Hawaii Ocean Time-series
HOT-320 Cruise Plan

Cruise ID: KM 20-07
Vessel: R/V *Kilo Moana*, University of Hawaii
Master of the Vessel: Captain Joey Daigle
Chief Scientist: Carolina Funkey, University of Hawaii
Marine Technicians: Juliana Diehl, Lance Frymire

Marine Center phone number: (808) 956-0688,
KM phone numbers (in port): 808-587-8566 / 67
KM cell phone: 808-864-0065
KM sat phone (voice): 011-870-773-234249
KM sat phone (fax): 011-870-783-207825

Carolina Funkey's Cell Number: (808) 333-8608

Pre-Cruise Meeting: June 24 at 1300 on Google Meet
Loading: July 12 at 1300, Pier 35 (**Science personnel to stay onboard overnight**).
Departure: July 13, 2020 at 0630
Arrival: July 19 at 0800
Post-Cruise Meeting: July 21 at 1330 Blue Jeans Meeting

1.0 COVID-19 PREVENTION

Due to the current COVID-19 pandemic extra precautions will be set in place before and during the cruise to prevent the spread of COVID-19 onboard. UNOLS has provided guidelines which will be followed on this cruise. A few of the guidelines are found below. The extensive list can be found in the Pandemic Response Plan.

- Sailing with a minimum science party, one scientist per berth (11 scientist).
- All cruise participants will shelter in place for 14 days (June 28th - July 11th) before the cruise.
- All cruise participants will be tested for COVID-19 before and during the shelter in place (June 26th and July 9th).

During the cruise all participants will:

- wear face masks
- maintain a distance of 6 ft. when possible
- properly disinfection of all workspaces often
- remain in their staterooms as much as possible during non-work hours

2.0 SCIENTIFIC OBJECTIVES

The objective of the cruise is to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations. Four stations will be occupied during the cruise, in the following order:

1) Station 1, referred to as Station Kahe, is located at 21° 20.6'N, 158° 16.4'W and will be occupied on July 13th for about 3-4 hours.
2) Station 2, referred to as Station ALOHA, is defined as a circle with a 6 nautical mile radius centered at 22° 45'N, 158°W. This is the main HOT station and will be occupied July 14th – July 18th.

3) Station 52, the site of WHOTS-16 Mooring (anchor position 22° 40.01'N 157° 56.96'W) will be occupied for about 3-4 hours on July 17th.
4) Station 6, referred to as Station Kaena, is located off Kaena Point at 21° 50.8'N, 158° 21.8'W and will be occupied on July 18th for about 2 hours.
5) Deep sediment trap anchor at 22°50.719' N, 157°55.068' W will be recovered on July 17th which will take about 3-4 hours.

2.1 SCIENTIFIC OPERATIONS

Station	Activities
Kahe (Sta. 1)	Weight Cast, Hyperpro cast, CTD cast (1000 m)
ALOHA (Sta. 2)	Sediment traps, Gas array, Wirewalker, Net tows, CTD operations, Primary productivity measurements, Optics casts, Misc. experiments, Trace Metal Casts, Recovery of Deep Sediment Traps
WHOTS mooring station (Sta. 52)	One CTD cast (yo-yo to 200 m) subsurface instrument intercomparison
Kaena (Sta. 6)	One near-bottom CTD cast (~ 2400 m)
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology, SeaFlow, C-Star, Imaging FlowCytobot (IFCB)

3.0 SCIENCE PERSONNEL

Participant	**Title**	**Affiliation**	**Citizenship**
Karin Björkman	Scientist	UH	SWE
Brandon Brenes	Research Assistant	UH	USA
Tim Burrell	Research Associate	UH/SCOPE	NZL
Mathieu Caffin	Post Doc	UH	FRA
Juliana Diehl	Marine Technician	OTG	USA
Dan Fitzgerald	Research Associate	UH	USA
Lance Frymire	Marine Technician	OTG	USA
Carolina Funkey-Chief Sci	Research Associate	UH	USA
Eric Grabowski	Research Associate	UH	USA
Fernando Pacheco	Research Associate	UH	BRA
Tully Rohrer	Research Associate	UH/SCOPE	USA
Blake Watkins	Marine Engineer	UH	USA
Angelicque White	PI	UH	USA

