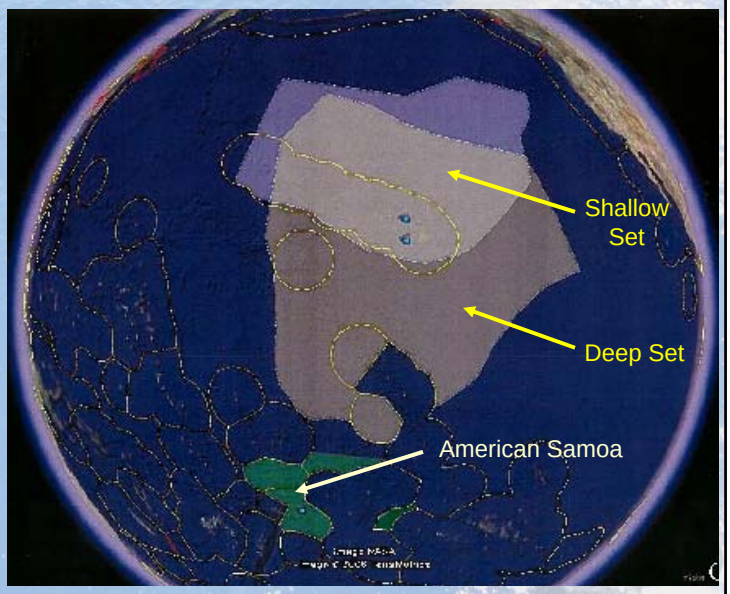
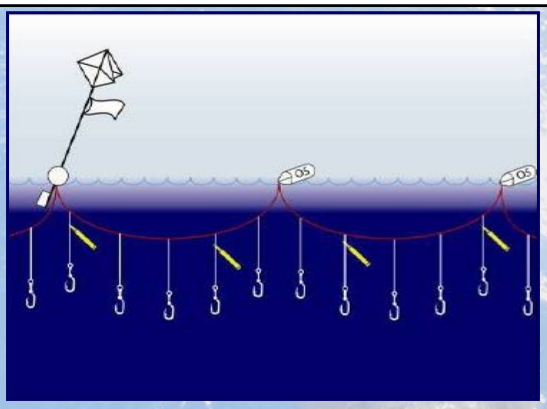
Overview of Hawaii-based longline fisheries

- Deep-set vs. shallow-set fisheries
- Observer program
- Cetacean interactions



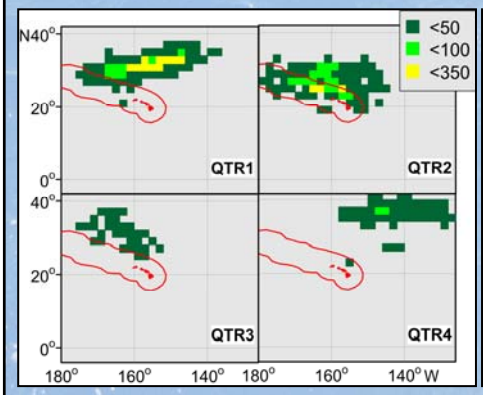
Overview of Hawaii-based deep-set and shallow-set longline fisheries



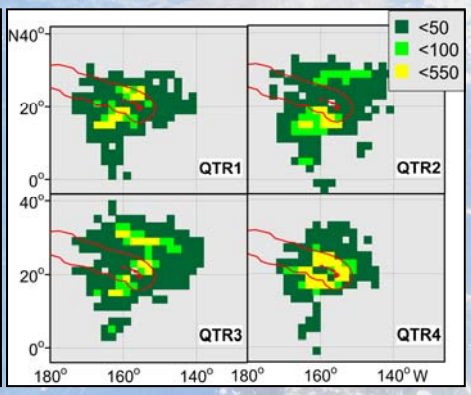
	Deep Set Fishery	Shallow Set Fishery
Target Species	Bigeye Tuna	Swordfish
Avg. # hooks	~2100	~880
Avg. hooks per float	Avg. 27	4
Avg. mainline length	36 miles	47 miles
Misc. gear characteristics	No lightsticks, hooks >100-200m; night haul	Lightsticks, hooks <100m deep; daytime haul

Seasonal distribution of effort by 2° block
(from 2003-2009 observer data)

