Proposal for an Exempted Fishery Permit
West Coast Pelagic Conservation Group

A proposal for continuation of the Southwest Fisheries Science Center (SWFSC)-Industry Collaborative[1] "Proof of Concept Project" started in 2017, for Nearshore Surveillance in NW Coastal Waters, in conjunction with the SWFSC Acoustic Trawl Methodology Survey (ATM)

1. Applicants must submit a completed application in writing that includes, but is not limited to, the following information:

a. **Date of application.**
Submitted March 16th, 2019 with updates. Originally submitted October 19, 2017 and tentatively approved by the SSC November 2017 for PFMC review in April 2018.

b. **Applicant's names, mailing addresses, and telephone numbers.**
West Coast Pelagic Conservation Group
Mailing Address:
Phones:

c. **A statement of the purpose and goals of the experiment for which an EFP is needed, including a general description of the arrangements for the disposition of all species harvested under the EFP.**
The purpose of this experiment is to use a CPS purse seine vessel appropriately outfitted to provide acoustic data collection and additional sampling for nearshore areas, to supplement the proposed 2019 NOAA/SWFSC acoustic-trawl survey. Sampling will be conducted at the same general time and location, adjacent to the NOAA survey transects, and in nearshore areas inaccessible to the NOAA vessel. As practicable and directed by the NOAA survey team, biological sampling may be done at night and/or in proximity to the survey ship trawl sampling. The EFP is needed because directed sardine fishing is closed.
Small amounts of live-caught coastal pelagic species (CPS) will be retained for species composition and biological sampling. Sampled fish will include sardines, anchovies, mackerel(s), and other CPS species. A WDFW biologist(s) with CPS expertise and experience on the NOAA/SWFSC ATM survey will conduct the sampling on-board the vessel. If necessary, some samples may be frozen and retained for identification and biological measurements to be performed by NOAA. Wrapped schools will be released alive, and no fish will be retained for commercial purposes. We anticipate dipnetting only the amount of fish necessary for sampling. Any excess fish will be released alive.

[1] Please note the addition of the Washington Department of Fish and Wildlife (WDFW) as a member of the Collaborative Team and resource contributor:

d. **Valid justification explaining why issuance of an EFP is warranted.**
The EFP is warranted to provide information in addition to the NOAA ATM survey, by providing indications of distributions and abundance, and species composition of CPS species in near-shore adjacent areas where the NOAA survey cannot sample or survey.

The industry vessel will be equipped with a calibrated Simrad EK-60 downsounder that will acoustically sample the area nearshore of the NOAA ATM survey area in order to make relative comparisons with the off-shore areas surveyed by the NOAA vessel. This is an enhanced extension of the 2017 collaborative "proof of concept" endeavor that the SWFSC and the NW fishing industry did off the coast of Washington and Oregon (See Attachment 1: 2017 Project Instructions from the SWFSC). This effort was a cooperative work utilizing the survey vessel *Reuben Lasker* and the seine fishing vessel *Lisa Marie.*

Directed sardine fishing is presently closed. Although the requested EFP amount is relatively small, Council and NOAA staff have advised us that an EFP is appropriate to continue this project.

e. **A statement of whether the proposed experimental fishing has broader significance than the applicant's individual goals.**
The experimental fishing/surveillance model could be applied to other species of fish that inhabit nearshore areas in any U.S. or Canadian waters. The techniques could be applied anywhere that additional species composition sampling would benefit fisheries survey work.

Near-shore biological sampling and acoustic work may be useful to inform future stock assessment on CPS, or other species' abundance, behavior, and composition in near-shore waters where trawl sampling and deep draft vessel surveillance is not an option.

f. **A statement whether the applicant intends to continue the EFP activities for more than one year. NMFS issues EFPs for only one year at a time. However, if an EFP proposal has a multi-year focus, this information should be included in the proposal.**
Yes, the applicants intend to continue more than one year.

g. **Number of vessels and processors covered under the EFP, as well as vessel names, skipper names, and vessel ID and permit numbers.**
One vessel: *F/V Lisa Marie*, Coast Guard #: 1038717.
Skipper: Ricky Blair. Owner: Andy Blair.

No processors will be involved in the handling of the samples unless it is to transfer samples to a location designated, and as directed, by the survey team, further WDFW staff may be able to facilitate delivery of fish retained for sampling by NOAA. There will be no commercial sale or purchase of fish in this project.

h. **A description of the species to be harvested under the EFP and the amount(s) of such harvest necessary to conduct the experiment; this description should include estimates of harvest impacts to non-target species.**

Species may include Pacific sardine, northern anchovy, jack mackerel, and Pacific mackerel, and other CPS. Estimated need is a maximum of 10 metric tons for all CPS species combined, although the sardine portion will be substantially less than 10 met. Non-CPS species will be released from the seine alive.

i. **A reasonable justification for the amount of EFP fish to be harvested. For statistical purposes, this could include a power analysis or other means to estimate a reasonable amount or number of fish. Any other justification that supports the amount of fish proposed for EFP activities should also be included.**
Small amounts of CPS will be dip-netted from sets to determine catch composition, and per set a minimum of 50 fish per CPS species up to a maximum of 25kg (i.e., combined weight of all CPS species) will be retained for biological sampling. 50 fish per species sampled is considered a standard number for these purposes, and we will follow the recommendations of SWFSC scientists regarding sample sizes.

Species composition will be accomplished by dip-netting from the seine net at top, mid, and bottom levels of the net. The dip-netted fish will be sampled fresh aboard the *F/V Lisa Marie* by a qualified WDFW biologist for length, individually counted by species, weighed by species, and otoliths will be collected. The target sample batch size will be approximately 50 fish per species per set, but the number of schools that can be sampled during the survey period will determine the total amount of each species harvested. If deemed necessary by the SWFSC some samples may be frozen and sampled at a later date. For more detail see Appendix 1.

The 10 mt EFP request is adequate to accommodate sampling of all CPS species, and is likely much greater than the actual weight of sardines to be harvested for this EFP research project. Any given set is likely to include a substantial portion of other CPS, and we anticipate sardine harvest to be less than five mt.

j. **A description of a mechanism, such as at-sea or dockside fishery monitoring, to ensure that the harvest or impact limits for targeted and incidental species are not exceeded, and are accurately accounted for and reported.**
Monitoring of sampling efforts will be in conjunction with the NOAA ATM survey team that will be sampling adjacent areas offshore of the proposed near-shore survey area. There may be a NOAA observer onboard the seine vessel when sampling occurs or at other appropriate times as there was in 2017. For 2019 WDFW is contributing to the project by providing a WDFW employed biologist with extensive sampling experience to conduct onboard sampling. The biologist will maintain and complete an observer log for each set.

