False Killer Whale Take Reduction Team
Research Priorities Work Group Teleconference
August 26, 2013

Attendees
Robin Baird, Asuka Ishizaki, John La Grange, David Laist, Ryan Steen, Sharon Young, Scott McCreary, Erin Oleson, Nancy Young,

Work Group members unable to attend
Hannah Bernard, Paul Dalzell, Eric Gilman, Paul Nachtigall, Tory O'Connell, Andy Read, Bennett Brooks

Call objective
The objective of the call was to review the updated list of candidate research projects (August 8 version) and discuss any final comments, and to discuss the logistical and procedural next steps for ranking the research projects.

Final review of candidate research projects
- Nancy briefly described the changes from the July 25 to the August 8 version of the spreadsheet
- Work Group members provided the following suggestions and comments to strengthen the ranking process:
    - Assign each project a unique number or letter code, to eliminate confusion when referring to projects
    - More specifically and consistently characterize project costs; as possible, quantify using broad cost brackets (e.g., <$10K, $10-$25K, etc.)
    - Define the "feasibility" descriptors and use them consistently within and across categories (tabs)
    - Note whether and how projects might be modular or scalable, such as when one project might be valuable even at a small modular scale, or whether the project can be "piggy-backed" to other projects
    - Consider combining projects addressing a similar research problems (e.g., three projects addressing injury severity – FKW biology tab, row 23; longline gear tab, row 17; FKW assessment tab, row 16)
        - Erin noted that these and other projects could be viewed as "variations on a theme," but most have distinctly different approaches, methods, data, and analysis; Erin will revise some entries in the spreadsheet to further distinguish the projects.
    - Better describe, and possibly combine, projects in the State Fisheries tab regarding state and federal data collection (rows 8 and 10)

Review of project description for monitoring and assessing weak hook performance
- Nancy requested feedback on the project description developed by David Laist and Hannah Bernard. She noted that collection of information from fishermen or others by

NMFS/NOAA, even if voluntary, may trigger potentially burdensome requirements of the Paperwork Reduction Act
- R. Steen suggested that while HLA did discuss this, at the present time given other pressing work, this research initiative is likely not a priority for the Hawaii Longline Association, but that if it is a highly ranked project, NMFS should lead the effort.
- J. LaGrange suggested information collection could be undertaken by observers, to minimize additional paperwork for captains. He suggested observers take pictures of the hooks used on boats to assist in identification of the manufacturer and/or supplier.
- Work Group members may discuss this project and its implementation strategy further, depending on how the project is ranked.

Ranking logistics
- Work Group members briefly discussed the next steps for ranking the projects:
    - NMFS (Nancy/Erin) and/or CONCUR (Scott/Bennett) will follow up with email containing the final spreadsheet and ranking instructions
    - Work Group members will individually rate each project on its own merit (ranking is not scaled to the number of projects within the tab), and submit their rankings to the NMFS and CONCUR team
    - Deadline will likely be two weeks from the time the spreadsheet and instructions are distributed.
    - NMFS will tabulate and distribute results for further discussion
- Work Group members discussed several options for summarizing and selecting overall ranks (e.g., choosing the top "x" number of projects within each cost category)

Saltonstall-Kennedy (S-K) Grant
- Nancy distributed information by email regarding the S-K grant opportunity for projects related to U.S. fisheries; deadline for proposals is September 29
- Asuka noted that bycatch or depredation reduction engineering projects may fall within the program's objectives; those could be combined with other projects, such as false killer whale assessment, as part of a multi-component proposal
- Asuka commented that the S-K grant is expected to be an annual award, so we could work toward developing a proposal next year

Next Steps
- Erin/Nancy again revise spreadsheet based on Work Group comments, and email the final version and ranking instructions to Work Group
- Work Group rank research projects and email results to Erin/Nancy/Scott/Bennett
- Erin/Nancy/Scott/Bennett tabulate and summarize rankings, and distribute to Work Group by email
- Work Group reconvenes by teleconference to discuss and tentatively finalize rankings
- Rankings distributed to full TRT for final approval and adoption

