April 5, 2013

This is a an **updated plan (v4)** for the cruise on the R/V Oceanus, Newport-to-Newport (Load 25 April, depart 26 April about 10am, dock 2 May by 8am).

This plan is subject to the approval by Captain Jeff Crews of the Oceanus. Times are only approximate and may change due to weather and sea state.

1. **Personnel**

			Team
Murray Levine	Ch Sci	OSU	Ch Sci / Mooring
David Langner	Tech	OSU	CTD B / Mooring
*Michelle Stuart	Tech	UM	CTD B
Steve Pierce	Sci	OSU	CTD A
*Nievita Watts	Observer	OHSU	Documentation
Peter Kahn	Sci	OHSU	CTD B
Fred Prahl	Sci	OSU	Methane
*Anna Pfeiffer-Herbert	Sci	OSU	Methane
*Michelle Maier	Sci	OHSU	CTD A
Andrew Wood	Tech	OHSU	CTD A
*Marnie Jo Zirbel	Tech	OSU	Methane

= 11

Berthing chart needed.

2. **Ship equipment needed**

CTD with Chlorophyl fluorometer (Wetstar), transmissometer (CStar), DO, and rosette
Install ISUS from Levine

CTD configured for estuary sampling with CMOP frame, assume same sensors as above
will use on different winch if possible.

-80 deg freezer
Regular freezer
Refrigerator
Mooring Winch – overwrap capability
Block
Crane (buoy deployment)
Boom mount to install 1200 kHz ADCP (Levine) on port side
Access to flow-through for installing FMA (Fast Methane Analyzer) and taking samples
Flow-through DAS (sensors: T,C, Chl fluorescence, transmissometer)
Meteorological DAS (including PAR, PIR, PSP, wind)
Ship ADCPs – 300 and 75 kHz

3. **Science equipment – party responsible for bringing, setting up, etc.**

Mooring/buoy – Levine/Langner

Flow through methane analyzer (FMA) – Prahl
Gas chromatograph system (need 30 A plug) incl small filter rack -- Prahl
Water processing equipment – filter rack & pumps – Kahn, Maier
Water processing expendables – filters, etc – Kahn, Maier, Stuart
ISUS for ocean CTD– Levine
ADCP (1200kHz) for pole mount – Langner/Pierce/Levine
Estuary CTD frame/weights from CMOP (Wilkin) – already in Newport
Pumps (2)/hose for estuary sampling, ext cord?, – Kahn, Maier
Owen tube and rack – Langner, Prahl, Levine
Owen tube processing equipment – Stuart
SBE-39 w/press to use on Owen tube deployment – Wilkin will give to Kahn to bring
Incubator on deck – Maier
Plankton net, hand deployed – Maier
DO sample bottles, reagents to preserve – Prahl
CDOM on flow through system -- TDB

4. Sampling activities – see timelines below

CTD teams: (12 hour shifts – night shift midnight to noon, day shift noon to midnight ?
Team A: Pierce, Maier, Wood -- Night shift
Team B: Langner, Kahn, Stuart – Day shift
Others will be available as well. Typically it takes minimum of 3 people to run a CTD (2 to launch and recover, and 1 to run computer acquisition). Processing of water requires the right mix of people; some may be in addition to the 3 to run CTD up and down.

Methane team members include: Prahl, Pfeiffer-Herbert, Zirbel
12 hour shifts starting at: st, st+8h, st+16h, where st = start time (e.g. st=noon, or midnight)

A. Deploy NH-10 mooring -- Leader: Langner/Levine
May want to spend some time looking for missing NH-10 mooring?
We may want to do a calibration cast at NH-10 before deployment with new DO sensors, FLNTU. This would then not need to be repeated when doing the NH line.

