APPENDIX I

B'13 FIELD SAMPLING QA/QC AUDIT FORMS

Bight'13 Grab Audit Checklist

Organization: _____ Date: _____

Boat: _____

Tasks	Check for Yes	NA = Not observed, available, applicable Comments
Pre-survey Field Audit	☐	
- organization supposed to use basic B'13 protocols		
In-Survey Field Audit	☐	
Within sampling Index (July 1 - Sept 30)	☐	
Sampled Bight'13 station	☐	
What strata?		
Personnel		
Who is the Cruise Leader?		
Crew safely hands equipment	☐	
Crew knows methods in manual	☐	
Crew prepared	☐	
Crew knows chain -of-command	☐	
Any observed trouble shooting	☐	
Crew has datasheets/manual/computer	☐	
Crew trained by Lead Scientist	☐	
Equipment		
Modified Van Veen Grab (single/double)	☐	
Material (galvanized/stainless)?		
Wash table/screen boxes (1 mm)	☐	
Water wash system (boat/portable)	☐	
Raw water screened	☐	
Communications (phone/others)	☐	
Boat has GPS (handheld/WAAS/DGPS)	☐	
Boat has fathometer	☐	
Boat has life vests/ring	☐	
CDFW Collection Permit aboard	☐	
Site acceptability		
Within radius (100m/200m)	☐	
Special canyon site (100 along X 200 across)	☐	
Within 10% depth (neglect <10m)	☐	
Special canyon site (20% depth)	☐	
Checked bottom salinity in estuary (>25ppt)	☐	
Greater than minimum depths?	☐	
(Min Depths are 6m-coastal, 3m-bay, 1m-estuary)		
Followed manual for site acceptability	☐	
Intermittent success (9 if < 500m)	☐	
Intermittent canyon success (6 if > 500m)	☐	
If site abandonment, was it valid	☐	
Was site completed normally	☐	
Benthic Sampling		
Grab lowered at appropriate speed	☐	
Crew could tell when grab hit bottom	☐	
Crew checked sample condition	☐	
(surface disturbance/evenness)		

Bight'13 Grab Audit Checklist

Organization: _____ Date: _____

Boat: _____

Tasks	Check for Yes	NA = Not observed, available, applicable Comments
Crew checked sample penetration		
Hanging debris cut off, inside retained		
Exterior debris discarded		
Overlying water drained carefully		
Penetration depth measured (nearest 0.5 cm)		
Sediment described properly		
Datasheet/computer input observed		
Biology grab		
Was biology grab done first		
Biology grab > 7cm penetration		
Water drained from grab retained/sieved		
Sediment thoroughly removed from sample		
Estuary-sediment removal done on land		
Off site screening done within 90 min		
Retained material transferred to jars		
Examined screen/used forceps		
30% headspace in jars		
Internal/external labels - splits		
30 minute relaxant treatment		
Formalin added after treatment (10%)		
Chemistry grabs		
Crew checked similar sediment types		
Crew checked similar penetration depth		
Chemistry grab >= 5 cm penetration		
Scoop material (stainless/plastic)?		_____
Plastic only acceptable for TOC/Grain size		
Surface sediment only collected		
Top 2 cm for the offshore		
Top 5 cm for bays, harbors, estuaries		
While scooping, avoided 1 cm of grab wall		
Multiple grabs-sediment distributed evenly		
Circle samples taken (Grain Size, TOC, Metals, Organics, Pyreth, PBDE, Alkylphen, Perfluor)		
Were samples iced in the field		
Planning to return samples to lab (24 hrs.)		TOC-refrigerate, Remaining-frozen
Perfluorinated jar without Teflon-lined lid		
Jars labeled appropriately		
Toxicology grabs		
Sediment not homogenized in field		
Scoop material (stainless/plastic)?		_____
Plastic scoop must be used		
Surface sediment only collected		
Top 2 cm for the offshore		
Top 5 cm for bays, harbors, estuaries		
Multiple grabs-sediment distributed evenly		