4.0 SUMMARY SCHEDULE

24 June	Pre-cruise planning meeting 1300 hrs, Google Meet
12 July	Equipment loading onto the KM (**Science personnel to stay on-board)**
13 July	Depart from Pier 35 at 0630 hrs.
13 July	Station 1 Kahe Pt. operations.
14-18 July	Station 2 ALOHA operations, Station 52 CTD yo-yo cast. Station 6 CTD cast.
19 July	Arrive back to Pier 35.
21 July	Post-cruise meeting at 1330 hrs. Blue Jeans

5.0 OPERATIONAL PLANS

5.1. Station Kahe (21°20.6'N, 158°16.4'W)

A 1300 lb. weight-test cast to 500 m, a Hyperpro cast (Sect. 5.2.8), one CTD cast to 1000 m (5.2.5), and one Trace Metal Clean Rosette cast (Sect. 5.10) will be conducted at this location on July 13th. The ships A-frame and the blue winch, wrapped in packaging wrap before spooling TM line, will be needed for these operations. After the operations are satisfactorily completed, the ship shall proceed to Station ALOHA.

5.2. Station ALOHA (22°45'N, 158°W with 6 nm radius)

5.2.1. Upon arrival to Station ALOHA, the Wirewalker will be deployed (Sect. 5.2.2). Once the Wirewalker is deployed, the Sediment Traps will be deployed (Sect. 5.2.3). After these operations are completed, one 1000-m cast will be conducted to collect water for the Primary Production Array. Following this, the Primary Production array will be deployed (5.2.4). A near-bottom CTD cast and the start of the 36-hour water column observations at Station ALOHA will begin on July 15th.

NOTE: Array tracking is facilitated through the SOEST Cruise and Drifter Tracks tool found at http://hahana.soest.hawaii.edu/nowcast/loctable.html

5.2.2. Wirewalker™ deployment

Upon arrival to Station ALOHA a Wirewalker (Del Mar Oceanographic) will be deployed to take hydrographic and optical observations in the upper 400 m of the water column. The instrument is approximately 1.5 m long and 0.6 m wide and weighs approximately 30 Kg. The instrument will be deployed on a wire with a 40 Kg bottom weight and a surface buoy with strobe light and Pacific Gyre positioning system (ID: DMO-GLBCN-0003 or DMO-GLBCN-0004), XEOS 51020_77.

The Wirewalker will be deployed at a location within Station ALOHA, to be determined by observed local and forecasted currents to avoid possible entanglement with the WHOTS mooring. The instrument will stay in the water for approximately 96 hours. Deployment and recovery will be conducted from the back deck through the A-frame and using the SeaMac winch, each operation will take 30 to 60 min. Two ABs will be required to operate the A-frame and winch respectively. Blake Watkins will be in charge of this deployment.

After deployment of the Wirewalker, the ship shall prepare to deploy the sediment trap array.

5.2.3. Sediment trap array deployment

The floating sediment traps will be deployed in close proximity to the Wirewalker, so the two arrays drift in a similar direction. The array will be deployed from the back of the deck thru the A-frame and using the SeaMac winch. After deployment we request that the bridge verify that the radio transmitters are functioning and directionally correct. The Sediment Trap array will consist of two crosses with 12 particle interceptor traps (PIT) at 150m.

The array will drift for about 96 hours before recovery. The array is equipped with ROCK transmitter (ID#: 25010_06), XEOS ID # 38640_268, strobe lights and a radio transmitter (channel 69: 156.475 MHz). Daily positions of the array shall be transmitted by email directly to the ship (argosfix@km.soest.hawaii.edu , password: argosfix), therefore the ship will **not** need to keep within site of the array until the time of the recovery. Assistance from the bridge is requested in plotting the drift track of the array. We request the use of the ship's radio direction finder for locating the array before recovery. Blake Watkins will be in charge of this deployment.