B. NH, CR, GH Lines – CTDs with rosette. Participants: CTD Teams
(* = Byron water samples, **=diLorenzo, ***=both)
NH-03*, 05**, 10*, 15, 20, 25*, 35, 45*
CR-04, 07***, 10, 15***, 20, 25, 30*, 35, 40*
GH-03*, 06, 10*, 16, 21*, 26, 31, 36, 41*

C. Plume study – Leaders: Pfeiffer-Herbert, Prahl. Participants: CTD and methane team
Sampling plume using standard CTD with rosette, and ship flow-through system for methane with discrete syringe samples.

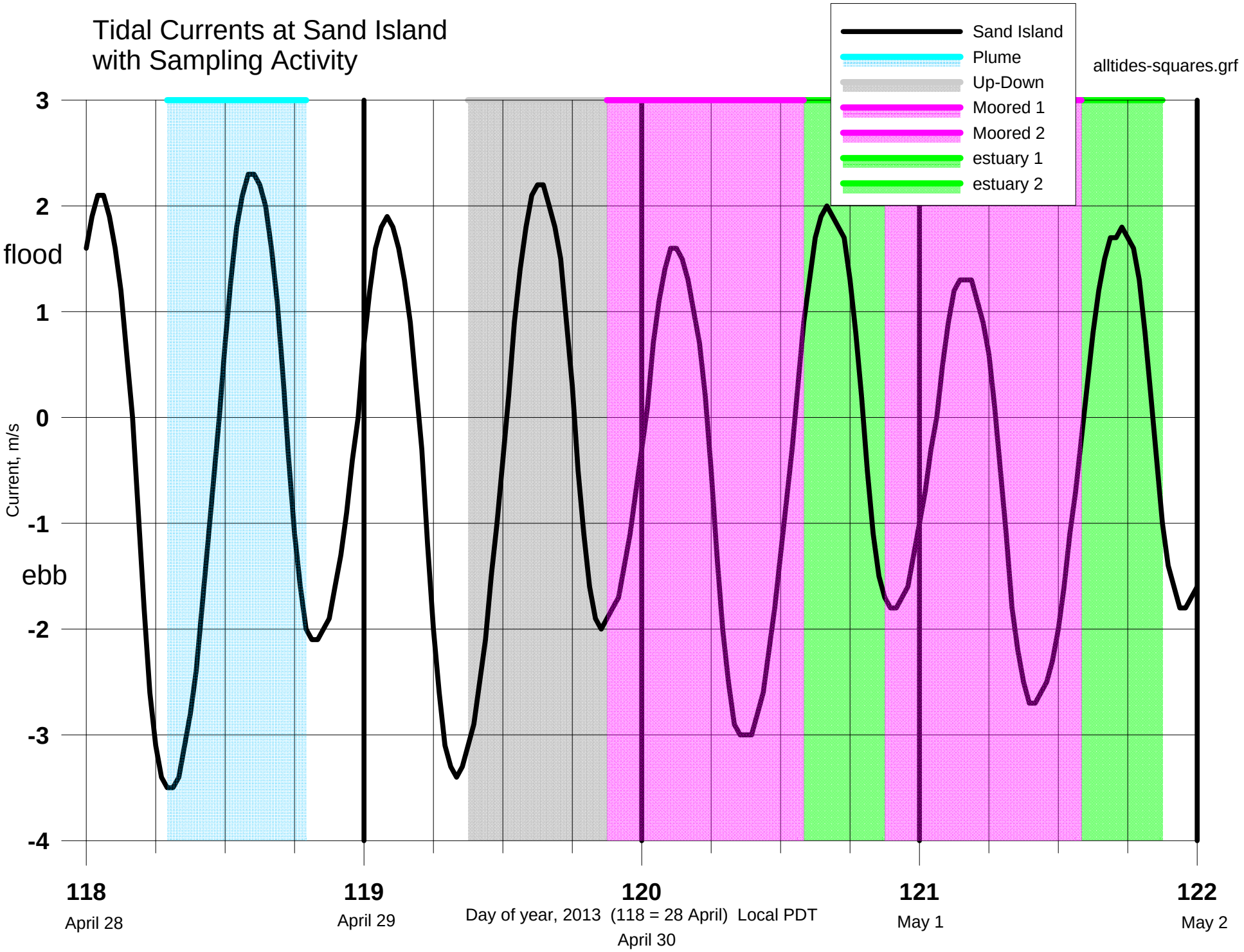
D. Estuary sampling(est) from non-anchored ship – Leader: Kahn. Particpants: CTD Teams.
Sampling with estuary CTD and pump. Kahn and Maier stations:
ML03, SC11, SC08, SC05, SC02, SAT04.
Note that we probably have more total time for **est** sampling than we need. Keep that in mind and think of useful sampling that could be done.