The participants do not intend to harvest any fish in commercial quantities while operating under this EFP.

k. **A description of the proposed data collection methods, including procedures to ensure and evaluate data quality during the experiment, and data analysis methodology and timeline of stages through completion.**
See Appendix 1: 2017 Project Instructions from the SWFSC for data collection methods and procedures to evaluate data quality and Appendix 2: Draft Responses to SSC Questions.

l. **A description of how vessels will be chosen to participate in the EFP.**
The *Lisa Marie* was chosen based on dialogue with the NOAA survey team about the type and size of vessel, availability, and a history of conducting research. The vessel selection was supported by members of West Coast Pelagic Conservation Group.

m. **For each vessel covered by the EFP, the approximate time(s) and place(s) fishing will occur, and the type, size, and amount of gear to be used.**
Survey time and locations will be scheduled to be in conjunction with the NOAA survey activities, most likely in a 14-day window between June 25th and August 31. Exact time and dates will be dependent on the NOAA survey vessel schedule. Only one purse seine gear using gear that complies with state and federal gear regulations will participate in the project.

All EFP "fishing" will be under the direction of the survey team and with either or both a WDFW biologist and NOAA observer onboard. Fishing will be for the collection of samples – not for commercial enterprise.

n. The signature of the applicant.

Michael M. Okoniewski

Board Member

West Coast Pelagic Conservation Group

Appendix 1: Project Instructions

Date Submitted: 5 June 2017

Platform: Fishing Vessel *Lisa Marie*

Project Title: SWFSC-Industry Collaborative, Summer 2017 Nearshore Survey

Project Dates: 5-10 days during ~1-13 July 2017

Prepared by: _____ Dated:
David A. Demer, Ph.D.
Senior Scientist, Group Leader
Advanced Survey Technologies,
SWFSC

Approved by: _____ Dated:
Mike Okoniewski Industry
Representative West Coast Pelagic

Approved by: _____ Dated:
Gerard DiNardo, Ph.D.
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Approved by: _____ Dated:
Kristen Koch
Science and Research Director (Acting)
SWFSC

F/V *Lisa Marie*

Contents

1 Overview

During June 19-August 11, 2017. NOAA FSV *Reuben Lasker* will be used by SWFSC FRD to survey the distributions and abundances of coastal pelagic fish species (CPS), their prey, and their biotic and abiotic environments in the California Current between San Diego, California and the northern extent of Vancouver Island, Canada (RL-17-04). Historically, Lasker has only surveyed in water depths greater than ~ 50 m and consequently does not sample the nearshore area, potentially under sampling any nearshore CPS aggregations. The aim of this collaborative research is to quantify this potential sampling bias by using an industry fishing vessel, *Lisa Marie,* to extend the sampling closer to shore.

The principle components of the nearshore sampling include: AST's Simrad EK60 General Purpose Transceiver (GPT) connected to *Lisa Marie's* Simrad 38 kHz transducer (ES38-B); AST's video logging electronics connected to *Lisa Marie's* Furuno 250 sonar display; and industry's processing of *Lisa Marie's* purse seine catches. During the week of 19 June, an AST member (Josiah Renfree) will work with J&G Marine Supply to install and test the EK60 and video recording systems. JR will calibrate the EK60 system so the data may be used to estimate CPS biomass in a nearshore sampling stratum. The sonar imagery will be used to qualitatively evaluate the numbers, sizes, and behaviors of CPS aggregations.

When *Lasker* is sampling near Westport, Washington (estimated between 1 and 9 July), two industry observers (Andrew Blair and Greg Shaughnessy) will embark *Lasker* from *Lisa Marie.* Meanwhile, for 5 to 10 days, when *Lasker* is surveying off Washington and Oregon, *Lisa Marie* will conduct complementary echosounder (Simrad EK60), sonar (Furuno 250), and purse-seine sampling along nearshore extensions of *Lasker's* survey transects. During this period, an AST member (Scott Mau) will be aboard *Lisa Marie* to log data, advise on the sampling protocol, and maintain a log of sampling activities, and species proportions and lengths in the catches.

Industry may also sample concomitantly with an aircraft-based camera, as during summer 2015 and 2016. If the aerial-photographic sampling is done, the acoustician aboard *Lasker* (Steve Sessions) and Captain Ricky Blair aboard *Lisa Marie* will coordinate with the fishing industry's pilot to assure that the nearshore transects are sampled from the various platforms as close in time as possible.

2 Sampling Protocol

Lisa Marie is expected to begin sampling the nearshore strip of the Washington Coast 5 miles north of *Lasker's* transect 101 (Latitude 47.678° N; Fig. 1) and continue as far south as times allows. The east-west transect are approximately 6.5 miles long to allow sampling of 3 transects per day during about 5 hours. Acoustic sampling of each east-west transect is expected to occur on a straight line between the inshore and offshore waypoints (Table 1). Deviations from these transect lines should be minimized. Each day, after the transects have been surveyed, *Lisa Marie* will fish to sample fish species and sizes.

Conditions permitting, *Lisa Marie* and *Lasker* will rendezvous daily to exchange information and maintain temporal and spatial coherence of the samples. If daily encounters are not possible, or if a large temporal mismatch between *Lisa Marie* and *Lasker* occurs, *Lisa Marie* will continue the sampling protocol independently of *Lasker,* at a rate of 3 to 4 transects per day for the remaining available time.