Shallow-set



Deep-set



Pacific Islands Regional Office Observer Program

1994	First mandatory observers deployed
2000	Increase in observer coverage to 20%
2002	Swordfish fishery closure
2004	Swordfish (shallow-set) fishery reopens with turtle bycatch limits; 100% observer coverage Deep-set fishery still has 20% observer coverage
2006	Coverage in American Samoa fishery begins (~7%)

4

Effort and observer coverage for deep-set and shallow-set fisheries

	Hawai'i Longline Deep Set Fishery	Hawai'i Longline Shallow Set Fishery
Target Species	Bigeye Tuna	Swordfish
# active vessels	125	45
Annual # sets	~12,000-14,000	<1200
Average trip length	21 days	33 days
Annual # sea days observed	~5,900	~2,475
Annual # trips observed	281	75
Percent coverage	20 %	100 %

5

The observer program is responsible for fielding longline observers to obtain data on incidental take of protected species and to collect fishing effort data.

6

The observers record species composition of the catch, tally fish that are kept and discarded, collect information about vessel fishing gear characteristics and operations, and process selected specimens for life history information.

7

The Pacific Islands Fisheries Science Center receives biological samples for analysis from the observer program. Observers obtain samples based on the current research activities being conducted by PIFSC staff.

8

Observers document all protected species interactions with longline gear. Protected species that interact with the fishery are sampled whenever possible.

Observers are trained to collect biological data by the Marine Turtle Research Program and the PIRO training staff.

Sightings of protected seabirds, marine mammals, and turtles that do not interact with fishing operations are also recorded.

Observers are trained in dehooking and are provided a hands on opportunity during their training course to practice using this equipment. This training has helped observers successfully dehook and disentangle marine mammal and turtles at sea.

11

The Pacific Islands Region uses observer data to calculate official estimates (e.g. protected species interactions) and produce technical reports. Quarterly reports summarizing percent observer coverage, protected species interactions, and fishing effort are produced and available online.

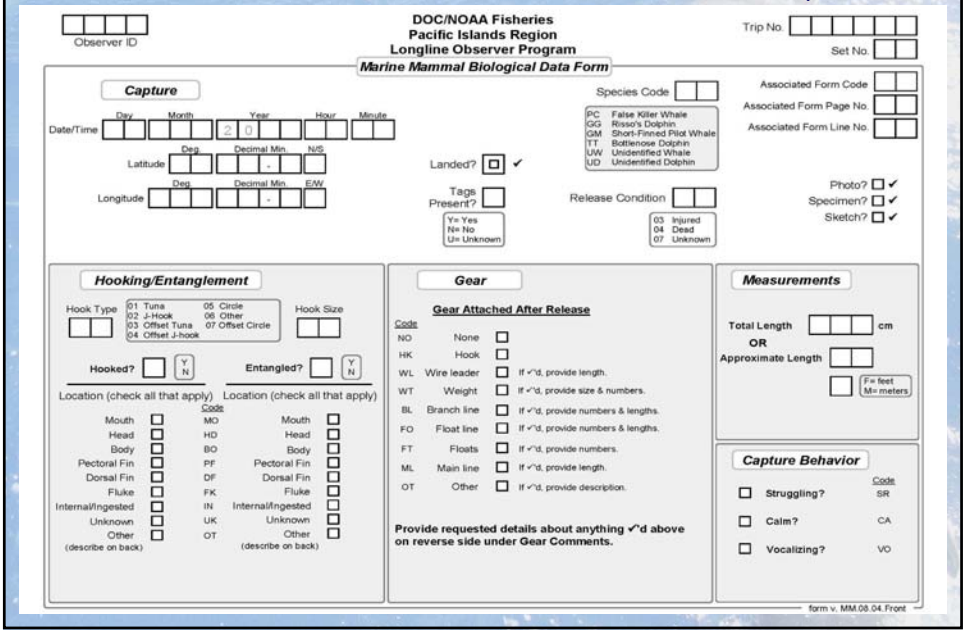
12

Cetacean records

- **Behavior:** any activity that does not involve contact with the fishing gear
- **Interaction:** any contact between the fishing gear and a protected species, including depredation on catch
- **Take:** an interaction involving a hooking, entanglement, or both

13

Marine Mammal Biological Data Form
(see TRT binder section 6.d. for filled out examples)



DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program
Marine Mammal Biological Data Form

Observer ID | Trip No. | Set No.

