ‘anonymous’ geographic region; may be able to fold VMS data into the animation

- Logbook data would be useful to include in the analysis; comprehensive for the fishery, no extrapolation
 - Don will do a quick examination of the match between logbook and observer datasets, and will report back to the WG
- Erin is working with John Hall and others to determine what equipment or other vessel characteristics influence the acoustic profile as a first step toward determining whether those characteristics are correlated with individual vessel catches/bycatch

D. Next steps

- Karin will send out results and any additional materials developed as outlined here to the WG on or before March 19
- Jamie and Michael will continue to examine hook type data and mixed/pure hook type sets
- Don will assist as time permits with obtaining additional environmental data and taking a quick look at false killer whale interaction reports in the logbook data
- WG members will reflect on the findings summarized here, review materials transmitted on Mar 19 and come to the Mar 23 call with further suggestions for data mining
- Next WG call March 23, 8:30 HST / 10:30 AKDT / 11:30 PDT / 14:30 EDT

Summary of Action Items

For next WG call:

- Finish analysis of the catch records of sets with the remaining FKW and blackfish take events, including key set and gear characteristics (task #6 in the handout) (**Karin**)
- Provide updates and any further information on the “outlier” vessels with very high and very low bycatch rates (**Karin**)
- Re-run the GAM, adding the 2009 environmental variables to the dataset, and running for different combinations of catch species (rather than, or in addition to, total catch) (**Karin**)

For 2nd TRT meeting:

- Re-code hook types in database to 4 or 5 categories (based on Michael and Jamie’s findings), and re-run the hook type analysis (**Karin**)
- Analysis of the proportion of mixed hooks versus single hook type in deep-set trips (**Jamie and Michael**)
- Examination of the match between logbook and observer datasets (**Don**)
- Follow up with fishermen regarding whether there has been a change in the use of hooks by different manufacturers over time (**Outreach WG**)
- Make (aggregated) plots of the spatial / seasonal distribution of takes, depredation, and total catch or catch of species of interest (bigeye, mahi, maybe lancetfish) (**Karin**)
- Spatio-temporal plotting of movements of vessels, depredation, and bycatch (**Jamie and Michael**)
- Continue work to describe acoustic profile of vessels and correlation with individual vessel catch/bycatch (**Erin**)

Next WG Call - March 23, 2010, 8:30 HST / 10:30 AKDT / 11:30 PDT / 14:30 EDT

False Killer Whale Take Reduction Team
DATA WORK GROUP
Conference call March 8, 2010

Background materials and updates since TRT Meeting #1
(prepared by Karin Forney)

Additional observer data processing / examination:

- Examined hook type records to get details on mixed hook type trips, and to assess reliability (Marsik, Marchetti)
- Downloaded and re-summarized observer data through the end of 2009 (now that the full years is available), including additional data fields of interest (e.g. vessel ID, misc. gear data). This added a few thousand sets and several additional false killer whale takes.
- Initiate steps to allow spatio-temporal plotting of movements of vessels, depredation, and bycatch (Marsik, Marchetti)

Summary of tasks completed to date:

1. Examination of hook type records and mixed hook type trips (Marsik, Marchetti):

A preliminary check of about 100 recent and 100 older trips revealed that the hook type designation needs to be considered more broadly, because there is error in recording types/sizes/offsets (manufacturer and observer differences). Proposed meaningful groupings, combining offset and non-offset hooks in all categories, are:

J-hook: combine 8/0 and 9/0; very rarely used in recent years

Tuna hook: combine 3.8 and 3.6mm sizes

Large circle hook: 18/0; required by shallow-set fleet

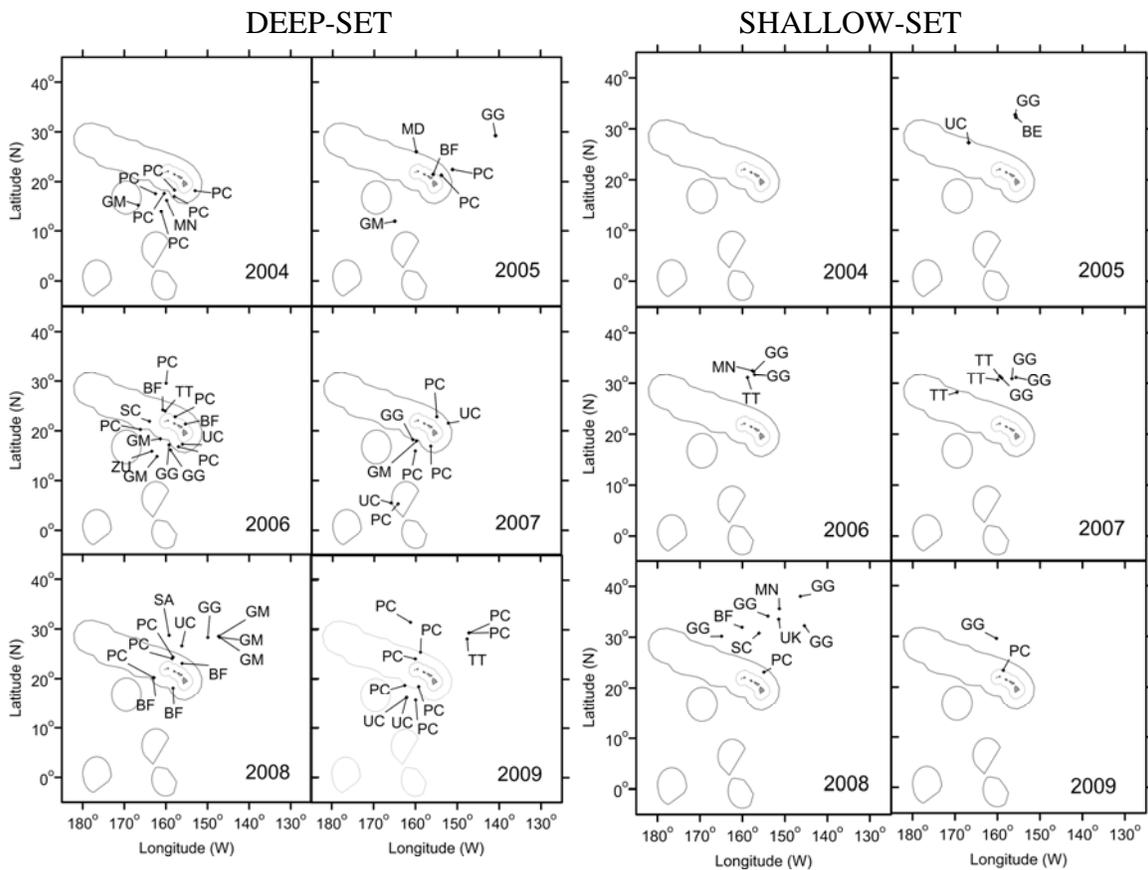
Medium circle-hook: combine 14/0, 15/0 and 16/0; used by deep-set fleet



2. Plot cetacean take locations by year and fishery

Species codes:

PC = false killer whale, GM = short-finned pilot whale, BF = unidentified PC or GM, GG = Risso's dolphin, TT=bottlenose dolphin, MN = humpback whale, BE = Bryde's whale, SA = spotted dolphin, SC = Striped dolphin, UK = pygmy/dwarf sperm whale, ZU = unidentified beaked whale, UC = Unidentified cetacean



3. Provide depredation & bycatch data for false killer whales and for false killer whales or blackfish only (Aug 2003 - Dec 2009, excluding vessels during/after experiments).

	DEEP-SET				SHALLOW-SET			
	# Sets	%	Sets with Takes	%	# Sets	%	Sets with Takes	%
False Killer Whales								
Sets with MM depredation	1179	6%	19	1.61%	183	3%	0	0.00%
Sets without MM depredation	19545	94%	9	0.05%	6045	97%	1	0.02%
TOTAL	20724		28	0.14%	6228		1	0.02%
False Killer Whales and Unid. Blackfish								
Sets with MM depredation	1179	6%	22	1.87%	183	3%	0	0.00%
Sets without MM depredation	19545	94%	11	0.06%	6045	97%	2	0.03%
TOTAL	20724		33	0.16%	6228		2	0.03%

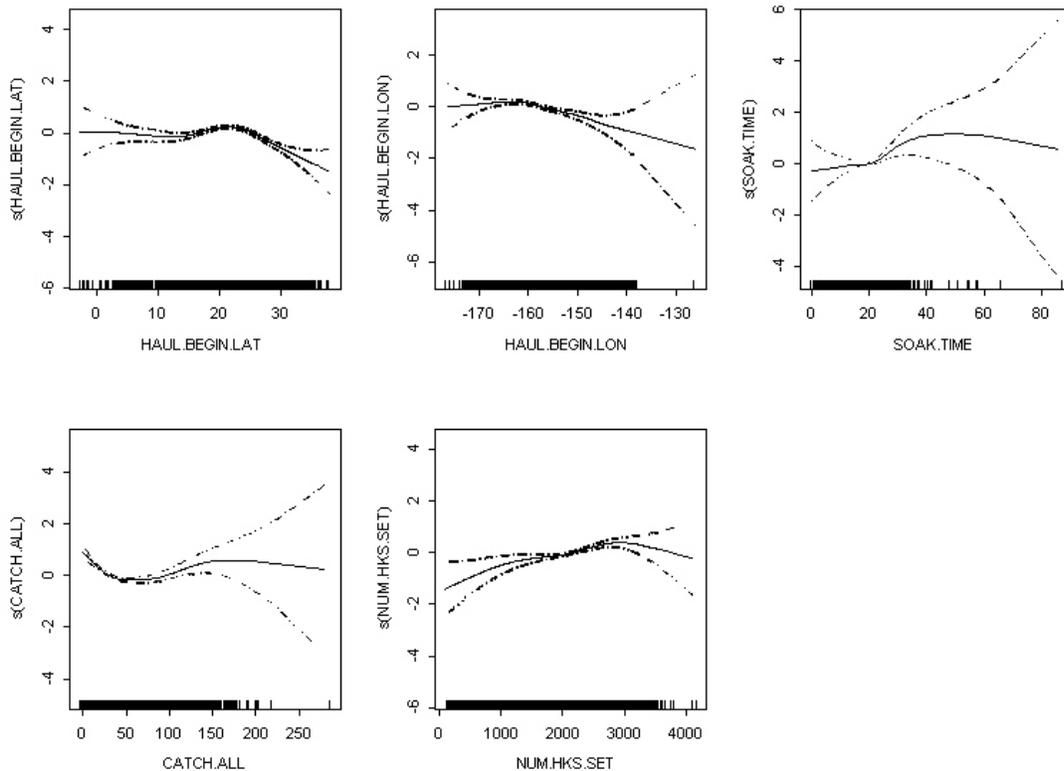
4. Vessel Effects? Do any vessels stand out as having particularly high or low rates of depredation and/or bycatch?