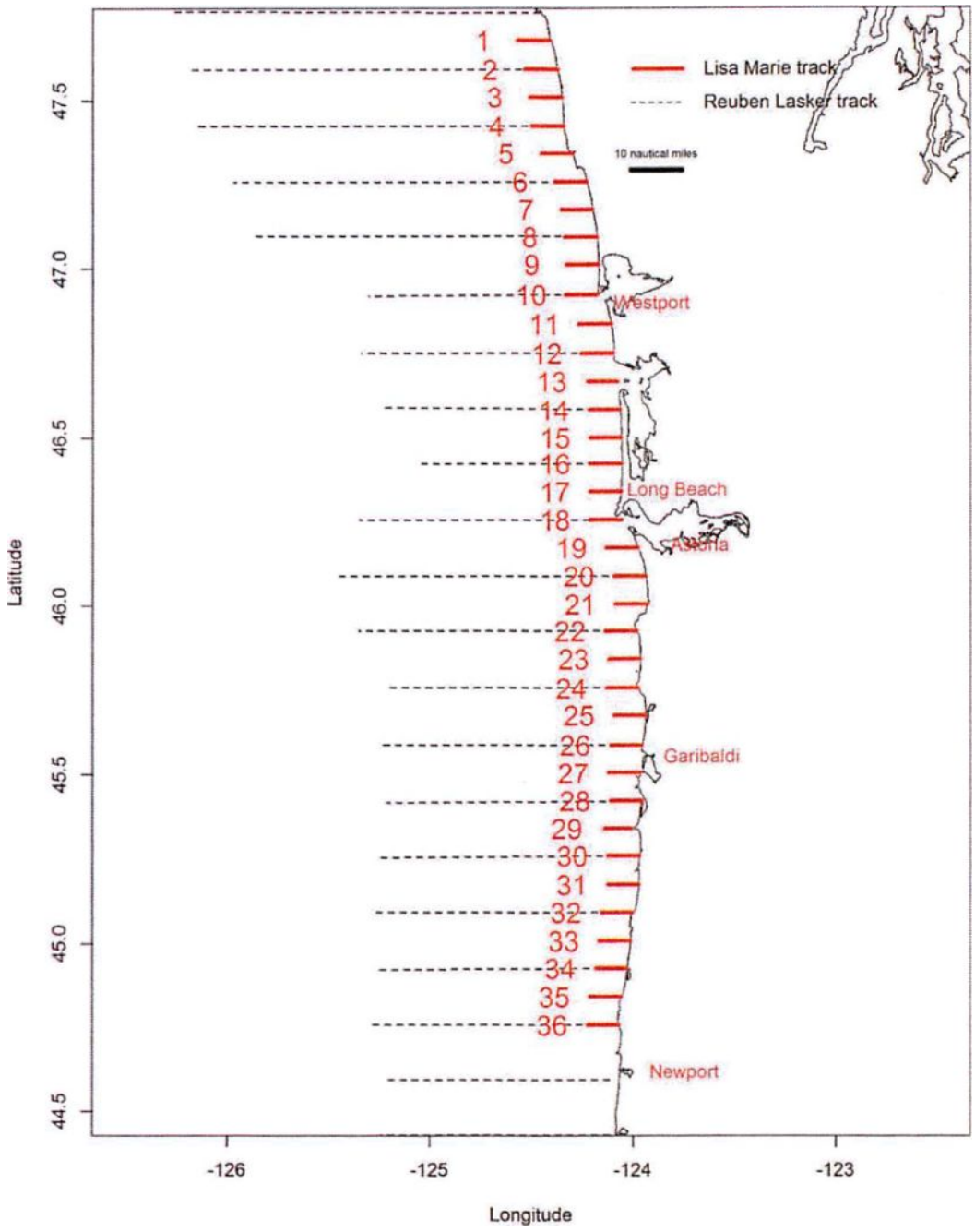


Figure 1. Nearshore survey transects to be sampled by *Lisa Marie* (red thick lines) overlaid on *Lasker's* compulsory lines (black thin dashed lines). Note, *Lisa Marie* will run the nearshore transects to the east, as close to shore as safely navigable.

Table 1. Waypoints for *Lisa Marie's* proposed track lines in Fig. 1. Note, the inshore waypoints are nominal, and *Lisa Marie* will continue transects as close to shore as safely navigable.

Transect	Waypoint	Longitude (° W)	Latitude (° N)
1	inshore	-124.408	47.67865
1	offshore	-124.569	47.67865
2	inshore	-124.372	47.59303
2	offshore	-124.534	47.59303
3	inshore	-124.35	47.51007
3	offshore	-124.509	47.51007
4	inshore	-124.34	47.42475
4	offshore	-124.501	47.42475
5	inshore	-124.298	47.34211
5	offshore	-124.453	47.34211
6	inshore	-124.227	47.25872
6	offshore	-124.387	47.25872
7	inshore	-124.198	47.1762
7	offshore	-124.354	47.1762
8	inshore	-124.178	47.09451
8	offshore	-124.337	47.09451
9	inshore	-124.171	47.01194
9	offshore	-124.328	47.01194
10	inshore	-124.174	46.92323
10	offshore	-124.333	46.92323
11	inshore	-124.109	46.83707
11	offshore	-124.267	46.83707
12	inshore	-124.097	46.75073
12	offshore	-124.255	46.75073
13	inshore	-124.078	46.66776
13	offshore	-124.223	46.66776
14	inshore	-124.064	46.5832
14	offshore	-124.215	46.5832
15	inshore	-124.059	46.50017
15	offshore	-124.212	46.50017
16	inshore	-124.057	46.42188
16	offshore	-124.213	46.42188
17	inshore	-124.059	46.33892
17	offshore	-124.211	46.33892
18	inshore	-124.056	46.25472
18	offshore	-124.212	46.25472
19	inshore	-123.977	46.17179
19	offshore	-124.132	46.17179
20	inshore	-123.938	46.08754
20	offshore	-124.093	46.08754
21	inshore	-123.93	46.005

21	offshore	-124.087	46.005
22	inshore	-123.981	45.92587
22	offshore	-124.137	45.92587
23	inshore	-123.965	45.84418
23	offshore	-124.118	45.84418
24	inshore	-123.975	45.75824
24	offshore	-124.129	45.75824
25	inshore	-123.94	45.67655
25	offshore	-124.091	45.67655
26	inshore	-123.958	45.5889
26	offshore	-124.109	45.5889
27	inshore	-123.965	45.50541
27	offshore	-124.12	45.50541
28	inshore	-123.958	45.42117
28	offshore	-124.109	45.42117
29	inshore	-124.01	45.33863
29	offshore	-124.138	45.33863
30	inshore	-123.969	45.25779
30	offshore	-124.123	45.25779
31	inshore	-123.972	45.17355
31	offshore	-124.123	45.17355
32	inshore	-124.002	45.09101
32	offshore	-124.155	45.09101
33	inshore	-124.013	45.00847
33	offshore	-124.165	45.00847
34	inshore	-124.03	44.92763
34	offshore	-124.182	44.92763
35	inshore	-124.058	44.84371
35	offshore	-124.211	44.84371
36	inshore	-124.07	44.76032
36	offshore	-124.222	44.76032

At the conclusion of the collaborative nearshore sampling (estimated 13 July 2017), the two industry observers (AB and GS) will disembark *Lasker* to *Lisa Marie.* At the conclusion of the nearshore survey aboard *Lisa Marie,* SM will be put ashore at Westport, WA.

3 EK60 System

The EK60 system is comprised of a 38-kHz GPT, a split-beam transducer, AC or DC power, a connection to the ship's ground, synchronization with other sounders and sonars, and an Ethernet connection to a laptop PC running Simrad ER60 control and data logging software. In this installation, the temperature sensor, event input, motion sensor, new line, and remote on/off inputs (see **Fig. 2)** will not be used.