Capture
Date/Time: Day, Month, Year (2 0), Hour, Minute
Latitude: Deg, Decimal Min, N/S
Longitude: Deg, Decimal Min, E/W
Landed?
Tags Present? (Y= Yes, N= No, U= Unknown)
Species Code
PC False Killer Whale; GG Risso's Dolphin; GM Short-Finned Pilot Whale; TT Bottlenose Dolphin; UW Unidentified Whale; UD Unidentified Dolphin
Release Condition (03 Injured, 04 Dead, 07 Unknown)
Associated Form Code; Associated Form Page No.; Associated Form Line No.
Photo? Specimen? Sketch?

Hooking/Entanglement
Hook Type (01 Tuna, 02 J-Hook, 03 Offset Tuna, 04 Offset J-hook, 05 Circle, 06 Other, 07 Offset Circle); Hook Size
Hooked? (Y, N); Entangled? (Y, N)
Location (check all that apply) | Code | Location (check all that apply)
Mouth MO; Head HD; Body BO; Pectoral Fin PF; Dorsal Fin DF; Fluke FK; Internal/Ingested IN; Unknown UK; Other OT (describe on back)

Gear
Gear Attached After Release

Code		
NO	None	
HK	Hook	
WL	Wire leader	If ✓'d, provide length.
WT	Weight	If ✓'d, provide size & numbers.
BL	Branch line	If ✓'d, provide numbers & lengths.
FO	Float line	If ✓'d, provide numbers & lengths.
FT	Floats	If ✓'d, provide numbers.
ML	Main line	If ✓'d, provide length.
OT	Other	If ✓'d, provide description.

Provide requested details about anything ✓'d above on reverse side under Gear Comments.

Measurements
Total Length cm
OR
Approximate Length
(F= feet, M= meters)

Capture Behavior
Struggling? SR; Calm? CA; Vocalizing? VO

form v. MM.08.04.Front

Entanglement

Restraint of an animal that involves line wrapped around one or more body parts

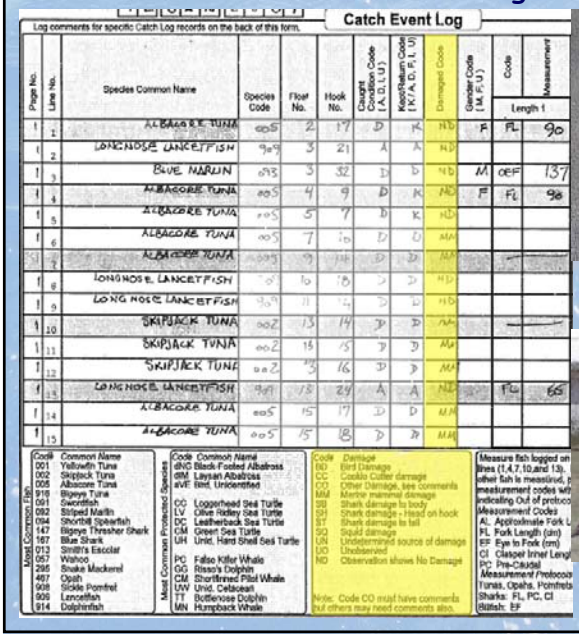
15

Hooking

Restraint of an animal that involves the piercing of tissue with a fishing hook, or the ingestion of a hook

16

Observers are trained to identify and record observed damage to catch


Catch Event Log

Log comments for specific Catch Log records on the back of this form.

Page No.	Line No.	Species Common Name	Species Code	Float No.	Hook No.	Caught Condition Code [A, D, L, U]	Kept/Return Code [K / A, D, F, L, U]	Damaged Codes	Gender Code [M, F, U]	Length 1 Code	Length 1 Measurement
1	1	ALBACORE TUNA	005	2	17	D	K	ND	F	FL	90
1	2	LONGNOSE LANCETFISH	909	3	21	A	A	ND			
1	3	BLUE MARLIN	693	3	32	D	D	ND	M	OEF	137
1	4	ALBACORE TUNA	005	4	9	D	K	ND	F	FL	98
1	5	ALBACORE TUNA	005	5	7	D	K	ND			
1	6	ALBACORE TUNA	005	7	10	D	D	MM			
1	7	ALBACORE TUNA	005	9	14	D	D	MM			
1	8	LONGNOSE LANCETFISH	909	10	18	D	D	ND			
1	9	LONGNOSE LANCETFISH	909	11	4	D	D	ND			
1	10	SKIPJACK TUNA	002	13	14	D	D	MM			
1	11	SKIPJACK TUNA	002	15	15	D	D	MM			
1	12	SKIPJACK TUNA	002	15	16	D	D	MM			
1	13	LONGNOSE LANCETFISH	909	15	29	A	A	ND		FL	65
1	14	ALBACORE TUNA	005	15	17	D	D	MM			
1	15	ALBACORE TUNA	005	15	18	D	D	MM			