Bight'13 Grab Audit Checklist

Organization: _____ Date: _____

Boat: _____

Tasks	Check for Yes	NA = Not observed, available, applicable Comments
Tox Sample jars HDPE w/ Teflon-lined lids	☐	
Jars labeled appropriately	☐	
Circle samples taken (Eohaustorius, Mytilus, Neanthes, TIE)		
All samples iced/refrigerated	☐	
QAQC		
Grab scrubbed out between sites	☐	
Grab washed out between sites	☐	
Scoops cleaned between sites	☐	
Scoops placed in clean plastic bags	☐	
Scoops rinsed before use - ambient water	☐	
Left-over sediment dumped over side	☐	
Where (at site, underway, next site)?		_____
End of Day/Transport		
Sample tracking observed	☐	
Shipped samples iced in cooler	☐	
Chain of Custody Form completed	☐	
Datasheet/Tablet/Computer data check	☐	
Special Studies		
Observed special study sampling	☐	

Comments:

Bight'13 Otter Trawl Checklist

Agency: _____ **Vessel:** _____ **Date:** _____

EQUIPMENT AND PROCEDURES	Yes	No	N/A	Comments
Equipment Specifications				
Net Headrope (7.6 m)				
Body Mesh Size (4.1 cm)				
Cod-end Liner Mesh Size (1.3 cm)				
Non-crushable Floats				
Footrope Chain				
Otter Boards (51 x 76 cm or 20 x 30 in.)				
Bridle Length (22.9 m)				
P/T Sensor Mounted on Door				
Lotek Archival Tag Reader				
Other				
Trawling Procedures				
Properly Deployed				
Proper Wire Scope				
Bottom Time (10 min coast, 5 min bays)				
Successful Trawl				
Qualified Crew				
Other				

Notes:

BIGHT'13 FIELD QA/QC

Trawl Processing Equipment Checklist

Agency: _____ **Vessel:** _____ **Date:** _____

EQUIPMENT	Yes	No	N/A	Comments
Sorting Buckets/Trays				
Live Holding Tanks (optional)				
Measuring Boards				
Data Sheets				
Trawl Cover Sheets				
Trawl Fish Species Sheets				
Trawl Fish Size Class Sheets				
Trawl Invertebrate Species Sheets				
Trawl Debris Sheets				
Tare Container				
Spring Scales				
3 kg				
15 kg				
Other				
Other				
Field Guides and Aids				
Miller and Lea (1972)				
Eschmeyer et al. (1983)				
Kramer et al. (1995) (flatfishes)				
Allen (1977) (juvenile rockfishes)				
Orr et al. (2000) rockfishes				
Other				
Field ID Tool Kit				
Wide-mouth Jars (Plastic)				
Plastic Bags				
10% Buffered Formalin				
Freezer or Ice Chest				
Other _____				
_____				
_____				

SPRING SCALE CALIBRATION CHECK

	Weight (kg)				
Test Weight	**Scale A**	**Scale B**	**Scale C**	**Scale D**	**Scale E**
0.15 kg					
0.30 kg					
0.45 kg					

BIGHT'13 FIELD QA/QC

Trawl Processing Procedures Checklist

Agency: _____ **Vessel:** _____ **Date:** _____

EQUIPMENT	Yes	No	N/A	Comments
Proper Trawl Acceptance				
Removal of All Organisms from Net				
Species Identifications:				
Qualified Staff				
Accurate ID of Common Species				
Return of Difficult Species to Lab				
Length Measurement:				
Proper Designation of Size Class				
Proper Data Sheet Recording for <10 Fish				
Proper Recording on Size Class Data Sheet				
Bony Fish (Standard Length)				
Sharks, Rays, Ratfish (Total Length)				
Stingrays (Wingspan)				
Weight Measurement:				
Scales Calibrated				
Tare Bucket Weight Checked				
Proper Weighing Procedures:				
Species Greater than 0.1 kg				
Species Less than 0.1 kg				
Invertebrate Counts Made				
Invertebrate Counts from Weights				
Anomaly Examination Conducted				
Proper Anomaly Identifications				
Proper Anomaly Notation on Data Sheets				
Debris Assessment Conducted				
FID/Voucher Preservation				
10% Buffered Formalin				
Slitting Body Cavity of Fish				
Proper Labeling				
Proper Photographic Techniques				
Photo Log				
Completion of Data Sheets				
Trawl Cover Sheets				
Trawl Fish Species Sheets				
Trawl Fish Size Class Sheets				
Trawl Invertebrate Species Sheets				
Trawl Debris Data Sheets				
Tissue Sampling:				
Proper Choice of Species				
Proper Labeling				
Proper Freezing Techniques				