Adjourn

False Killer Whale Biology					
Rank (2010)		Research Activity	Approach & Purpose/Benefit	Feasibility	Cost
Within topic	Overall				
2	6	~~Continue telemetry studies~~ Continue telemetry studies on the pelagic stock FKWs	Assess pelagic FKW movements relative to fishing activity and refine stock boundaries	Possible, but requires significant search effort as FKW densities are low	High: tags alone cost ~$4000 ea. Need several tags deployed on a number of groups to assess population movements. Will require large vessel with small vessel launch capability.
New-2013		Continue telemetry studies on the NWHI stock FKWs	Assess NWHI FKW movements relative to fishing activity, degree of geographic overlap with pelagic and MHI stocks, and differences in ecology between MHI and NWHI insular animals	Possible, but requires significant search effort as FKW densities are low. Requires genetic samples for stock-ID confirmation.	High: tags alone cost ~$4000 ea. Need several tags deployed on a number of groups to assess population movements. Will require large vessel with small vessel launch capability.
New-2013		Continue telemetry studies on the MHI insular stock FKWs	Focus tagging efforts on cluster 2 individuals and during the winter and early spring. No individuals from cluster 2 have been tagged previously and there is some suggestion that they may use different areas than cluster 1 and 3 individuals. Very little telemetry data are available in the winter and spring so seasonal variations in insular FKW movements are difficult to assess	Possible. Deployments during winter and spring will be difficult due to weather conditions. Cluster 2 individuals are encountered less frequently than other social clusters.	High, but lower than pelagic or NWHI studies as animals are relatively accessible during nearshore surveys. Tags alone cost ~$4000 ea.
7		~~Evaluate acoustic differences between insular vs. pelagic animals~~ Examine call types and rates by different FKW populations to better understand the variability and nuances of the acoustic data, allowing for more precise and useful examination of existing and ongoing acoustic data.	Allows alternative method for identifying individuals during surveys or interacting with fishing activities	Possible: some data already available, but additional data from all stocks would be needed	Moderate- some data collection required, particularly for pelagic stock FKWs. Equipment already available.
1	5	~~Distinguish FKW calls from other odontocete species~~ Develop real-time assessment capability for distinguishing between FKWs and other odontocetes using whistles and echolocation clicks	Allows alternative method for identifying individuals during surveys or interacting with fishing activities	Possible with existing data, better with more data, particularly from pilot whales	Low- hydrophones already available to researchers & analysis methods are defined. Can be done as piggy-back project
3		Evaluate acoustic behavior near longlines using recorders on fishing gear	Understand the dynamics of how false killer whales are interacting with gear and how animals are attracted to the gear. Also provides acoustic ID following depredation.	Project to begin this year with specific vessels and through the observer program. Will take significant effort to adequately assess interactions given low interaction rate and length of sets	High start-up cost: recorders expensive (>$10K ea.) and many sets will need to be recorded.
9		Understand foraging and acoustic behavior using acoustic tags	Understand how animals capture prey and how they communicate with conspecifics	Possible, but requires significant search effort as FKW densities are low, must get close to the animal to apply suction-cup tags, specific training required	High start-up cost: suction-cup acoustic tags are expensive (>$15K ea.)
4 (tie)		Carry out underwater observations of foraging behavior	Use audio & video to understand the mechanism of depredation- how are they removing fish, when are they near gear, what are the group dynamics (calm vs. frenzy)	Doable if targeted in areas with high rates of interactions	High start-up cost: video and audio recorders expensive (>$10K ea.) and will need several to assure recordings in a given set. May require chartering contracts.
14		Study adaptive learning~~, particularly by young~~ in the FKW	~~Evaluate how young animals learn to depredate gear, and if hook-up of an individual in the group deters depredation in the future~~ Evaluate whether loud sounds (higher frequencies than those assumed to be heard by fish) presented on longlines cause reduction in depredation; conduct further analysis of whether the reduction remains a useful tool or if FKWs adapt to it	~~Very difficult: not clear how this study would be done given no young captive animals~~ Feasible	Undetermined
10 (tie)		Conduct vessel sound playbacks	At what distance to false killer whale react to fishing vessels? Do insular animals react?	Possible, but need permits, which will take up to a year to obtain	High: tags alone cost ~$4000 ea. Need several tags deployed.
New - 2013		Determine the extent to which FADs attract FKWs.	Place acoustic monitors strategically to examine the impact of FADs on FKW distribution. Examine survey effort and sighting rates to evaluate whether higher encounter rates near FADs.	Difficult given locations of most FADs are unknown. Analyses to date do not show higher encounter rates near State FADs, but private FADs may be more effective aggregators of fish and whales.	
8		Assess impact of hook density on FKW ability to follow line	Would help understand whether FKW are actively searching for fishing vessels, and could evaluate impact of moving fishing effort elsewhere	Two ways to assess: 1. Use logbook data, but limited info on interactions on trips without observers- initial evaluation feasible, 2. Use satellite tagged individuals versus VMS data- very difficult to locate pelagic animals for tagging	Observer data- Low Satellite tagging-High
4 (tie)		Determine range at which a hook in a fish can be detected by FKW	Tank experiment with Kina to evaluate detection ability with different prey species	Easy: Kina already trained to do echolocation experiments	Low
13		Test visual acuity of FKWs given different types of lights often found of longline vessels	Tank experiment with Kina	Possible, will require some retraining	Moderate- additional cost of re-training and acquiring testing objects
10 (tie)		Evaluate FKW capability to see floats, as well as monofilament line of different colors and width	Tank experiment with Kina	Possible, will require some retraining	Moderate- additional cost of re-training and acquiring testing objects
12		Assess FKW response to compounds found in oil fish and other fish species that FKWs do not depredate from the line	Purpose is to determine if this is a potential deterrent with commercial applications; tank experiment with Kina	Possible, will require some retraining, may need to assess Kina's taste sensitivity relative to wild FKWs first	Moderate- additional cost of re-training
6		~~Mine existing acoustic data from Cross Seamount and elsewhere~~ Evaluate detection probability using for autonomous recorders in various locations	~~Use moored acoustic devices to assess level of fishing at Cross and frequency of false killer whale occurrence~~ High or low rates of FKW detection at various recording sites may be due to instrument placement.	Easy: data are already available	Low
New - 2013		Sample stress and reproductive hormones	Collect skin/blubber samples from false killer whales to examine stress hormones and various demographics including sex ratio and pregnancy rates.	Moderate- some samples available, but additional samples will be needed. May require specialized handling.	Data collection- high. Data analysis- moderate
New - 2013		Examine physiological response of FKW and similar species during/following an interaction	Collect tissue, blood, or blubber samples from hooked FKWs	Very difficult: not clear how this study would be done	High
New - 2013		Evaluate survival of FKWs and similar species following fisheries interactions.	May include literature research, assessment of archived and new photographs of injured photos, assessment of wound healing over time, evaluation of stranded animal injuries, etc.	Possible, but will take time to obtain time-series photographs of injured individuals. Literature search may be more quickly accomplished. Note types of injuries, frequency, severity (fatal vs. non-fatal)	Low to moderate.
New - 2013		Assess importance of fishery as a food source for FKWs.	What proportion of the FKW diet comes from depredating longlines. Are FKWs consuming species form longline gear not typically part of their diet?	Moderate to difficult- some analyses and studies on other species may provide insight. May be able to use fatty acid signatures as a means of examining diet. Would need to differentiate samples for depredating animals versus those thought not to be depredating.	Low- assessment of existing studies. Moderate to high- collection of new samples across the population including some known to have been depredating.