Most Common Fish:

Code	Common Name
001	Yellowfin Tuna
002	Skipjack Tuna
005	Albacore Tuna
018	Bigeye Tuna
091	Swordfish
092	Striped Marlin
094	Shortbill Spearfish
147	Bigeye Thresher Shark
167	Blue Shark
013	Smith's Escolar
057	Wahoo
295	Snake Mackerel
467	Opah
908	Sickle Pomfret
906	Lancetfish
914	Dolphinfish

Most Common Protected Species:

Code	Common Name
dNG	Black-Footed Albatross
dM	Laysan Albatross
aVE	Bird, Unidentified
CC	Loggerhead Sea Turtle
LV	Olive Ridley Sea Turtle
DC	Leatherback Sea Turtle
CM	Green Sea Turtle
UH	Unid. Hard Shell Sea Turtle
PC	False Killer Whale
GG	Risso's Dolphin
CM	Shortfinned Pilot Whale
UW	Unid. Cetacean
TT	Bottlenose Dolphin
MN	Humpback Whale

Code	Damage
BD	Bird Damage
CC	Cookie Cutter damage
CO	Other Damage, see comments
MM	Marine mammal damage
SB	Shark damage to body
SH	Shark damage - Head on hook
ST	Shark damage to tail
SQ	Squid damage
UN	Undetermined source of damage
UO	Undeserved
ND	Observation shows No Damage

Note: Code CO must have comments but others may need comments also.

Measure fish logged on lines (1,4,7,10,and 13). other fish is measured, p measurement codes wit indicating Out of protoco

Measurement Codes
AL Approximate Fork L
FL Fork Length (cm)
EF Eye to Fork (cm)
Cl Clasper Inner Leng
PC Pre-Caudal

Measurement Protocols
Tunas, Opahs, Pomfrets
Sharks: FL, PC, Cl
Billfish: EF

Squid Damage

Shark Damage

17

Depredation of Catch

False killer whale prey includes target species Tunas (Ahi, Aku, & Tombo), Billfish, Dolphinfish (Mahi mahi), Wahoo (Ono), Pomfret (Monchong), and Opah

Since 2005, about 1.15% of the tunas landed on observed trips showed signs of marine mammal damage

18

Marine Mammal Damage to Bigeye Tunas consistent with false killer whale dentition

Nature of cetacean – longline interactions "The Big Picture"

Two 'modes':

- Depredation
  - Deep-set: false killer whales, pilot whales
  - Shallow-set: Risso's and bottlenose dolphins
  - Most often hooked in mouth

- Accidental hooking or entanglement
  - Small dolphins, beaked whales
  - Large whales

20

Frequency of depredation and marine mammal takes, 2003-2008
(excluding vessels during and after experimental trips)

DEEP-SET	# Sets	%	Sets with MM Takes	
Sets with MM depredation	1000	6%	20	2.0%
Sets without MM depredation	16729	94%	22	0.1%
TOTAL	17729		42	0.2%
SHALLOW-SET	**# Sets**	**%**	**Sets with MM Takes**	
Sets with MM depredation	130	3%	0	0.0%
Sets without MM depredation	4588	97%	14	0.3%
TOTAL	4718		14	0.3%

Fishermen and observers report that depredation is becoming more frequent

Mortalities and serious injuries of all cetaceans (1994-2008)

