False Killer Whale TRT – Predictive Model Work Group

Teleconference #1, May 7, 2010

Attendees: John Hall, Robin Baird, Tory O'Connell, Eric Gilman, John LaGrange, Karin Forney, Erin Oleson, Bennett Brooks, Scott McCreary, Nancy Young

Background Documents

Karin Forney prepared a handout describing two conceptual approaches that can be included in simulations and key decisions needed for the structure of the model (Attachment 1). This handout provided the basis for the Work Group's discussions. Karin also distributed during the call a summary of the number of sets available for analysis (Attachment 2).

Observer data from 2003-2009 (see Attachment 2) will be used to simulate various different scenarios in terms of assumptions about the distribution of fishing effort in time and space, and potential changes in depredation or serious injury rates. Attachment 2 includes observed sets only, not total fishery effort. Karin emphasized that we must keep sample size in mind when considering the questions to answer and how to slice the data for simulations.

The Work Group then discussed the two approaches and key decisions outlined in Attachment 1:

Approach #1 (see Attachment 1)

- Defining areas
    - Need to be large enough to have meaningful differences in take rates; sample sizes will be too small if small areas are selected
    - Options discussed for initial model runs
        - 3 areas: HI EEZ, north of HI EEZ, south of HI EEZ
        - East/West of 150 W longitude (IATTC management boundary)
        - 4 quadrants centered at Honolulu harbor, divided by inside/outside EEZ
            - This option selected for initial simulation
    - EEZ still relevant because TRT's take reduction goal may still be bounded by the EEZ (decision has not yet been made)
    - Use "haul begin" as the set location variable
    - Recognize that there may be typical spatio-temporal patterns for fishery as vessels follow the perceived movements of target species, but great variability within and between years
    - Concern that false killer whales will follow the vessels, so cannot determine the effect on false killer whale bycatch if the fishery changed its spatial distribution
        - Karin stated that we can simulate the potential effect if the relationship between whales and vessels stays the same as it currently is in observer data; if there is a basis to say that depredation rate changes or whales follow boat, such an effect can be added later
- Temporal resolution
    - Month ("trip start" month as temporal designation)
- Sampling units
    - Trip, so sets from different vessels are not being combined

    - Sample whole years (as opposed to mixed years), to address inter-annual variability in distribution of fish (and fishing effort) and see actual range of potential effects
    - Vary the starting points of the year to see if simulation provides very different answers (start with calendar year)
- Evaluate when potential caps are reached
    - Simulation builds in a trigger, then switch to a different distribution of fishing effort or any other constraint
    - Include triggers from other regulations that would impact fishery's spatial distribution:
        - Turtle bycatch cap for shallow-set fishery
        - Bigeye quota (3,763 metric tons by US vessels west of 150° W longitude)

Approach #2 (see Attachment 1)

- Approach - input parameter values that we determine from some other source
    - E.g., using weak hooks would result in "x" decrease in serious injury rate
- Discussion deferred until next call

Output

- Include measure of target species catch (bigeye, swordfish)

Other

- Request that Karin ask Teri Williams (University of CA Santa Cruz) to do some calculations to understand how far and long false killer whales can follow a vessel without needing to feed

Next Steps

- Karin will talk to T. Williams about request for energetics calculations
- Karin will distribute initial model output by 5/13
- Next Work Group conference call – Friday, May 14, 8:30 am HST / 10:30 am AKDT / 11:30 PDT

Attachment 1

False killer whale TRT -- Predictive model draft outline
for work group call 7 May 2010

The proposed predictive model framework will use random sub-sampling of the 2003-2009 observer data to evaluate potential effects of different mitigation measures.

There are two conceptual approaches that can be included in the simulations and require discussion/decisions:

1. Assume mortality and serious injury levels will continue to be, on average, the same as in the observer data, and examine potential effects of changes in effort by geographic area, time of year, or deep vs. shallow set fisheries. This approach will randomly draw trips or sets (with replacement) to simulate fishing under various spatio-temporal restrictions and/or allocation of effort to shallow-set vs. deep-set fisheries. This set of simulations assumes no other gear or avoidance mitigation factors are in operation. We could also evaluate when a potential cap might be reached, if desired

   Key decisions:
   - What areas (how many, how large; need to specify coordinates)?
   - What temporal resolution (months, quarters)?
   - Sampling units and decisions:
     - Trips vs. Sets;
     - Whole years vs. mixed years (interannual variability & dependence issues)
   - Evaluate when potential caps are reached

2. Modify some of the bycatch variables to differ from those in the 2003-2009 data set, i.e., to simulate a reduction in depredation rates, or reduced likelihood of serious injury when animals are hooked. These simulations will require us to specify new rates based on assumed reductions.

   Key decisions:
   - What parameters do we want to be able to adjust?
   - Values for alternate parameters?

What output information should the simulations provide? For example:
- Plots of effort distribution by deep/shallow set fishery (aggregated appropriately)
- Monthly/quarterly effort by deep/shallow set fishery
- Average and variation in rates of depredation?
- Average/variation in hooking and entanglements?
- Average/variation mortality and serious injury?
- OTHER?

Attachment 2

Additional materials for discussion

	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%**

Number of sets by fishery and HI EEZ vs. outside HI EEZ

	Inside HI EEZ	Outside (incl. other EEZs)
Shallow set:	1132	5096
Deep set:	8495	12229