Longline Gear					
Rank (2010)		Research Activity	Approach & Purpose/Benefit	Feasibility	Cost
Within topic	Overall				
11		Evaluate feasibility of using moored listening stations (FADs, NOAA weather buoys, etc.) to determine FKW occurrence before a fishing trip	Would provide advanced notice to the fleet on FKW presence in specific areas.	Likely relatively easy to set up, but may not provide adequate information as buoys are few and far between.	Expensive given cost of transmitting data from the buoys
3	3	Develop new or test existing methods for fleet to use acoustic recorders to determine FKW presence prior to setting	Use radio buoys to alert to FKW presence prior to and during setting	Development already underway (G. McPherson), still testing. Doable over the long-term.	Reasonable given fisherman already purchase radio buoys
7		Record acoustic profile of vessels and fishing gear across the fleet during transiting, setting, soaking, and hauling to assess potential cues to FKWs	Evaluate whether there are specific acoustic cues that may attract animals to the gear or may allow animals to follow or locate fishing vessels.	Project to begin this year with specific vessels and through the observer program. Requires explicit participation of individual fisherman.	~~High start-up cost: recorders expensive (>$10K ea.) and~~ Moderate- recorders exist for remote monitoring of gear. Many sets will need to be recorded, potentially requiring charter contracts.
4		Survey all longline vessels to identify commonalities among those with high depredation rates	Is there a common feature of vessels that are commonly whaled or that have higher rates of bycatch?	Difficult given confidentiality restrictions	Low
Not Rated - 2010		Examine role of bait type, size, and manner of threading on bait depredation			
6		Evaluate where animals are caught within a set and why	Initial analysis of observer data suggest higher interaction rate in the middle of a basket. Need to understand if this is an artifact of small sample size or if there is a higher probability of hooking in the middle of the set.	Difficult to evaluate given low interaction rates. The why could be assessed using other techniques already listed- acoustic and video recordings, etc.	Likely high given equipment required for conducting observations
10		Evaluate potential to use killer whale/other playbacks as deterrents	Evaluate if killer whale sounds are a deterrent to FKWs. Would need to use tropical transient killer whale calls.	May be difficult to identify appropriate sounds as little is known on killer whale ecology in the tropics. Need research permits (up to 1 yr to obtain).	Probably low.
New - 2013		Examine the ability of FADs to be used as decoys for false killer whales (to reduce depredation of active longlines).			
5		Evaluate effectiveness of additions to terminal tackle or other items on the mainline ~~wire loops on circle hooks~~ as a method to reduce depredation on bait, catch and incidental takes of false killer whales	Is bait and/or catch depredation rate lower when other items are near hooks or on the mainline ~~with wire loops on the hooks~~? Should be formally assessed using NMFS observer program.	Feasible, some experimentation already underway. May take considerable time to assess impact on false killer whale catch rates or deterrence, and would require large scale study with well-defined experimental methods.	High cost for experiment approach (vessel contracts, hook or other gear purchases). Low for opportunistic effort or gradual adoption by fisherman
8		Assess potential for hooks to be modified (foam coating, etc.) to increase or decrease detection range	1. Are hooks easy to modify, 2. do modified hooks increase or decrease detection range, and 3. does this change in range reduce depredation or bycatch	Easy to test detection range with Kina	Hook modification may be high. Experimental cost is low.
New - 2013		Determine types of hooks and hook manufacturers used by Hawaii deep-set longline vessels (*see details in doc prepared by Laist and Bernard*)	Information request by observers, enforcement officers, and/or survey by PIRO or HLA of fishermen and/or gear suppliers	Feasible- perhaps most effectively surveyed through initiative of fishery	Low
New - 2013		Evaluate performance of gear used in deep-set fishery (*see details in doc prepared by Laist and Bernard*)	Using gear voluntarily collected from fishermen or purchased, confirm breaking or bending strength and likely injury severity given performance; evaluate performance over time	Feasible- perhaps most effectively surveyed through initiative of fishery	Low to moderate depending on amount of gear involved.
New - 2013		Identify and evaluate other factors that may affect hook strength (and severity of FKW injuries)	Evaluate metallurgy, production methods, specific hooks shapes, etc,	Feasible- may take time for adequate sample of compliant available hooks for testing.	Low if using already manufactured hooks. Moderate if manufacturing hooks specifically for testing and evaluation.
New - 2013		Hook-tissue interaction research to better understand the relationship between type of gear and where the animal is hooked and the severity of the injury.	Pursue research collaboration with B. McLellan	Feasible - contract being sought	Already funded
New - 2013		Desktop study to assess size of false killer whales caught	May inform strength of weak hook needed to release FKWs.	Could be difficult given variability in observer interpretation of animal size.	Low
2	2	Follow-up weak hook study to understand impact on target catch.	Conduct experiment of catch rates testing hooks with smaller wire diameter than required by TRP (e.g., 4.3 mm, 4.2 mm, 4.0 mm) or with different properties (hook shape, metallurgy, etc.)	Very feasible- existing circle hooks may prove weak enough	High cost for experiment (vessel contracts, hook purchases). Low for opportunistic effort or gradual adoption by fisherman
1	1	Evaluate impact of weak hooks on FKW bycatch rates	Long-term evaluation of bycatch rates using the observer data	High, but will take time	Low given gradual adoption of hooks by fisherman.
New - 2013		Collect straightened hooks for genetic sampling	Voluntary collection, potentially via observers, of straightened hooks for genetic analysis, to ID species that straightened the hook and possibly add to pelagic FKW sample size	Feasible, but may take some time to collect an adequate sample	Analysis already funded