5.2.4. Primary production experiment

Samples for the primary productivity experiment will be collected from the rosette. Before dawn (Sunrise 0547 hrs on July 14th), a free drifting incubation array will be deployed from the back of the deck thru the A-frame and using the SeaMac winch. The primary production incubation array will be deployed at a location within Station ALOHA, to be determined by observed local and forecasted currents to avoid possible entanglement with the WHOTS mooring. The array is equipped with ROCK transmitter (ID # 27870_05), XEOS ID # 42950_267, strobe lights and a radio transmitter (channel 73: 156.675 MHz). Positions of the array will be emailed to argosfix@km.soest.hawaii.edu, password: argosfix. The **ship shall keep within site of the**

array while performing CTD operations for the last 6 hours of the approximately12-hour time the array will be in the water unless the array drifts outside of the ALOHA circle. If the array drifts out of the circle, the ship should return inside the circle to conduct CTD casts, and the monitoring of the array will be coordinated with the watch leader. The array will be recovered just at sunset (1925 hrs). All radioactive waste generated by the experiment shall be returned to the University of Hawaii. Only qualified personnel shall handle radioactive material. Blake Watkins will be in charge of this deployment.

After deployment of the Primary Production Array, the ship shall transit to the center of the station circle to conduct a bottom CTD cast, S2C2 (approximately 1000 m).

5.2.5. Water column measurements

Vertical profiles of temperature, conductivity and dissolved oxygen will be made with an instrument package consisting of a Sea-Bird CTD attached to a 24-place rosette with 12 liter Bullister sampling bottles. We will need the ship's CTD winch and A-frame for these operations. Water samples for biogeochemical measurements will be collected on each cast. On July 15th the first near-bottom cast (approximately 4740 m) shall be made. Following this cast, a series of 1000-m casts shall be made continuously every 3 hours for a 36-hour period, ending with a second near-bottom cast.

Whenever pumping of the ship's tanks is needed, it must be conducted outside the circle that defines station ALOHA (Sect. 2.0). To avoid disruptions in the schedule, this operation should be coordinated with the chief scientist or the watch leaders **(Dan Fitzgerald and Tully Rohrer)**.

5.2.6. Lowered Acoustic Doppler Current Profiler

The HOT rosette configuration includes a Teledyne Workhorse Mariner Model 600 kHz lowered-ADCP (LADCP) for current measurements on down- and up-cast. The LADCP, operating in single ping mode, will record measurements internally at a rate of 4 Hz. These measurements will then be downloaded after each cast via an RS232-to-ethernet connection. This will require direct connection to the ADCP after each cast, with data download before the next cast.

5.2.7. Gas Array deployment

A free drifting incubation array will be deployed the fourth day of the cruise at Station ALOHA. Samples for the gas array will be collected from Station 2 CTD cast 10. The gas array will be deployed from the back of the deck thru the A-frame and using the SeaMac winch. The gas array be deployed at a location within Station ALOHA, to be determined by observed local and forecasted currents to avoid possible entanglement with the WHOTS mooring. The array is equipped with ROCK transmitter (ID # 27870_05), XEOS ID # 42950_267, strobe lights and a radio transmitter (channel 73: 156.675 MHz). Positions of the array will be emailed to argosfix@km.soest.hawaii.edu, password: argosfix. The ship will **not** need to keep within sight of the array until the time of the recovery, approximately 25 hours after its deployment. Assistance from the bridge is requested in plotting the drift track of the array. B. Watkins will be in charge of this deployment.

5.2.8. Hyperpro

The Hyperpro is a profiling unit with one up-looking and one down-looking hyperspectral radiometer, a WET Labs ECO-BB2F triplet (measuring Chlorophyll-*a* fluorescence and backscattering in the blue and red wavelengths), temperature and conductivity sensors. This instrument also incorporates a ship mounted surface radiometer. Around 1400 on the first, second and fourth days, the Hyperpro will be deployed from the stern through a small block hung from the A-frame. The instrument is lowered and retrieved by hand. Each deployment will consist of two profiles and one yo-yo (5 x 20m) before the instrument is retrieved.