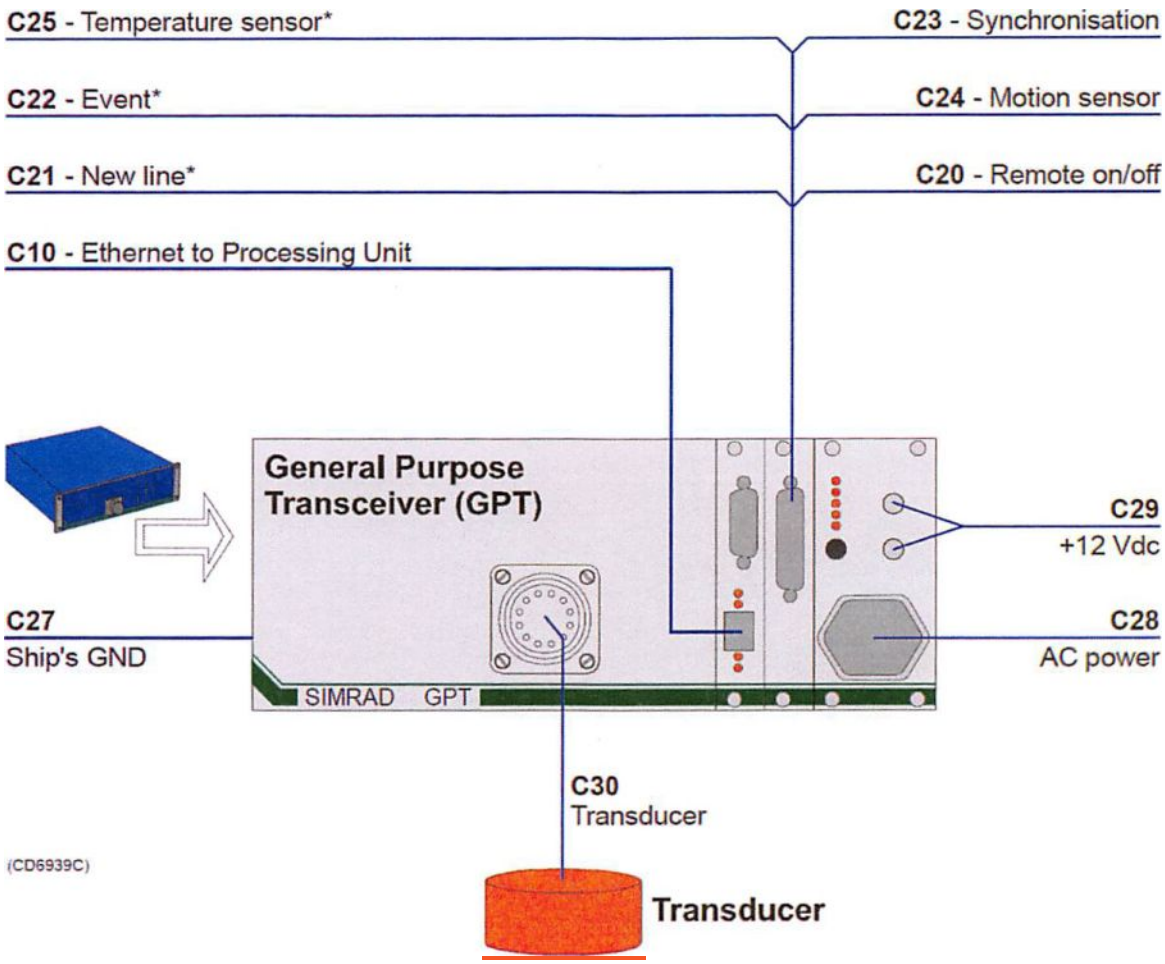


Figure 2. Diagram of connections to the Simrad General Purpose Transceiver (GPT), notably including: TrigOut from the auxiliary port (C23), AC power (C28), grounding (C27), ES38-B transducer (C30), and Ethernet to a laptop running Simrad ER60 software (CIO).

3.1Transducer

The ES38-B transducer, mounted in the hull of *Lisa Marie,* is connected, via a terminal strip in a junction box on the bridge, to the GPT using an 11-pin Amphenol connector **(Fig. 3).**

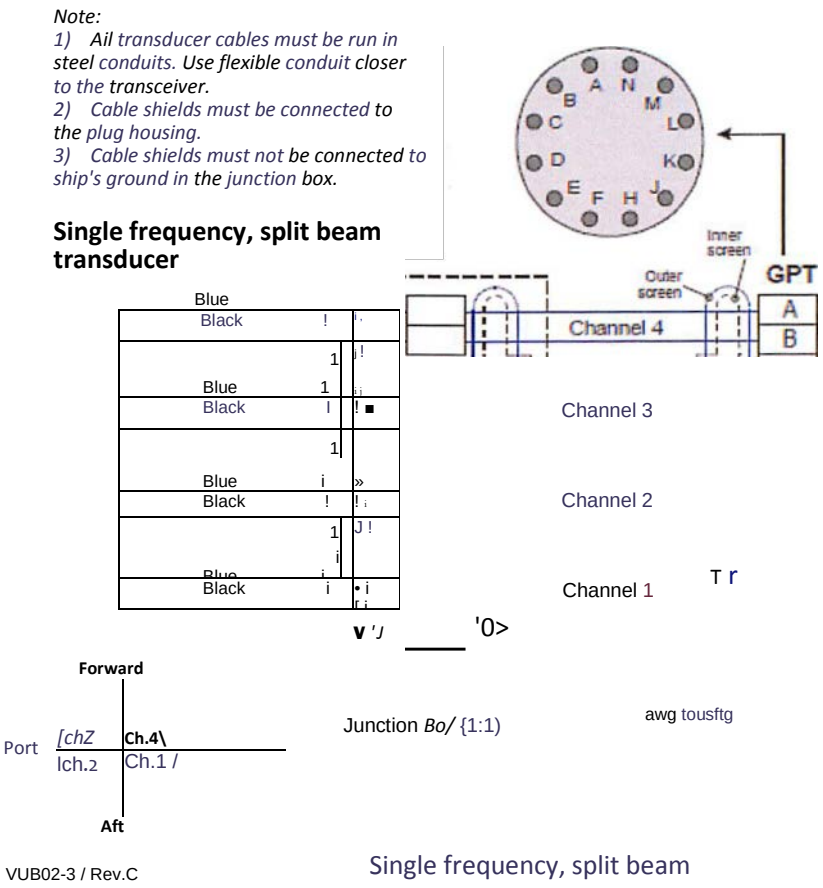


Figure 3. Wiring diagram for the Amphenol connector used to connect the ES38-B transducer to the EK60 GPT. Note, the polarity is important for split-beam function; and the cable shields must <u>not</u> be connected to the ship's ground in the junction box.

3.2 Power

The GPT may be powered by either 110 AC or 12 VDC/7A. To reduce noise in the echosounder data, use a power strip with line filter.

3.3 Ground

The GPT chassis must be connected to the ship's ground using a cable that is as short as possible.

3.4 Synchronization

To mitigate "cross-talk" noise in the EK60 data, the EK60 ouputs a "master" trigger pulse that should be used to synchronize the transmissions from sonars and other sounders. The TrigOut signal from the GPT Auxiliary connector is available with either positive or negative triggering **(Fig. 4).** The TrigOut+ signal is an open collector output (max 100 mA) containing a 100-kOhm pull-up resistor to +5 VDC. This signal is normally low. The TrigOut+ signal goes high when the GPT is ready to transmit, and it goes low again when the GPT has finished transmitting. TrigOut- is the inverse of TrigOut+. Connect the ground wire to one of the Ground pins (18-22).