	Deep-set				Shallow-set				Other
SPECIES	Dead	Serious	Not Serious	Total	Dead	Serious	Not Serious	Total	Serious
False killer whale	2	24	3	29		1	1	2	1
Pilot whale	1	7	3	11	1	1		2	
'Blackfish'		11		11		1		1	
Risso's dolphin	1	4		5	2	15		17	
Bottlenose dolphin	1	1		2		6		6	
Spotted dolphin	2			2					
Striped dolphin	1			1		1		1	
Spinner dolphin							1	1	1
Common dolphin							1	1	
Mesoplodon beaked whale	1		1	2					
Unidentified beaked whale		1		1			1	1	
Pygmy or dwarf sperm whale							1	1	
Humpback whale			3	3		1	1	2	
Sperm whale							1	1	
Bryde's whale							1	1	
Unidentified whale/dolphin		7	2	9		3	1	4	
All species	9	55	12	76	3	29	9	41	2

Observed false killer whale and 'blackfish' takes by fishery (through Nov 2009)

(Source: Forney, 2009, Draft working paper SRG-2009-09)

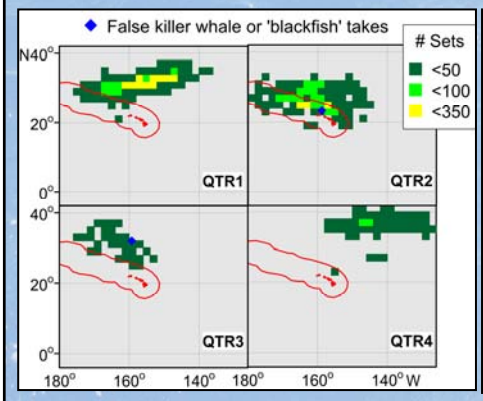
	Undeclared Sets	Deep Set	Shallow Set
1997	1		
1998	1		
1999	0		
2000	0 (1)		
2001	3 (1)		
2002		5	closed
2003		2 (1)	closed
2004		6	0
2005		2 (1)	0
2006		4 (2)	0
2007		4	0
2008		3 (3)	1(1)
2009		9	1

23

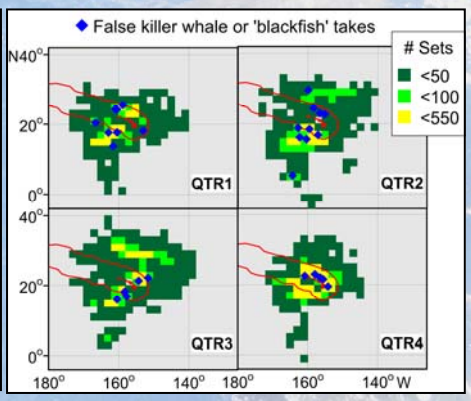
False killer whale and blackfish takes by quarter and fishery, Aug 2003 – Jun 2009

(observed effort summarized by 2° block)