State Fisheries					
Rank (2010)		Research Activity	Approach & Purpose/Benefit	Feasibility	Cost
Within topic	Overall				
1	4 (combined)	Determine number of vessels use shortline & kaka line gear	Currently no good measure of number of vessels using this gear type or how often.	Doable, but will require on-the-ground effort and cooperation with the State	Moderate
2	4 (combined)	Begin data collection on when and how fishing with shortline and kaka line gear	Work with the State to evaluate logbook data for these fisheries- not clear that the data are available.	May be difficult to acquire the data and present results given confidentiality restrictions.	Unknown
3		Institute observer coverage (possibly from an alternative platform) and/or video monitoring to better track state fisheries' practices and possible interactions.	Develop a program using independent vessels to assess fisheries interactions.	Unclear, unlikely to gain cooperation from fisherman being observed.	High
New - 2013		Cross-reference and otherwise examine existing data to assess consistency and QA/QC.			
New - 2013		Broaden current data collection protocols to include more precise information on gear types (other than shortline and kaka line) used in the state fisheries (e.g., troll, dangler, handline, hybrid).			
New - 2013		Evaluate the mixed and hybrid gear categories to distinguish among gear types actually used.			
New - 2013		Better understand the distinctions and areas of commonality in federal and state reporting protocols.			
New - 2013		Evaluate hook-and-line fishery effort and geographic distribution regionally and seasonally			
New - 2013		Model the potential for FKW interactions with state fisheries by calculating a FKW CPUE in the deep-set longline fishery and then extrapolating that to the state fishery (based on rates of tuna caught).			