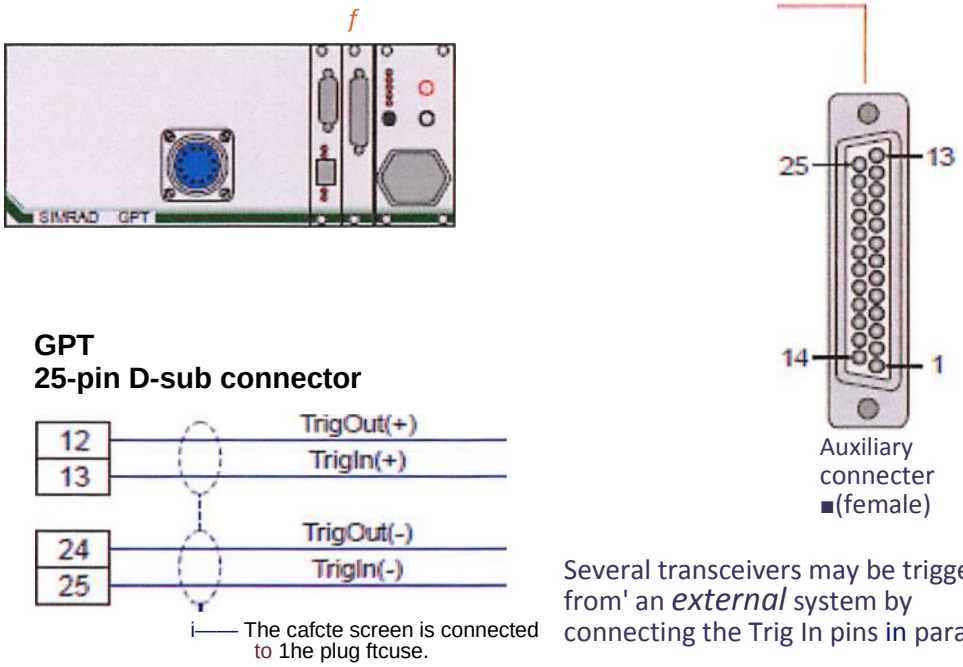


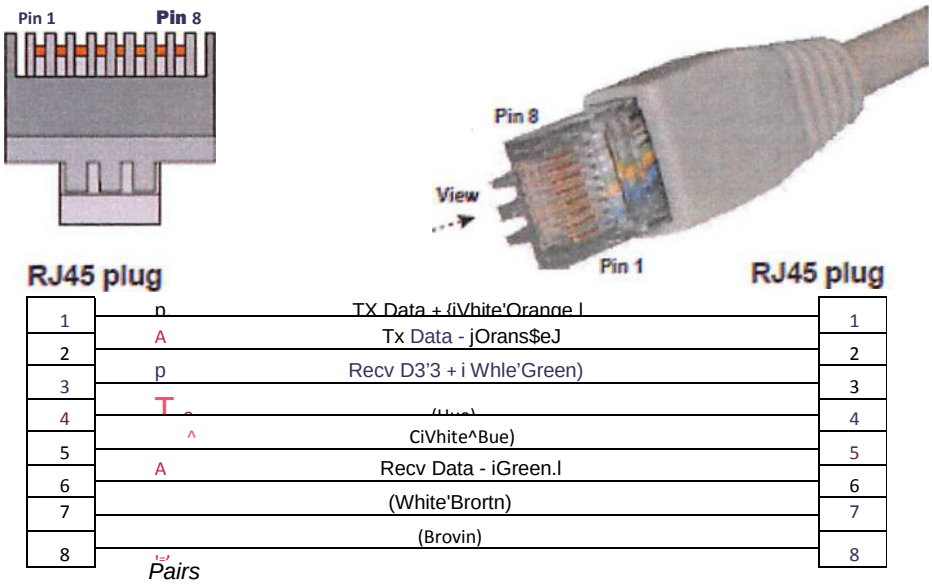
Figure 4. The Auxiliary port on the EK60 GPT provides TrigOut signals that should be used to synchronize the transmit pulses from all echosounders and sonars. This trigger signal is available with either positive (TrigOut+) or negative (TrigOut-) triggering.

3.5 ER60 Computer

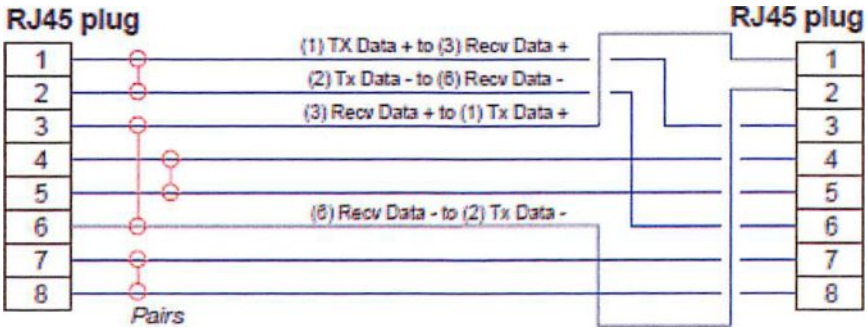
The EK60 will be controlled, and its data will be logged, using a laptop PC running Simrad ER60 software. Data will be backed-up to USB hard disk drives (HDDs).

3.6 Ethernet

The Ethernet cable which connects the GPT and the laptop may be direct, using a "crossover cable", or via an Ethernet switch, using two "straight through" Ethernet cables **(Fig. 5).**



Ethernet 10Base-T "Straight Through



Ethernet 10Base-T Crossover

MOTE; In order so prevent noise and crossover. you are strongly **adviced** to ise the cable pairs indicated above.

The "crossover' **cable** is used so cascade HU3s, or **fc«T** cm **netting** mo **Ethernet** stations or corrpicers back-to-back without a HUB)

W4D0 / Rev E — Ethernet 10Base-T with RJ45 plugs

Figure 5. The GPT and laptop are connected by Ethernet, either directly using a "crossover" cable, or via a switch using "straight through" cables.

3.7GPS Data

NMEA 0183 data from a GPS receiver must be input to the laptop via a USB-serial adapter. The communication parameters are 4800 bps, 8 data bits, no parity, and one stop bit. The GPS's serial output signal (Tx, pin 3) and ground (pin 5) wires must be connected to the laptop's serial input signal (Rx, pin 2) and ground (pin 5) wires using a maximum cable length of 10 m (Fig. 6).