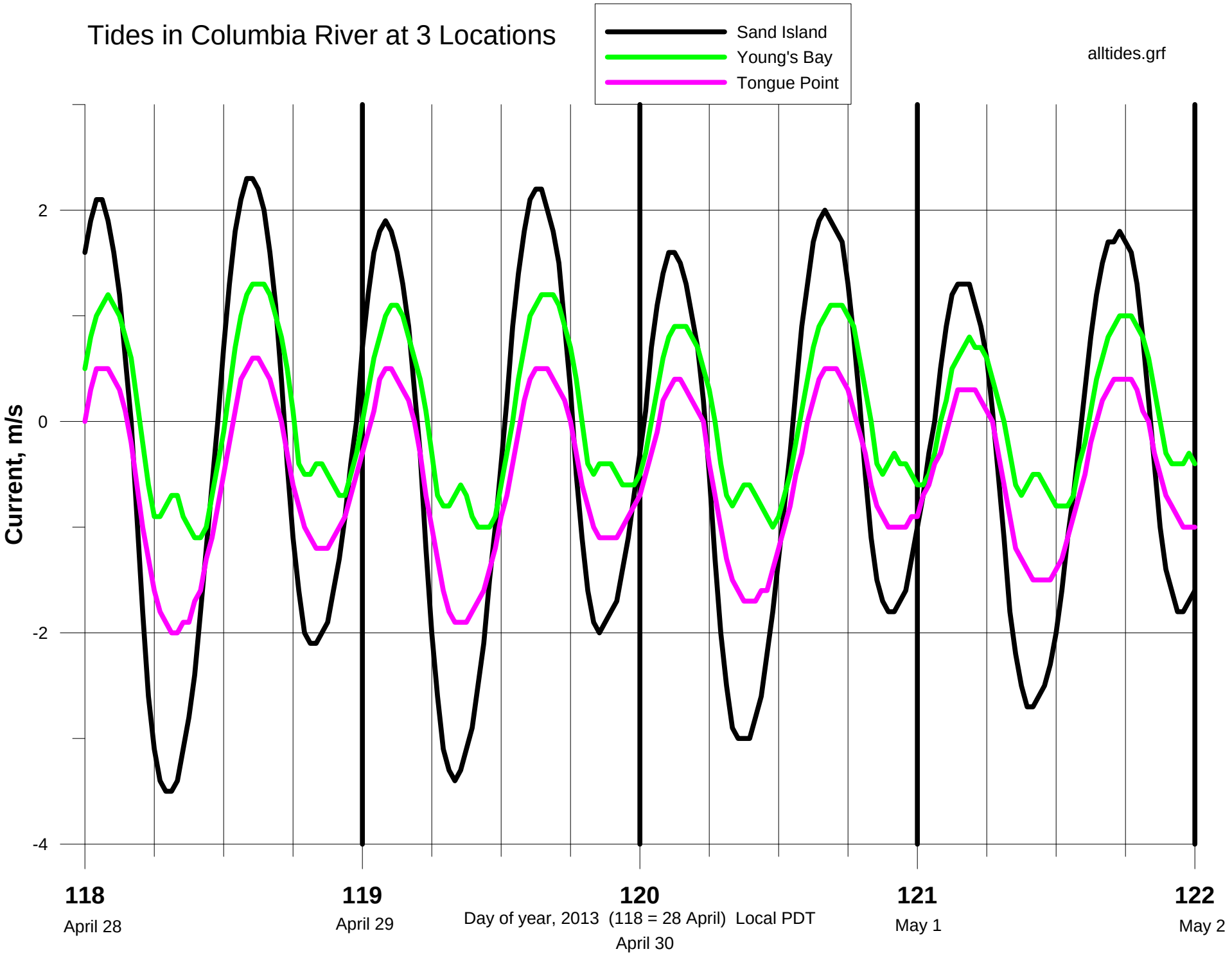
E. Transect up and down river – Participants: CTD and methane teams.
Estuary CTDs with pump sampling. FMA equilibrator with discrete samples.
Pump samples at 5 stations given below at top, middle, bottom:
UP1, UP2, UP3, UP4, UP5 (Beaver Army)
Methane team wants to sample for: SPM, POC/PN, HPLC, methane (triplicate).