5.2.9. Optics

An optical package including a SeaBird Seacat with temperature, conductivity, and pressure sensors, a Wetlabs ECO triplet measuring g backscatter, chlorophyll fluorescence, and CDOM fluorescence and a LISST particle size and distribution analyzer will be deployed during the cruise. Each deployment will consist of three

up and two down profiles to a target depth of 200 m at a constant speed of 10 m/min during both the downcast and upcast. An instrument soaking period at just below the surface will be required between the two profiles. The A-frame and capstan will be needed for this operation.

5.2.10. Zooplankton Net Tows

A plankton net will be deployed from the stern and shall be towed for half-hour periods. Half-hour periods are scheduled around noon and midnight on the second, third, and fourth days (see schedule) for a total of six slots. The A-frame and small capstan will be needed for this operation. B. Watkins will be in charge of these operations.

5.2.11. Net Tow (EG)

A handheld plankton net (0.5 um mesh) will be deployed from the stern and shall be towed for 20-30 minutes. The vessel will need to move ~ 0.5 knots. These tows are scheduled around noon and midnight on the third, fourth and fifth days (see schedule) for a total of six slots. E. Grabowski will be in charge of these operations.

5.3. Gas Array, sediment trap and Wirewalker recovery

In the morning of July 17th, the ship shall transit for the recovery of the Gas Array. The A-frame and the Sea-Mac winch will be needed to retrieve the sediment trap array. After the Wirewalker is recovered, the ship shall transit to Station 52. In the morning of July 18th, the ship shall transit to recover the Wirewalker. On completion of the Wirewalker recovery, the ship shall transit to the floating sediment trap array. B. Watkins will be in charge of these operations.

5.4. Station 52 - WHOTS-16 Mooring

The anchor position of the WHOTS-16 mooring is 22° 40.01'N 157° 56.96'W. The watch circle of the buoy is about 2 nautical miles. Generally, the buoy stays on the edge of the watch circle. The buoy can be detected via radar in good weather conditions but is harder to detect with larger sea states. Upon arrival at Station 52 on July 17th, a Hyperpro cast, one 200 m CTD yo-yo cast and ADCP inter comparisons will be conducted.

5.4.1. CTD yo-yo cast (subsurface instrument intercomparison)

One 200-m CTD yo-yo cast with at least 5 full cycles will be conducted near the WHOTS mooring on July 17th for subsurface instrument intercomparison. This cast should be conducted downwind, down current, and about 200 m from the mooring.

5.5. Deep Trap Recovery

In the afternoon of July 17th, the ship shall transit of the deep sediment trap anchor at 22°50.719’ N, 157°55.068’ W. Recovery of the sediment trap is expected to take approximately 3 hours, with return to the surface expected to take an hour. The array is equipped with a radio transmitter for location (channel 72: 156.625MHz), XEOS ID # 30930_151.

Blake Watkins will be in charge of this operation with 2 or 3 members of the science party. Two ABs will be required to operate the A-frame and winch respectively.

5.6. Station Kaena (21° 50.8'N, 158° 21.8'W)

A near-bottom CTD cast (~2500 m) will be conducted at this location in the evening of July 18th. Once the CTD cast is complete, the ship shall return to Pier 35.

5.7. Acoustic Doppler Current Profiler

The ship’s acoustic Doppler current profilers (ADCP) will be in operation during the duration of the cruise. The OTG technicians will be in charge of the ADCP system.

5.8. Thermosalinograph, Fluorometer and pCO_2

The ship's thermosalinograph, fluorometer and pCO_2 sampling the uncontaminated seawater supply system will be in operation during the duration of the cruise while the ship is outside of Honolulu Harbor. Salinity samples to calibrate the thermosalinograph will be taken from the intake hose at 4-hour intervals throughout the duration of the cruise by the science personnel. The ship's meteorological system shall be in operation throughout the cruise. Access to real-time underway data through the ship's network will be required. The OTG technicians will be in charge of the thermosalinograph, Fluorometer, and meteorological suite operations.