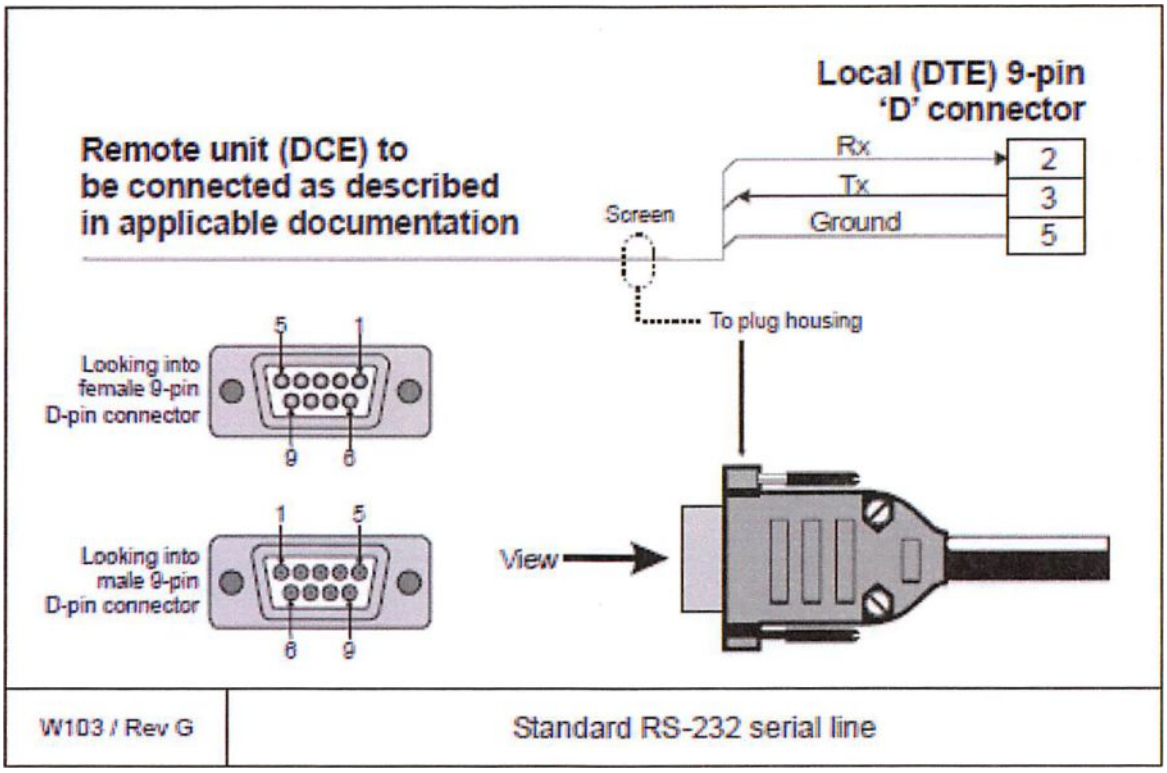


Figure 6. The GPS's transmit signal (NEMA 0183 format) is input to the laptop PC on pins 3 (Tx) and 5 (ground) of a DB-9 connector.

4 EK60 Calibration

The echoes received by the EK60 system must be calibrated relative to a sphere made from tungsten carbide with 6% cobalt binder material, suspended directly beneath the transducer, at a range of more than 20 feet, using two or three lengths of fishing line **(Fig. 7).** The lines may be controlled manually. This procedure requires two people on deck and one on the bridge observing the ER60 display.

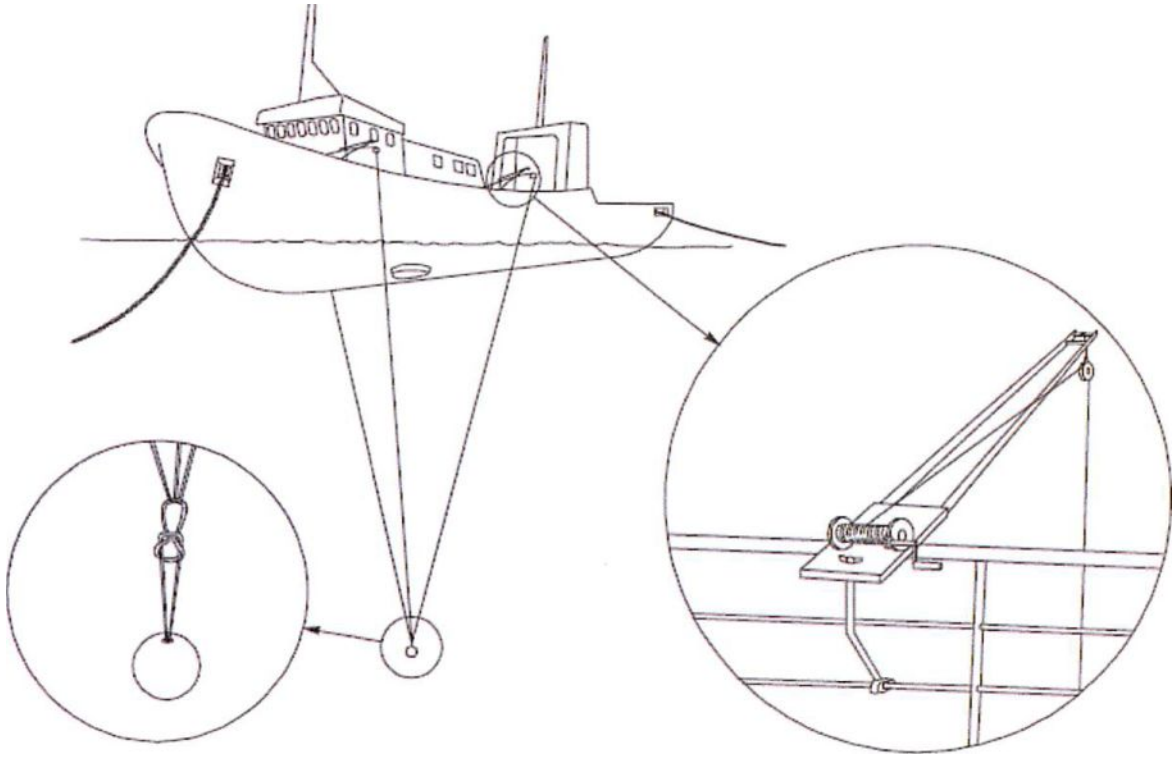


Figure 7. The EK60 system is calibrated by suspending a metal sphere directly beneath the transducer at a range of more than 20 feet. The sphere is tethered using two or three monofilament lines. It is positioned by manually adjusting the line positions and lengths.

5 Sonar System

The Furuno 250 sonar aboard *Lisa Marie* will be used to observe near-surface fish schools

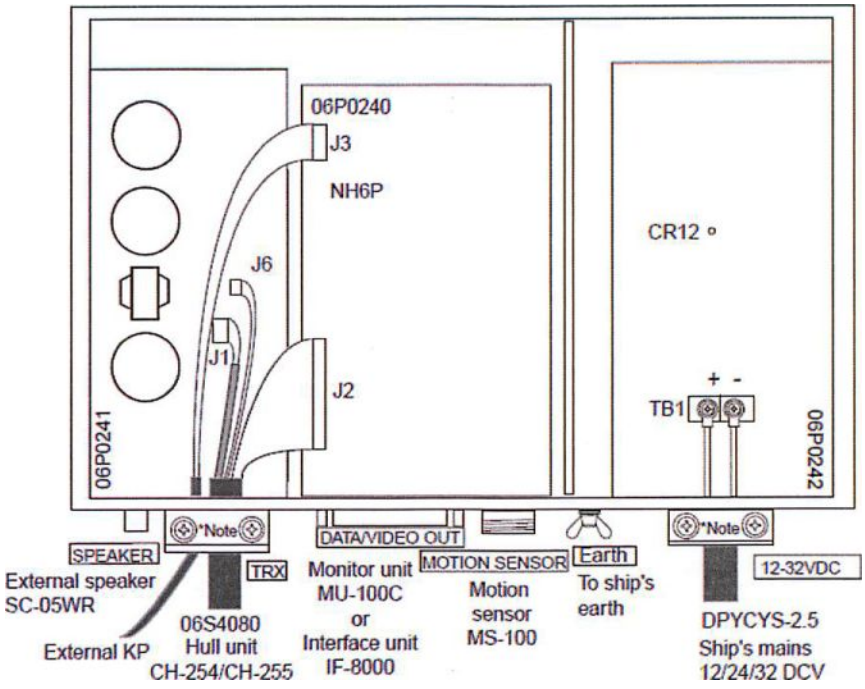
5.1 Display logging

The analog (VGA) display signal from the Furuno 250 sonar aboard *Lisa Marie* will be split, converted to digital (HDMI), and then logged to HDD with a video recorder. The sonar display includes geographic position. If the display recording does not include time, it shall be derived by cross-referencing the position information in the EK60 data. For sonar specifications and a block diagram of an installation, see http://www.furunousa.com/ProductDocuments/CH250%20Brochure.pdf . The recording devices will be located with the GPT and laptop on the bridge of *Lisa Marie* **(Fig. 8)**

Figure 8. Table on the bridge of Lisa Marie (left) where the EK60 GPT, laptop, and sonar- display recording equipment will be located. The table is located to the port side of the helm station, behind the array of instrumentation and monitors (right).