F. Moored in estuary. Participants: CTD and methane teams.
2 anchor stations—near Saturn-03 and Young's Bay.
Provides night time activity as well as morning sampling to capture ebb tide. Estuary CTDs with pump sampling. Casts once/hour, sampling top and bottom for:
nutrients, Mn/Fe, SPM, POC/PN, HPLC, methane (triplicate)

Make chart of this material

OC1304C Timeline																								
Sunrise 0700 PDT, Sunset 2000 PDT																								
Hour =	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
26-Apr											T	T	T	mo	mo	mo	mo	nh	nh	nh	nh	nh	nh	nh
27-Apr	nh	nh	nh	T	T	T	T	T	T	T	T	T	T	T	T	T	gh	gh	gh	gh	gh	gh	gh	gh
28-Apr	gh	gh	T	T	T	T	T	plu	plu	plu	plu	plu	plu	plu	plu	plu	plu	plu	plu	cr	cr	cr	cr	cr
29-Apr	cr	cr	cr	cr	T	T	T	T	T	up	up	up	up	up	up	dn	dn	dn	dn	dn	dn	m	m	m
30-Apr	m	m	m	m	m	m	m	m	m	m	m	m	m	m	est	est	est	est	est	est	est	m	m	m
1-May	m	m	m	m	m	m	m	m	m	m	m	m	m	m	est	est	est	est	est	est	est	T	T	T
2-May	T	T	T	T	T	T	T	T																
T= transit																								
mo = mooring ops																								
nh = Newport Hydro line					03*, 05*, 10*, 15, 20, 25*, 35, 45*										(*= water station)					(heading west)				
gh = Grays Harbor line					03*, 06, 10*, 16, 21*, 26, 31, 36, 41*										(*= water station)					(heading east)				
cr = Columbia River line					04, 07*, 10, 15*, 20, 25, 30*, 35, 40*										(*= water station)					(heading west, then ea				
plu = plume transects																								
est = estuary stations					ML03, SC11, SC08, SC05, SC02																			
m= moored in estuary					Young's Bay, SAT-03																			
up = up river transect					UP1,UP2,UP3,UP4,UP5																			
dn = down river transect					UP1,UP2,UP3,UP4,UP5																			


Tidal Currents at Sand Island
with Sampling Activity
alltides-squares.grf
Sand Island
Plume
Up-Down
Moored 1
Moored 2
estuary 1
estuary 2
3
2
flood
1
0
-1
ebb
-2
-3
-4
Current, m/s
118
April 28
119
April 29
120
April 30
121
May 1
122
May 2
Day of year, 2013 (118 = 28 April) Local PDT


Tides in Columbia River at 3 Locations
Sand Island
Young's Bay
Tongue Point
alltides.grf
Current, m/s
2
0
-2
-4
118
April 28
119
April 29
120
April 30
121
May 1
122
May 2
Day of year, 2013 (118 = 28 April) Local PDT