There are a few ‘outlier’ vessels with markedly higher depredation and/or bycatch rates. There are also a number of vessels with rates well below average. Sample sizes are good and there may be something there, but I have not yet had a chance to look into potential differences between those two types of vessels. I will continue to research this apparent pattern, but please note that the type of information I can legally disclose may be limited by confidentiality constraints. Please stay tuned.

5. Soaktime/Catch: Is apparent soak time effect on depredation related to total catch?

Adding the total number of fish caught as a predictor in the Generalized Additive model, this variable becomes the most significant factor, but soak time is still included as well:

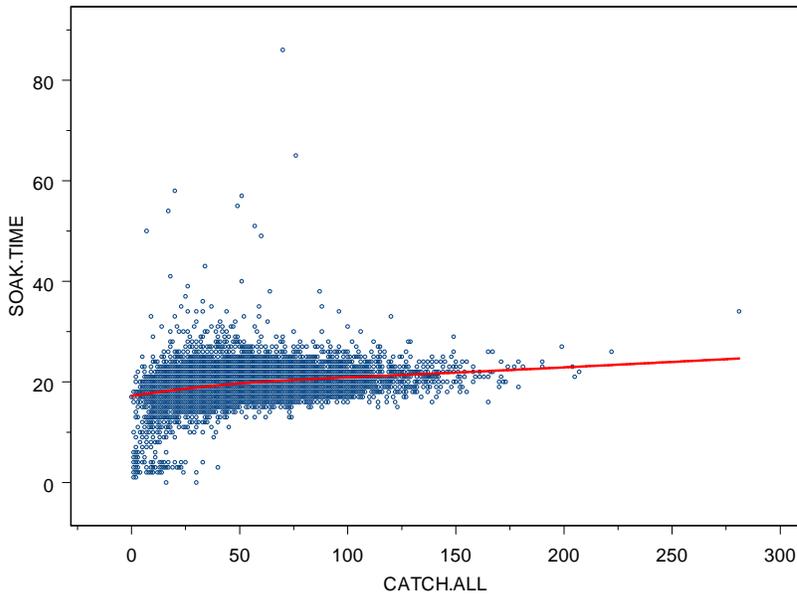
NOTE: Some of the variables in the GAM results presented at the 1st TRT meeting have not yet been incorporated into this data set and were therefore excluded from this GAM (e.g. remotely sensed variables, bathymetry, distance to 200fm isobath)



	Df	Npar	Df	Npar	Chisq	P(Chi)
(Intercept)	1					
s(HAUL.BEGIN.LAT)	1	2.9	74.63835	0.0000000		
s(HAUL.BEGIN.LON)	1	2.8	10.23554	0.01361164		
s(SOAK.TIME)	1	2.8	9.01676	0.02502903		
s(CATCH.ALL)	1	2.9	61.01067	0.0000000		
s(NUM.HKS.SET)	1	2.8	9.47753	0.0198052		

Null Deviance: 9043.269 on 20721 degrees of freedom
 Residual Deviance: 8814.631 on 20701.87 degrees of freedom

Attachment 1



Plot of soak time vs. total catch (red line is smooth through data):

6. Within-set patterns of depredation/hooks: Within a set, are there any patterns regarding location along the line of depredation, hooked false killer whales, and catch composition

I have started reviewing the catch records in detail, and I have summarized the most recent 19 false killer whale or 'blackfish' take events (17 deep sets and 2 shallow sets) in a spreadsheet that I may be able to send out for the call (need to check whether confidential info is sufficiently stripped). I do not see any obvious patterns -- animals seem to be caught all along the set (high and low float #s), on a range of hook #'s within a basket, with a variety of catch species, and with/without depredation.