5.2 Synchronization

To synchronize transmissions of the CH-250 with the EK60, connect the GPT TrigOut to pin 3 on transceiver connector J3 / 06P0240 **(Fig. 9).**



NH6P (local supply)

Transceiver unit

Vinyl wire (loca' supply) .AWG22-26

Sonar. E/S

06P0240 J3
KPI > 3 >
EXT_SW > 5 >-
GND> 6 >-

. KP OUT +5V to 15V GND

3 to I5V possitive

(TRXjclomp

Figure 9. To trigger the Furuno 250 sonar from the EK60, connect the TrigOut signal (+ pin 12, - or pin 24) from the auxiliary port to pin 3 on the J3 connector. Connect EK60 ground (pins 18-22) to J3 pin 6.

Press the sonar MENU key to display the User Menu. Select COM1 at the top of the MENU display. Press the down arrow to select TX RATE. Press the left arrow to display the setting window. Press the left arrow to select EXTERNAL. Press the MENU key to close the User Menu.

6 Contact List

Last Name	First Name	Affiliation	Phone	Email
Blair	Andrew	F/V *Lisa Marie,* owner		
Blair	CPT Ricky	F/V *Lisa Marie*		
Cutter	Randy	SWFSC, AST		
Demer	David	SWFSC, AST		
DiNardo	Gerard	SWFSC, AST		
Mau	Scott	SWFSC, AST		
Okoniewski	Mike	West Coast Pelagic Coop		
Reinikka	Dave	J&G Marine Supply		
Renfree	Josiah	SWFSC, AST		
Sessions	Steve	SWFSC, AST		
Shaughnessy	Greg	Ocean Gold Seafoods, Inc.		
Stierhoff	Kevin	SWFSC, AST		
Vejar	LT David	NOAA Corps, *Reuben Lasker*		
Zwolinski	Juan	SWFSC, AST		

7 Equipment List

Equipment/Supply	Quantity	Responsibility
EK60 GPT (with AC power cable)	1	AST
Line-conditioning power strip	2	AST
GPT ground cable	1	J&G Marine Supply
GPT 110V AC power source	1	J&G Marine Supply
ES38-B Transducer	1	F/V *Lisa Marie*
ES38-B Factory Calibration Sheet	1	J&G Marine Supply
Transducer cable and Amphenol connector (6')	1	AST
ER60 Laptop PC (and spare)	2	AST
USB-Serial adapter (and spare)	2	AST
2-TB USB HDDs (and spare)	2	AST
Handheld GPS receiver, antennae, PS (backup)	2	AST
Male DB-9 serial plug (and spare) for GPS input	2	AST
Male DB-25 serial plug (and spare) for auxiliary	2	AST
"Crossover" Ethernet cable (and spare)	2	AST
"Straight through" Ethernet cables (backup)	2	AST
Four-port Ethernet switch and PS (backup)	1	AST
Surge suppressor/line filter power strip (and spare)	2	AST
Extension cord (and spare)	2	AST
Furuno 250 sonar	1	F/V *Lisa Marie*
Synchronize *Lisa Marie's* sounders and sonar from GPT Auxiliary	1	J&G Marine Supply
VGA splitter	1	J&G Marine Supply
VGA-HDMI converter https://www.bhphotovideo.com/c/search?Ntt=COCCNVGA2HD&N=0&lnitialSearch=yes&sts=ma&Top+Nav-Search=	1	AST
HDMI recorder https://www.blackmagicdesign.com/products/h264prorecorder or https://www.bhphotovideo.com/c/product/1033457-REG/atomos_atomnja004_ninja_blade_5_hdmi.html	1	AST
6' HDMI cable	1	AST
38.1-mm diameter WC (6% Co) sphere (and spare)	2	AST
Reel, ~20 lb test monofilament line	1	AST
Handheld VHF radios and charger	3	AST

Appendix 2: Draft Responses to Questions from the Scientific and Statistical Committee (SSC)

Answers to SSC questions for industry / research CPS PNW-EFP for continuation of a Proof of Concept project started in 2017 to use the seine vessel *Lisa Marie* (LM) in conjunction with the NOAA survey vessel *Rueben Lasker*. (RL) The LM will again use a calibrated NOAA EK 60 echosounder to surveil nearshore waters (<50 meters) in the Pacific NW from the Washington- Canada border to the Oregon-California border as instructed by the SWFSC survey team: In addition the LM will use its own fishing sonar, and record when possible, encounters with schools to measure behavior patterns and take informal estimates of school sizes.

SSC. *Description of Sampling and how it will achieve its objectives*: (see attachment: "**2018 Project Summary updated from 2017 SWFSC-Industry Collaborative, Summer 2017 Nearshore Survey Project Instructions"**
Protocols will be as outlined by the SWFSC instructions and /or as outlined herein.

"The principle components of the nearshore sampling include: AST's Simrad EK60 General Purpose Transceiver (GPT) connected to Lisa Marie's Simrad 38 kHz transducer (ES38-B); AST's video logging electronics connected to Lisa Marie's Furuno 250 sonar display; and industry's processing of Lisa Marie's purse seine catches. During June, an AST member will work with J&G Marine Supply to install and test the EK60 and video recording systems and calibrate the EK60 system so the data may be used to estimate CPS biomass in a nearshore sampling stratum. The sonar imagery will be used to qualitatively evaluate the numbers, sizes, and behaviors of CPS aggregations.

When the Reuben Lasker is surveying off Washington and Oregon, the Lisa Marie will conduct complementary echosounder (Simrad EK60), sonar (Furuno 250), and purse-seine sampling along nearshore extensions of Lasker's survey transects. During this period, an AST member will be aboard Lisa Marie to log data, advise on the sampling protocol, and maintain a log of sampling activities, and species catches in a series of seine sets to identify species composition and collect biological samples. The CPS species that will be collected include Pacific sardine, northern anchovy and mackerel(s). The sampled fish (e.g., 5kg-25kg) will be frozen and retained for identification and biological measurements to be performed by SWFSC. Wrapped schools will then be released alive, and no fish will be harvested for commercial purposes."