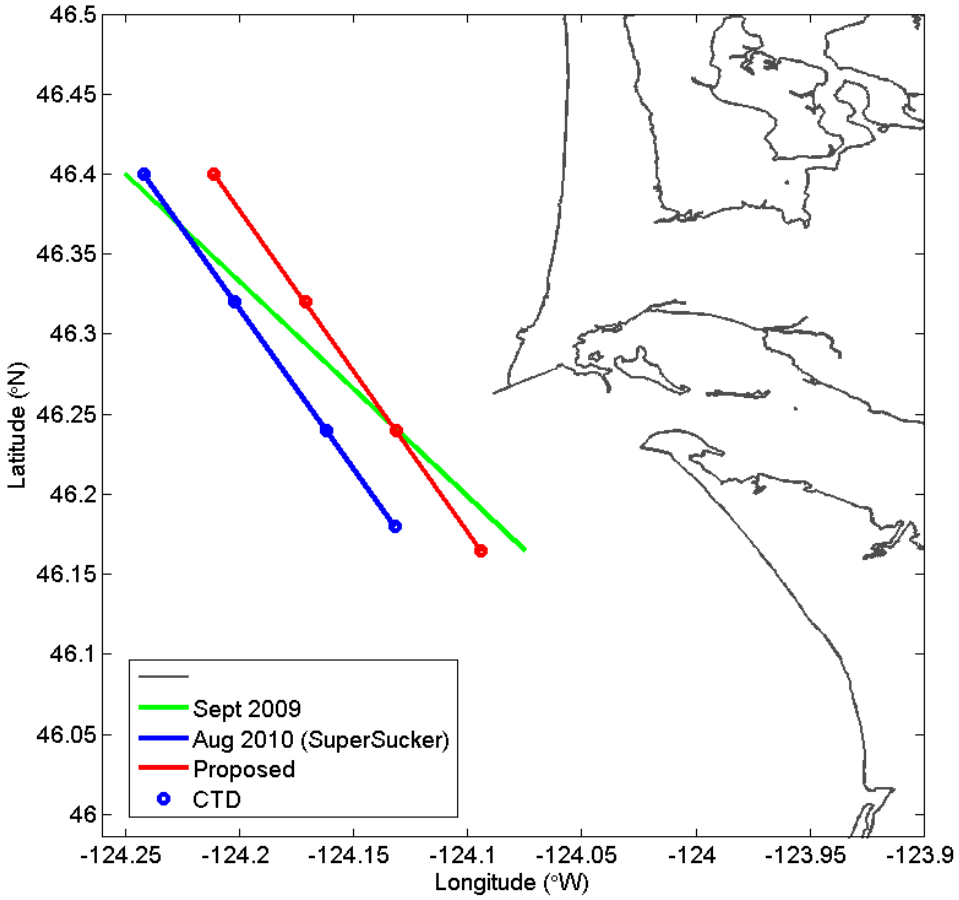
6. Baseline Stations

	Lat N			Long W			Depth
NH-1	44	39.1	44.652	124	6.00	124.100	30
NH-3	44	39.1	44.652	124	7.80	124.130	48
NH-5	44	39.1	44.652	124	10.60	124.177	60
NH-10	44	39.1	44.652	124	17.70	124.295	80
NH-15	44	39.1	44.652	124	24.70	124.412	90
NH-20	44	39.1	44.652	124	31.70	124.528	140
NH-25	44	39.1	44.652	124	39.00	124.650	296
NH-35	44	39.1	44.652	124	53.00	124.883	435
NH-45	44	39.1	44.652	125	7.00	125.117	700
NH-55	44	39.1	44.652	125	22.00	125.367	2885
NH-65	44	39.1	44.652	125	36.00	125.600	2880
NH-85	44	39.1	44.652	126	3.00	126.050	2900

GH-3	47	0	47.000	124	14.80	124.247	27
GH-6	47	0	47.000	124	19.20	124.320	38
GH-10	47	0	47.000	124	25.00	124.417	55
GH-16	47	0	47.000	124	33.50	124.558	82
GH-21	47	0	47.000	124	41.70	124.695	110
GH-26	47	0	47.000	124	48.80	124.813	165
GH-31	47	0	47.000	124	56.40	124.940	176
GH-36	47	0	47.000	125	3.70	125.062	732
GH-41	47	0	47.000	125	11.30	125.188	1000