5.9. SeaFlow, Inline C-Star Transmissometer and Imaging FlowCytobot (IFCB)

In addition to the continuous thermosalinograph and fluorometer sampling, the SeaFlow, an inline C-Star Transmissometer, and the IFCB will sample continuously from the uncontaminated seawater supply system throughout the duration of the cruise while the ship is outside of Honolulu Harbor. Access to real-time underway data through the ships network is required. The SCOPEOps technicians and UH personnel will be in charge of these instruments and operations.

5.10. Trace Metal Clean Rosette

Vertical profiles between 0-600m will be conducted for trace metal analysis using a rosette package with autonomous Auto Fire Module. This mini-CTD rosette consists of a SeaBird CTD attached to a 12-place rosette with 8 liter Niskin sampling bottles. The rosette is approximately 5 ft x 5ft x 4 ft and weighs 355/565 lbs in air empty/full. We will deploy the CTD rosette using the blue winch which will be wrapped in package wrap to prevent the Amsteel Line coming into contact with metal, delrin block and 1/4" Amsteel line using trace metal clean procedures from the stern of the vessel using the A-Frame.

6.0 EQUIPMENT

6.1. The HOT science party shall be bringing the following

1. Seabird CTD system, all sensors, deck boxes and computer CTD acquisition systems
2. Rosette and 24 12L Bullister sampling bottles, and all associated spare parts
3. Lowered Acoustic Doppler Current Profiler (LADCP)
4. One 20 ft. laboratory van (#23) with assorted equipment for radioisotope and general use, and one 10x8 ft. equipment van (PO) for equipment and spare storage.
5. Distilled, deionized water and all required chemicals and isotopes
6. Large vacuum waste containers
7. Liquid nitrogen dewars
8. Drifting sediment trap array with strobe lights, satellite and radio transmitters, floats, weights, line, sediment traps and crosses.
9. Drifting primary production array with strobe lights, satellite and radio transmitters, floats, weights, line primary production bottles and spreader bars.
10. Drifting gas array with strobe lights, satellite and radio transmitters, floats, weights, line, 4 L bottles and short mounting bars.
11. Drifting Wirewalker™ array with surface buoy, strobe lights, satellite transmitters, floats, weights, 400m and cable.
12. Oxygen titration system
13. Plankton nets and towing lines
14. Desktop and laptop personal computers
15. Assorted tools
16. All required sampling bottles
17. Pertinent MSDS
18. Wirewalker™

19. SeaFlow
20. Inline C-Star Transmissometer
21. Imaging FlowCytobot (IFCB)
22. Trace metal clean rosette with 8L Niskin bottles and programmable CTD
23. 1 “Big Blue” deck incubators and 2 ‘Baby Blue’ and hoses
24. One 20 ft. laboratory van (#24) for trace metal work
25. McLane Pump