BIGHT'13 FIELD QA/QC

Fish and Invertebrate Identification and Processing Audit

Agency: _____ **Vessel: _____** **Date: ___**

Trawls

Attempted	
Successful	
Percent	

Species Identification

Number Species Examined	
Number Species Correct	
Percent Species Correct	

Anomaly Identification

No. Anomalies Examined	
No. Anomalies Correct	
% Anomalies Correct	

Problem Anomalies:

Incorrect ID	**Correct ID**	**Incorrect ID**	**Correct ID**

	Species	**Count** Listed	Audited	% Diff.	**Size** Listed	Audited	%Diff.	**Weight(kg)** Listed	Audited	%Diff.
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Comments

Completed by

BIGHT'13 TRAWL DEMERSAL FISH - QUALITY CONTROL FORM

Station: _____ **Trawl #:** _____ **Agency:** _____

Date: _____ **Previously Measured by:** _____

Re-Measured by: _____

Original Gross weight (kg) _____ **Tare Weight (kg)** _____ **Net weight (kg)** _____

QC Re-weigh weight (kg) _____ **Tare Weight (kg)** _____ **Net weight (kg)** _____

Size Class	Original Species:			Anomalies
	QC Re-ID:			
	Re-ID Count	+/-2 mm	Tweener count	
1		1-2		
2		2-3		
3		3-4		
4		4-5		
5		5-6		
6		6-7		
7		7-8		
8		8-9		
9		9-10		
10		10-11		
11		11-12		
12		12-13		
13		13-14		
14		14-15		
15		15-16		
16		16-17		
17		17-18		
18		18-19		
19		19-20		
20		20-21		
21		21-22		
22		22-23		
23		23-24		
24		24-25		
25		25-26		
26		26-27		
27		27-28		
28		28-29		
Total		Total		

Other Species found in sample:			QA/QC Acceptance	Pass	Fail	Initials
			Identification			
			Count			
			Length			
			Biomass			
Other species Weight (kg)			Pathology			
Gross	Tare	Net	Notes:			

Anomaly Codes (*record as superscript to length measurement*): **A** = ambicoloration, **B** = albinism, **D** = skeletal deformity, **E** = copepod eye-parasite (i.e., *Phrixocephalus*), **F** = fin erosion, , **H** = Leeches, **L** = lesion (*describe in* Comments), **M** = Monogeneans, **O** = other anomaly (*describe in* Comments), **P** = other external parasite (*describe in* Comments), **T** = tumor, multiple occurrences on individual put "-"and #

Using the "Tweener" count section of the QAQC Form

This form closely resembles regular "size class data sheets" except for the allowance of measurements that fall directly near an integer value of a size class. This "tweener" method should be used by the auditor for the recheck/assessment, not for subsequent retests of a species by field crew. To use the form, any measured fish that falls +/- 2mm on either side of a centimeter mark (integer), place a tally mark on the right side of the form straddling the two sizes in question. For example, a fish measuring 59 mm would have a tweener tally in the 5-6 cm category. A fish measuring 63 mm would have a normal tally in the 7 cm size class category.