CR-4	46	10	46.167	124	4.60	124.077	27
CR-7	46	10	46.167	124	9.50	124.158	55
CR-10	46	10	46.167	124	13.10	124.218	82
CR-15	46	10	46.167	124	20.00	124.333	110
CR-20	46	10	46.167	124	27.10	124.452	132
CR-25	46	10	46.167	124	33.40	124.557	146
CR-30	46	10	46.167	124	40.20	124.670	591
CR-35	46	10	46.167	124	47.50	124.792	1097
CR-40	46	10	46.167	124	54.60	124.910	969

7. Plume Stations



Stations	Red	Blue
South	46° 09.90'N, 124° 05.64'W	46° 10.80'N, 124° 07.92'W
Plume center	46° 14.40'N, 124° 07.88'W	46° 14.40'N, 124° 09.72'W
Plume north	46° 19.20'N, 124° 10.27'W	46° 19.20'N, 124° 12.12'W
North	46° 24.00'N, 124° 12.66'W	46° 24.00'N, 124° 14.52'W

Approx. 5 nm between stations (except first set)

Target time, plan v3: at "plume center" station between 0700 and 1000 PDT on April 28 (for major ebb)

8. River Anchor Stations

Young's Bay Anchor Site:

46 deg 11.0'N, 123 deg 53.1'W (nearby in deeper water)

Saturn-03 Anchor Site:

46 deg 12.1'N, 123 deg 56.5'W (near Hammond, Oregon)

9. Estuary Stations (Kahn and Maier)**:**

ML03	46.24501	-123.99933	Mouth Line 03
SC11	46.213783	-123.956537	South Channel Transect 11
SAT03	46.200094	-123.939795	Saturn 03
SC08	46.189749	-123.912303	South Channel Transect 08
YB01	46.176962	-123.871912	Youngs Bay 01
SC05	46.192802	-123.852754	South Channel Transect 05
SC02	46.208913	-123.777463	South Channel Transect 02
SAT04	46.203970	-123.757520	Saturn 04
UP1	46.225	-123.680	Upriver#1
UP2	46.255	-123.550	Upriver#2
UP3	46.210	-123.420	Upriver#3
UP4	46.150	-123.320	Upriver#4
UP5	46.180	-123.180	Beaver Army Dock

Note: Shaded sites will be sampled during the anchor stations


ML03
SAT03
SC11
SC08
YB01
SC05
SC02
SAT04
UP1
UP2
UP3
UP4
UP5
Image © 2013 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth
miles
km
20
40

APPENDIX – CTD Background -- Summary of recent past ocean Baseline sampling:

W1109D – Sep 2011 -- CTD Summary

CMOP spreadsheet: W1109D-v2.xls

Bottle samples as recorded in spreadsheet for:
DNA/RNA (except NH-35, -45), NUT1, TDN/P, DOC

All times here are UTC. The alignment of the ISUS files with the CTD casts is based on looking at the times in the cast*.hex and DIVE*.dat files.

Date	Day	Cast # *	Station	Time	Bottles	ISUS files****
9/28/11	271	01	NH-03	0203	2.6, 40	DIVE160.dat
9/28/11	271	02	NH-10	0325	2.6, 74	DIVE161.dat
9/28/11	271	03	NH-15	0408		DIVE162.dat
9/28/11	271	04	NH-20	0512		DIVE163.dat
9/28/11	271	05	NH-25	0608	2, 280	DIVE164.dat
9/28/11	271	***		1722		DIVE165.dat
9/29/11	272	06	Saturn-02	0253	1.8	DIVE166.dat
9/29/11	272	07	CR-4	0501	1.6	DIVE167.dat
9/29/11	272	08	CR-7	0541	1, 12	DIVE168.dat
9/29/11	272	09	CR-7	0616	2, 10, 45	DIVE169.dat
9/29/11	272	10	CR-10	0714	2	
9/29/11	272	11	CR-15	0803		DIVE170.dat
9/29/11	272	12	CR-20	0857	1, 16, 126	DIVE171.dat
9/29/11	272	**		0928		DIVE172.dat
9/29/11	272	13	CR-25	1017	143	DIVE173.dat
9/29/11	272	14	CR-30	1058		DIVE174.dat
9/29/11	272	15	CR-35	1220	2, 20, 498	DIVE175.dat
9/29/11	272	16	CR-40	1329		DIVE176.dat
9/30/11	273	17	NH-35	0515	1, 18, 425	DIVE177.dat
9/30/11	273	18	NH-45	0652	1, 20, 680	DIVE178.dat