6.2. We will need the use of the following ship's equipment:

1. A-frame
2. A-frame block assembly
3. CTD winch
4. Electric power
   -440/480 VAC, 3 phase 60Hz, 60amp for winches
   -208 VAC single phase at 60 amps for lab vans
5. Space on upper 01 deck port side for one 10 ft van **(Equipment van)**
6. Space on upper 01 deck port side for one 20 ft van **(#23)**
7. Space on 02 deck for incubators
8. Space on 02 deck for McLane Pump
9. Space on deck for ~4 deck baskets of array gear
10. Small capstan (~ 10 m/min)
11. SeaMac Winch
12. Radio direction finder
13. Hand-held VHF transceivers
14. Shackles, sheaves, hooks and lines
15. Precision depth recorder
16. Shipboard Acoustic Doppler Current Profiler
17. Thermosalinograph, pCO_2 system, and Fluorometer
18. Meteorological suite
19. Grappling hooks and line
20. Navlink2 PC or equivalent
21. Running fresh water and seawater, hoses
22. Uncontaminated seawater supply
23. Source of compressed air for Trace Metal pump
24. -80°C Freezer
25. 4°C Refrigerator and -20°C Freezer
26. Distilled, deionized water system
27. Electronic mail system
28. GPS system
29. Underway/on-station data acquisition system for meteorological instruments, ADCP, thermosalinograph, fluorometer, SeaFlow, inline C-Star transmissometer and IFCB and access to real-time data through the network.
30. OTG’s 24-place rosette, and 24 12-l water sampling bottles (to be used as spare)
31. ~1300 lb weight
32. Remote CTD dbar pressure display in the winch operator area.
33. Monitor in CTD Lab displaying ship coordinates, bottom depth and GMT.
34. OTG's transmissometer (preferably SN 1366)
35. Trace metal free block
36. Amsteel Line (1/4”) for trace metal clean work

Ship: R/V *Kilo Moana* **HOT 320 CTD CASTS** **Date: July 13 – July 19, 2020**

Cast		Samples	#Bottles
Kahe Pt.			
s1c1	1000 m	O_2, Temp, DIC/Alk, pH, Nuts, LLN, LLP, Chl a, Salts	15
Station ALOHA			
s2c1	1000 m	Primary Production (3@ 5, 25, 45, 75, 100, 125, 150, 2@ 175) Chl a, FCM, SCOPE O18 SF-S (pb 3@ 5, 25, 45, 75, 100, 125) and O2(1@15), Salts	24
s2c2	1000 m	EG (20@350)	20
TM Cast 1	135 m	Fill all bottles @100 for cleaning (no processing)	12
s2c3	4740 m (PO-1)	O_2, Temp, DOC, DIC/Alk, pH, Ref Si, Nuts, Salts	24
s2c4	1000 m (PO-2)	O_2, Temp, DOC, DIC/Alk, pH, Ref Si, Nuts, Salts	24
s2c5	1000 m	PC/PN, SCOPE DNA(1@5,25,45,75), EG(4@350), Salts	23
s2c6	1000 m	PPO4, SF-S(1@5, 25) and O2(1@15), EG(4@350), Salts	21
s2c7	1000 m (BEACH)	O_2, Temp, DIC/Alk, pH, Nuts, LLN, LLP, DOC, Keeling, Quay, Salts, SF-S (1@5,pb@25)	24
s2c8	1000 m	SCOPE DNA(1@,100,125,150,175), SF-S(1@5, 25), Salts	17
s2c9	1000 m	Gas Array(3@5,25,45,75,100,125), SF-S(1@5,25), Salts	22
s2c10	1000 m	SCOPE DNA(1@200,225,250,275), MC DNA (1@5, 25, 45, 75, 100, 125, 150, 175), SF-S(1@5, 25) and O2(1@15), PO(6@1000), Salts	23
s2c11	1000 m	PSi, SF-S(1@5, 25),Salts	12
s2c12	1000 m	SCOPE Gases SW(1@5,25,45,75,100,125,150,175, 200, 300, 400, 600, 800), SF-S(1@5,25), EG(4@350), Salts	21
s2c13	1000 m	ATP, SCOPE DNA(1@300,400,500,770), SF-S(1@5,25), Salts	17
s2c14	1000 m	SF-S(1@5, 25) and O2(1@15), KB(2@ 25, 75, DCM) Salts	9
s2c15	1000 m	HPLC, Chl a, Salts	18
s2c16	4740 m (PO-3)	Oxygen, SCOPE DNA(1@1000,2000,3000,4000), KB (1@2000, 2500, 3000, 3500, 4000, 4500, Deepest), Salts	16
s2c17	1000 m	EG(1@ 5,45,75,100,150,175, 200)(x3 @25,125,250,350)	19
s2c18	1000 m	RL(1@5,25,45,75,100,125,150,175), O2(1@15) CS(pb@ 25, 75, 100)	9
s2c19	1000 m	EG (19@15, 5@700)	24
TM Cast 2	350 m	NH (1@ 15, 25, 45, 75, 100, 125, 150, 175, 200, 225, 250, 300)	12
TM Cast 3	350 m	NH (1@ 15, 25, 45, 75, 100, 125, 150, 175, 200, 225, 250, 300) (no processing)	12