Shallow-set

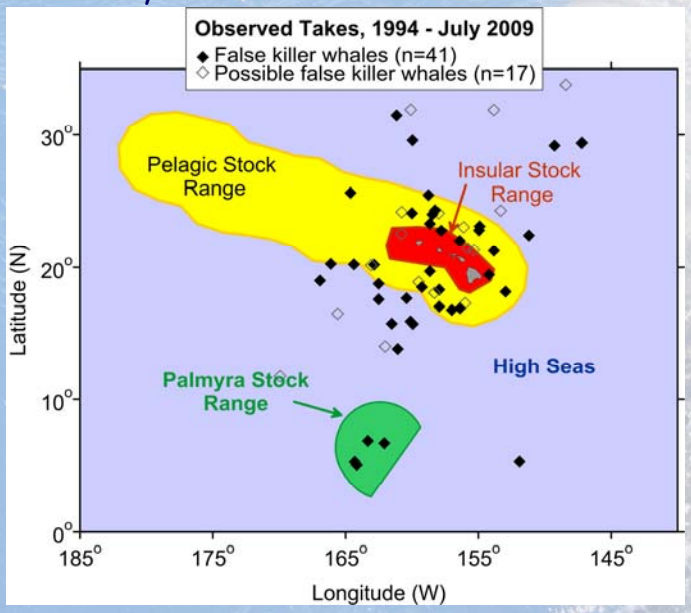


Deep-set



24

False killer whale and 'blackfish' takes by stock area 1994 to mid-2009



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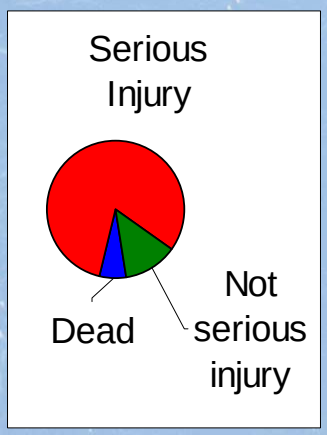
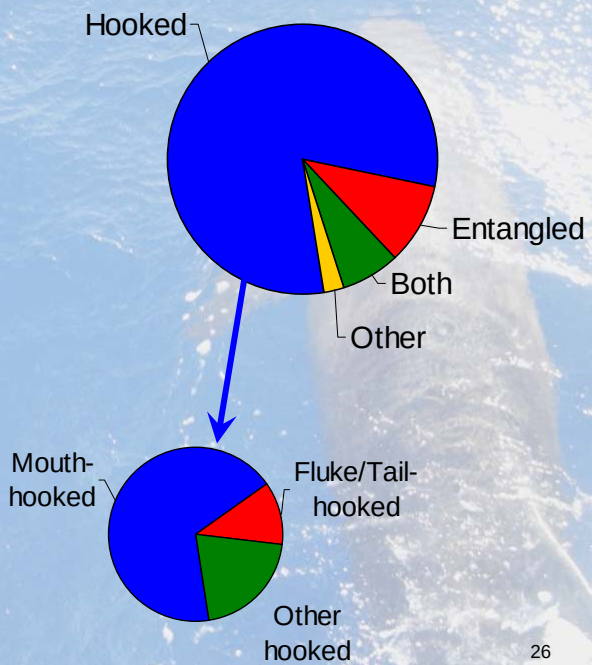
Types of interactions and injuries of false killer whales, 1994 to mid-2009



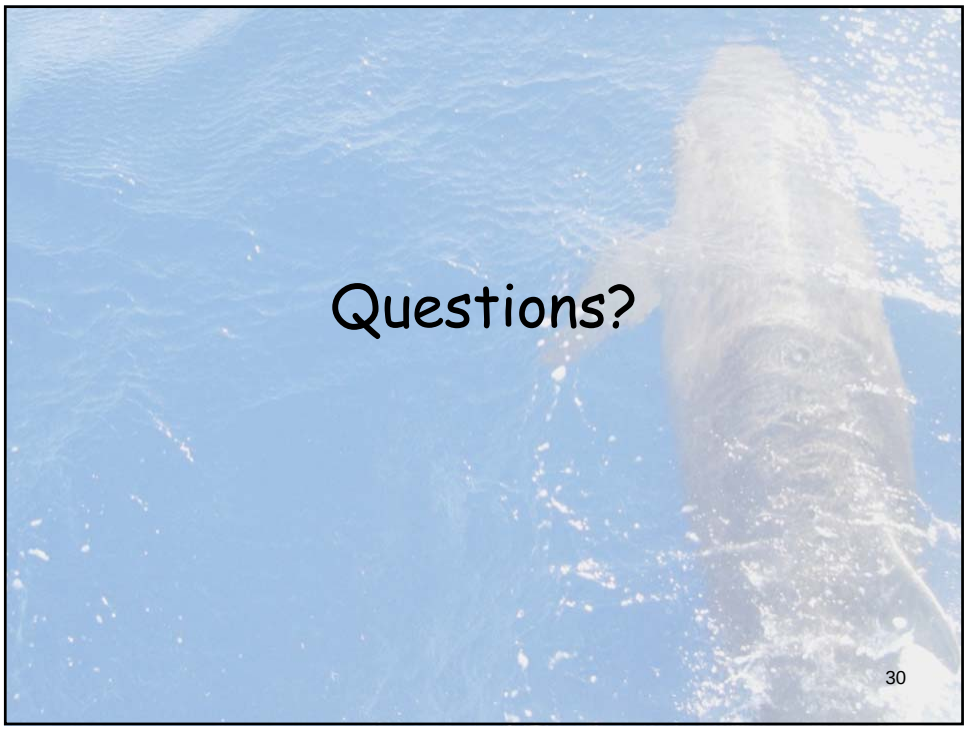


26


Of the 42 Interactions, 25 were photographed/ filmed, 6 produced a biological specimen, and 4 secured both a specimen and photo / video


Observers are taught handling and release tactics and encouraged to pass them on to the crews


Observers occasionally have opportunities to
record false killer whale behavior around the vessel


Questions?
30