Sampling will be executed by the LM as it performs the inshore transects given to them by the SWFSC. As schools are "spotted" by the EK60 and /or the vessel "fishing" sonar the LM will set an anchovy seine net (smallest seine mesh available for commercial harvest) around these CPS schools or portions of these CPS schools. The net will be pursed to bring them toward the surface but to prevent mortality-(loose purse). When loose pursed the "Bunt" (bottom) of the seine net will be at a depth of 15'-20'. Samples will be dip netted with a long handled pole 20' that can reach the fish at the bunt of the net and samples taken from the top and bottom of the school. Jigging the school before setting, an industry practice to identify the composition prior to setting, may be done to see if there are marked differences with samples taken prior to setting and what is taken in the seine net. We will attempt where practicable to collect 50 biological samples per species per set. In the event the species are, or are nearly, homogenous we will collect a minimum of 50 fish of the predominant species for biological samples and as many other CPS species samples as are available that came aboard with those samples of the predominant species. Weight of biological samples for any one set will not exceed 25kg or be less

than 5kg. Biological samples will be batched by set and species and coded for environmental and catch information including date and location. (Note: if individual state enforcement agencies have sampling protocols to determine species composition it is possible we will use those protocols to determine species composition but only if they fulfill the needs expressed herein)

It is noted that biological sampling alone will not provide accurate estimations of species composition. For that reason the fish in each dip netted haul will be separated by species, counted, weighed and recorded to establish species composition of each dip net of fish brought aboard. We will separate by species, count, weigh and record all fish brought aboard but biological samples may not include all dip netted fish. Thus the species composition evaluation will be dependent on the dip netting and separation by species, count, and weight while, biological sampling will be done by attempting to capture a minimum of 50 fish per species per set but limited by an upper bounds of 25kg for the total (all species) biological sample for the set. Dip net on board hauls will be catalogued by top of net or bottom of the net location and there will be a minimum of two dip net hauls brought aboard per set, at least one from the top of the net and one from the bunt. Long-lat., time of day, weather, SST, etc. data will be recorded at the time of the set.

Based on time, weather and availability of RL the LM will attempt to do some day and night sets in proximity to the RL and in waters >50M (offshore) to determine if species compositions are similar to those the RL captures in their trawl sampling net and similar to what is sampled inshore. Samples for the LM will be gathered using the same protocols as nearshore.

SSC. *How will schools being sampled be chosen?* The SWFSC will establish "bins" for school sizes they want sampled over the course of the LM inshore transects: Example: 15 schools each 5-15MT: 15 schools each 15-35MT: 15 schools each 35-60MT: 15 schools each >60MT. LM will attempt to find these school sizes as it does their nearshore acoustic transects. The LM will prioritize efforts to find school sizes to best match the request for each and all bins. Similar to using a spotter plane, the LM will use a sonar and / or the EK60 to estimate the school size before setting. However if the requested school sizes we are seeking to fill requested bins are not available for any one day, the LM will set on schools that are available for that day. Estimates of school sizes the LM sets on will be recorded. Except for the grouping by "size" bins we will set randomly without regard to species composition. At all times we will follow the advice from the NOAA observer and or other survey staff.

SSC. *The SSC is concerned whether the proposed catch and sample size are appropriate to accurately characterize the biomass, age-structure, and size-structure as well as the variance associated with each*. This EFP to collect PNW samples inshore or off shore will not be able to accurately inform the survey team as to biomass nor is it intended to at this stage of development. The use of the EK 60 on the seine vessel in waters <50 meters is intended to supply information that we believe will lead to vetted survey methodology and data sources that will better inform the stock assessment. As a "proof of concept" however this is in the "exploratory" mode and in the developmental phase process. As the author recalls it took 6 years, and 3 survey cruises, plus a methodology review before the ATM survey was fully vetted for the stock assessments. As the methodology and equipment is very similar to the present ATM survey our belief is that we could provide data for the stock assessment in a shorter interval of development time. As we are not capturing schools for commercial harvest or point sets, and are subject to CPS school availability, point sets or school capture for biomass estimation is not a viable option.

As to "*age-structure, and size-structure as well as the variance associated with each."* Subject to finding schools or aggregations of CPS that warrant seine sampling sets we believe that seining will be able to provide random sampling inshore and off shore day or night. We believe that if the aggregations are found inshore in proximity to the prescribed LM transects we will be able to provide more samples from more schools using the process described herein than if we were taking fish for commercial purpose and / or point sets. In part this is because as we do not need take time to depose the harvested fish to a processing facility. This means we will be able to make a higher number of sets overall than when there is a need to capture the entire school. With the time savings of not having to pump the school on board, waste time with partial school capture, and steam many hours to shore (and back) to unload we estimate we can do 2 to 4 times as many sets than if we were "point setting"

Offshore sampling, if done, would attempt to shadow the RL and take samples in proximity to where they are trawl sampling or doing acoustic transects. Again subject to finding CPS schools, seining should prove a productive tool to gather a large number of random samples. Age-structure and size-structure should be as representative of the population inhabiting NW waters as those taken by trawl sampling with two possible exceptions: Inshore waters may have a different mixture of species, ages, and sizes from offshore waters; and fish that are less than 6 months of age may not be captured in a seine net. At the least sampling with the use of seine gear, inshore or offshore, will give us a composition comparison with what is caught offshore in a surface trawl net. The rationale used for sample sizes is the same as the survey team for trawl sampling. We want to replicate the sample size the survey vessel uses as it is part of their survey methodology, and to make composition comparative analysis to the trawl sampling as straightforward as possible.

SSC: *The EFP proposal from 2010 (Agenda item F.1.a., Attachment 1, April 2010 can provide guidance on addressing many of the recommendations brought up in our discussion.* The author has reviewed this document and was involved with the NW Sardine Aerial survey. The specific document relates to point sets and entire school capture which this "proof of concept" exercise will not be doing. Relative to selecting which schools to sample, school sizes will be a component as outlined above. Specific size or number of school bins is yet to be determined but will be as the survey team determines to be scientifically defensible. The SSC or other appropriate scientific guidance shall also be utilized to determine the best sampling protocols. In this it is important to note that when the 2010 protocols were used there was an abundance of sardines in the NW which is not the case now. Consequently school sizes may be much smaller or sparser for some CPS species than in 2010. In part, the work from 2017 and going forward is to establish what this equates to so we can align the protocols with present population spatial and temporal dynamics. With very little inshore work and no fishing effort to base assumptions we do not know exactly what school sizes, or numbers of schools we can expect to find.

SSC: *Provide some information from last year (e.g. sample sizes etc.)* No sampling was undertaken in 2017 as the LM only had a sardine net which is unsuitable for harvesting the anchovy that is expected to be in the CPS composition the LM encounters.

SSC: *What would the protocol be to gather a random sample dip netting?* The first step will to randomly select schools that meet size bin requirements without regard to harvest selectivity. To this end we will take advice from the NOAA observer. Once a school is selected the LM will set on the school using a loose set purse that is tight enough to allow sampling at the top and bottom (<20' to the bunt end of the seine net) of the purse. Dip netted fish will be sorted by species, counted, weighed and the results recorded. To the extent possible we will attempt to select 50 fish for each species in the dip net and freeze these species as per instructions from the SWFSC and as outlined above.

SSC: *What's the plan for next steps or the end goal*. The plan is simple and straightforward.

1. To accurately survey the inshore waters to gather data on the inshore component of CPS in the NW that can be used as a valuable extension of the present ATM survey to inform the stock assessment.
2. To develop alternate species composition methods that can be used day or night to produce data that can be used for comparative analysis with the trawl sampling methodology and to inform the stock assessment.
3. To develop collaborative construct approaches between industry and NOAA Fisheries that can be utilized for other collaborative research work in the U.S theater and worldwide.