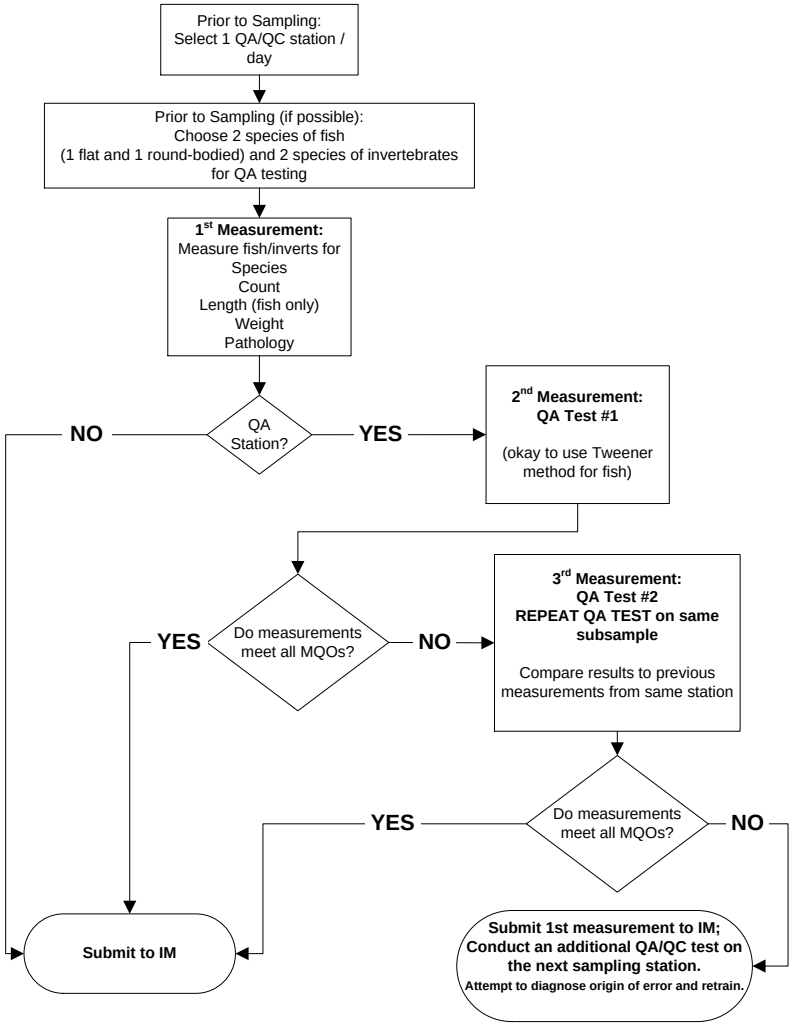
Measurement errors generally occur with fish measured near the centimeter mark. These errors tend to be subjective, so the "tweener" method helps auditors reduce the ambiguity. To evaluate the crews performance, the auditor compares normal size class tallies. Any differences can be the result of "tweeners" and moves tweener tallies up or down once. If a 10% or greater difference still exist, the crew has failed the initial QC assessment and needs to re-measure the batch of fish again. Another failure results in spot training by the Cruise leader and re-measurements until error is less than 10%. The subsequent trawl is categorized as another QC trawl with auditor assessing the crew again. The auditor does not have to use the tweener (right-side) section, so all size-class measurements will be recorded on the left-side of the sheet.

Size Class	Original Species: *Microstomus pacificus* QC Re-ID:			Anomalies
	Re-ID Count	+/-2 mm	Tweener count	
6	||	6-7		
7	|	7-8	|	
8	||	8-9	𝍸	
9	|	9-10	|	
10		10-11		
11		11-12		
12		12-13		

This fish can be counted as a 7 or 8 size class

These fish can be counted as a 8 or 9 size class

This fish can be counted as a 9 or 10 size class



BIGHT'13 TRAWL INVERTEBRATE - QUALITY CONTROL FORM

Station: _____ **Trawl #:** _____ **Agency:** _____

Date: _____ **Previously Measured by:** _____

Re-Measured by: _____

Species #1

Original Species name:				
QC Re-ID Species name:				
Comments/Anomalies	**N**	**QC Re-weigh (kg)**		
		Gross	**Tare**	**Net**
Other species found in lot				
1				
2				
3				

Anomaly Codes: **B** = burnspot, **P** = External Parasite, **W** = wasting disease, **O** = other anomaly (*describe)* _____

Species #2

Original Species name:				
QC Re-ID Species name:				
Comments/Anomalies	**N**	**QC Re-weigh (kg)**		
		Gross	**Tare**	**Net**
Other species found in lot				
1				
2				
3				

Anomaly Codes: **B** = burnspot, **P** = External Parasite, **W** = wasting disease, **O** = other anomaly (*describe)* _____

Species #1

QA/QC Acceptance			
Metric	**Pass**	**Fail**	**Initials**
ID			
Count			
Biomass			
Anomalies			

Species #2

QA/QC Acceptance			
Metric	**Pass**	**Fail**	**Initials**
ID			
Count			
Biomass			
Anomalies			

Notes:

ALIQUOT RECORDING AND CALCULATIONS WORKSHEET (If necessary)

Species 1

ALIQUOT DATA

Species:	**N**	**Gross (kg)**	**Tare (kg)**	**Net (kg)**
Record Catch gross weights here:	*Show calculations here*			
	Catch gross wt. – Catch tare wt. = catch Net wt.			
	_____ - _____ = _____			
	(Catch Net wt. /Aliquot net wt.) x # in Aliquot = Abundance			
	_____ **x** _____ **=** _____			

All weights are to be recorded in kg.