WHOTS Mooring

s52c1	200 m yo-yo	DIC/TA(1@5), SCOPE Zher (1@ 25) AB(1@ DCM, pb @ 5, 25)	3

Kaena

s6c1	2400 m	Chl, Salts	13

Underway

CF (1x 20 L), **CS** (5 x 10L), **RF** (2 x 20 L)

MC=Matt Church, **SW**=Sam Wilson, **SF-S=**Sara Ferrón-Smith, **EG**=Eric Grabowski, **RL**=Robert Letscher, **KB** =Karin Björkman, **NH**= Nick Hawco, **PO**= Physical Oceanography group, **CS**= Chris Schvarcz, **AB**= Anamica Bedi de Silva

Ship: R/V *Kilo Moana* HOT 320 Date: July 13 – July 19, 2020

TIME	July 13	July 14	July 15	July 16	July 17
0000		Deploy WireWalker	Optics		
0100		Deploy Sed Trap			
0200		S2C1 PP		S2C9 Gas Array	
0300			S2C3 PO-1(Deep)		
0400		Deploy PP Array		Deploy Gas Array	Recover Gas Array
0500				S2C10 Open	
0600	Depart Pier 35				
0700					S2C17
0800		S2C2		S2C11 PSi	
0900	Arrive Kahe Weight Cast			Transit to pump tanks	S52C1 WHOTS
1000					
1100	HyperPro		S2C4 PO-2 (Begin 36 hr)	S2C12 Open	
1200	S1C1 Kahe	Net Tow	Net Tow Net Tow (EG)	Net Tow Net Tow (EG)	Net Tow (EG)
1300		HyperPro			
1400	Transit ALOHA		S2C5 PC/PN	S2C13 ATP	
1500					Deep Trap Recovery
1600	Incinerator	Transit to pump tanks Incinerator			
1700			S2C6 PPO4	S2C14 Open	
1800		Transit to PP array		Transit to pump tanks Incinerator	
1900		Recover PP array			Pump Tanks Incinerator
2000		TM CTD Cast 1	S2C7 BEACH	S2C15 HPLC	S2C18 Open
2100	Arrive to ALOHA		Transit to pump tanks Incinerator		
2200		Net Tow Net Tow	Net Tow (EG)	Net Tow Net Tow (EG)	Net Tow (EG)
2300			S2C8 Open	S2C16 PO-3 (Deep)(end 36 hours)	

July 14th: Sunrise 0547, Sunset 1925

Ship: R/V *Kilo Moana* HOT 320 Date: July 3 – July 10, 2020

TIME	July 18	July 19			
0000					
0100					
0200					
0300					
0400					
0500	Recover Wirewalker				
0600	Recover Sediment Traps				
0700					
0800		Arrive Pier 35			
0900					
1000	S2C19				
1100	Trace Metal CTD Cast 2				
1200	HyperPro				
1300					
1400	Trace Metal CTD Cast 3				
1500					
1600					
1700	Pump Tanks Incinerator				
1800					
1900					
2000	S6C1 Kaena				
2100					
2200					
2300					

July 14th: Sunrise 0547, Sunset 1925

7.0 HOT-320 Watch Schedule

0300-1500

Dan Fitzgerald – Watch Leader, Tag
Carolina Funkey – Water Boss, Chief Scientist
Eric Grabowski- Tag
Fernando Pacheco- Console

1500-0300

Karin Björkman – Water Boss
Brandon Brenes- Tag
Tully Rohrer – Console, Watch Leader
Angel White- Tag

At Large

Tim Burrell
Mathieu Caffin
Blake Watkins

OTG

Juliana Diehl (lead)
Lance Frymire