False Killer Whale Assessment

Rank (2010) Within topic	Rank (2010) Overall	Research Activity	Approach & Purpose/Benefit	Feasibility	Cost
1	7	Hawaiian EEZ survey (at least every 5 years)	Conduct large-scale (2 ships, 175 days-at-sea) covering the entire Hawaiian EEZ with visual and acoustic observing. Survey is intended to update abundance estimates for all cetaceans, but FKW will be priority for auxiliary projects.	~~Is happening in collaboration with SWFSC~~ Next survey may need to occur in collaboration with SWFSC	High
2	8	Continue research into FKW abundance using towed and stationary acoustics Develop new towed systems that allow for real-time localization of vocal FKWs	Detection rates are higher acoustically than visually so this may provide an alternative means of estimating abundance. Many questions need to be addressed.	Research in ongoing	High
New - 2013		Monitor abundance and trends of MHI insular stock	FKW TRP measures intended to protect insular stock animals from interactions. Continued monitoring may provide sense of degree of decline due to fisheries interactions and evaluate whether the decline continues.	Possible	Moderate- continued encounters required for assessment of annual mark-recapture abundance estimates
New - 2013		Survey windward side of Hawaiian Islands to assess differential FKW encounter rates	Cross-reference collected information with existing telemetry data	Feasible with large ship. Smaller vessel surveys will require larger time investment to insure adequate effort despite weather days.	Moderate to high depending on survey platform and level of effort
6		Develop predictive habitat models of FKW density	Incorporate *in situ* and remotely -sensed oceanographic data to develop models of FKW habitat which can be applied to unsurveyed areas or identify hotspots for further evaluation during a future survey	Currently under development, but will require more FKW data to build a robust model	At-sea data collection cost is high, but collected as part of cetacean survey. Low cost for remotely-sensed data.
4		Evaluate alternative methods for estimating abundance, with emphasis on improving precision	Consider alternatives that may provide a means for 1) surveying populations, and 2) modelling density. New methods for surveying may include fishery-dependant data evaluation, acoustic gliders, etc.	Survey and analysis methods must be developed. Long-term research goal.	High
New - 2013		Use Observer Program data (in combination with other fishery-dependent data where applicable) on FKW sightings, interactions, and depredation to develop abundance estimates, estimate depredation rates, and identify hot spots.			
Not Rated - 2010		Use mark/recapture studies to supplement info on abundance, demographics, stock structure, and injury categorization			
3	9	Collect additional genetic samples from the pelagic, NWHI, and other distant FKWs to assess population structure	Collect biopsy samples using observers biopsying from bow of fishing boats, or during dedicated cetacean surveys	Feasible, but may not have many opportunities	Low- collection,, Moderate- analysis
7		Evaluate degree of genetic differentiation between insular and pelagic stocks	Requires additional effort to obtain samples to the west and north of Hawaii	Difficult	High
5		Develop methods to pro-rate blackfish and unidentified cetacean bycatch	Bycatch is currently underestimated ~~as a sizeable number of takes are identified only as pilot whales or FKWs~~ several takes are identified only as unidentified cetacean. Alternative models (see SSC recommendations) may yield better assessment of FKW versus pilot whale allocation.	Several methods proposed, but require careful consideration.	Low
Not Rated - 2010		Further study to validate current assignment of M&SI designations to FKW and the longline fishery			
New - 2013		Re-analyze the proportion of SI vs. NSI for circle hooks vs. tuna and J-hooks		Feasible - analysis of existing observer data, but will take some time to amass enough interactions for robust result	Low