Species 2

ALIQUOT DATA

Species:	**N**	**Gross (kg)**	**Tare (kg)**	**Net (kg)**
Record Catch gross weights here:	*Show calculations here*			
	Catch gross wt. – Catch tare wt. = catch Net wt.			
	_____ - _____ = _____			
	(Catch Net wt. /Aliquot net wt.) x # in Aliquot = Abundance			
	_____ **x** _____ **=** _____			

All weights are to be recorded in kg.

Error Calculation Examples

1 Fish count:

Calculated as percent difference between total numbers of fish in original count vs. QA/QC recount.

Initial count:	46 specimens of *Sebastes saxicola*
QA/QC recount:	44 specimens of *Sebastes saxicola*
Percent error:	46 - 44 = 2 (2 / 46)*100 = 4.3% error
Acceptability:	Yes
Report:	Note percent error and sign off on QA/QC sheet under "QA/QC Acceptance" - "Count". Attach QA/QC sheet to original data record. Enter QA/QC data into computer record.
From DBM or QA/QC Officer:	included in notebook and as comment in Event table.

2 Fish Size-class measurement:

Calculated as a percent difference between original report and QA/QC size class notations.

Example for species *Microstomus pacificus*: 36 specimens were distributed over 12 size classes as follows:

QA/QC

Size	Initial abundances	Abundances	Difference
4	2	3	1
5	0	1	1
6	3	3	0
7	0	0	0
8	5	5	0
9	0	1	1
10	2	1	1
11	4	4	0
12	6	7	1
13	7	6	1
14	2	2	0
15	1	2	1
16	4	3	1

Total discrepancies = 4

Percent error:	4 specimen discrepancies / 36 specimens = 11.1% size class error
Acceptability:	No
Results:	Re-measure until MQO is met. In this case, until two readings errors are less than 10%.

Report:	Note percent error and sign off on QA/QC sheet under "QA/QC Acceptance" - "Length". Attach QA/QC sheet to original data record. Enter into QA/QC data into computer record.
From DBM or QA/QC Officer:	Included in notebook and as field event comment.

Note: Each of the above circled pairs is considered a single error. Correction of one of the paired errors results in the pair being correct.

3 Biomass QA/QC:

Calculated as percent difference between original report and QA/QC size class notations. Weights of 1.0 kg or less are expected to be within +/- 0.1 kg of the QA/QC weight. Net weights greater than 1.0 kg will need to be with 10% of a QA/QC weight. Percent error calculated between these determinations is used to determine acceptability.

Example: Species *Lyopsetta exilis* initially weighs 1.5 kg. Re-weighed, it measures 1.4 kg

Percent error:	1.5 – 1.4 = 0.1 differences 0.1 / 1.5 = 6.6 % error
Acceptability:	Yes
Results:	conserve with files
Report:	Note percent error and sign off on QA/QC sheet under "QA/QC Acceptance" - "Biomass". Attach QA/QC sheet to original data record. Enter into computer record.
From DBM or QA/QC Officer:	included in notebook and as field event comment.

4 Pathology:

Example: Species *Citharichthys sordidus* has 19 individuals, one with an eye parasite. Recount reveals the same individual with an eye parasite and a skeletal deformity.

Initial count:	19 individual non-abnormality 1 individual eye parasite
QA/QC recount:	19 individual non-abnormality 1 individual eye parasite and skeletal deformity
Percent error:	1 individual with mismatched anomaly (1 / 19)*100 = 5.26% error
Acceptability:	No
Results:	Re measure until two closest discrepancy results agree by > 95% and select fish group measured as data reported.
Report:	Note percent error and sign off on QA/QC sheet under "QA/QC Acceptance" - "Pathology". Attach QA/QC sheet to original data record. Enter into computer record.
From DBM or QA/QC Officer:	included in notebook and as field event comment.