* = cast number xx is the same number embedded in the filename castxx.hex, etc.

** = no CTD data file found; however there is an ISUS file DIVE172.dat. So, maybe CTD file was overwritten?

*** = no CTD data file or log sheet, so no cast. Not sure why there is an ISUS file

**** = calibration file: ISUS172G.CAL; created on board Wecoma before the cruise using de-ionized water

OC1203A – Mar 2012 – CTD Summary

Bad weather greatly reduced CTD sampling on this cruise.
All time UTC.

Date	Day	Cast #	Station	Time	Bottles, depth	ISUS files
3/28/12	88	2	NH-10	0035	4,29,61,70	DIVE184.dat
3/28/12	88	3	NH-15	0225		DIVE185.dat
3/28/12	88	4	NH-20	0321		DIVE186.dat
3/28/12	88	5	NH-25	0422	2,41,73,285	DIVE187.dat

Note: Cast#1 had technical problems.

Not sure if Bottles were actually kept as processing was delayed because of bad weather.

OC1210B – Oct 2012 – CTD Summary

CMOP spreadsheet: OC1210B-v2.xls
No microbiology team; only nutrients taken processed at OSU
All times are UTC

Date	Day	Cast #	Station	Time	Bottles for nutrients	ISUS files
10/20/12		1	NH-5	0246	0,10,20,30,50	DIVE190.dat
10/20/12		2	NH-10	0400		DIVE191.dat
10/20/12		3	NH-15	0452	0,10,20,30,50,70,85	DIVE192.dat
10/20/12		4	NH-20	0601		DIVE193.dat
10/20/12		5	NH-25	0658	0,10,20,30,50,70,100,150	DIVE194.dat
10/20/12		6	CR-4	2357	0,10,20,25	DIVE195.dat
10/21/12		7	CR-7	0047	0,10,20,30,50	DIVE196.dat
10/21/12		8	CR-10	0129		DIVE197.dat
10/21/12		9	CR-15	0219	50,70,150	DIVE198.dat
10/21/12		10	CR-20	0317	100, 144	DIVE199.dat
10/21/12		11*	CR-25	0410	100, 150	DIVE200.dat
10/21/12		12	GH-3	1517	0,10,20	DIVE201.dat
10/21/12		13	GH-6	1603	0,10,20,30	DIVE202.dat
10/21/12		14	GH-10	1651		DIVE203.dat
10/21/12		15	GH-16	1744	0,10,20,30,50,70	DIVE204.dat
10/21/12		16	GH-21	1847		DIVE205.dat
10/21/12		17	GH-26	1941	0,11,20,30,50,70,100,150	DIVE206.dat
10/21/12		18	GH-31	2037		DIVE207.dat
10/21/12		19	GH-36	2129	0,10,20,30,50,70,100,150	DIVE208.dat
10/21/12		20**	GH-41	2318		DIVE209.dat
10/22/12		21	CR-30	0510		DIVE210.dat

* = communication with CTD ended abruptly during upcast of 10; winch slip ring problem

**= Served as calibration cast for NH-10 sensors

Nutrients analyzed (ML-OC1210B-Nuts-xmit.xlsx):

PO4, N+N, Silicate, NO2, NH4