

May 7, 1998

F/SWC2:RWB:FLF
CR9804-3.RWB

CRUISE REPORT

VESSEL: *Townsend Cromwell*, Cruise 98-04 (TC-230)

CRUISE PERIOD: 27 March-16 April 1998

AREA OF OPERATION: Lee sides of the Island of Oahu (off southern or western coasts) and the Island of Hawaii (Kona Coast)

TYPE OF OPERATION: Longline operations were set up to capture bigeye tuna for the placement of electronic archival tags, and to capture other pelagic fish for tissue samples needed to complete ongoing biochemical, physiological, anatomical, and reproductive studies. Performed IK tows along surface slicks to collect juvenile swordfish, and CTD stations to look for enhanced phytoplankton productivity resulting from ongoing volcanic activity on the Island of Hawaii.

ITINERARY:

27-29 March Embarked scientists Richard Brill, Tom Kazama and Mike Musyl. Departed Snug Harbor 1600. Transited to area off the leeward coast of the Island of Oahu. Deployed and retrieved longline gear to catch bigeye tuna for the placement of archival tags. (Data on longline sets are summarized in Tables 1 and 2.)

31 March Returned to Snug Harbor. Embarked Nancy Ash and Dan Curran. Departed Snug Harbor 1800 for Kailua-Kona (western, leeward coast of the Island of Hawaii).

31 March-1 April Transited to Kona Coast, Island of Hawaii. Operations were confined to this area because of exceptionally strong trade winds (20-30 knots sustained, gusting to 50 knots in the channels between the islands).

1 April- 11 April Deployed and retrieved longline gear to catch bigeye tuna for the placement of archival tags. (Data on archival tags deployed are summarized in Table 3.) Conducted CTD transects. (Data on CTD stations are summarized in Table 4.)

11 April Returned to Kailua-Kona and anchored. Disembarked Nancy Ash and embarked Robert Humphreys.

13-15 April Deployed and retrieved longline gear to catch bigeye tuna for the placement of archival tags. Conducted IK surface tows to capture larval swordfish. (Data on IK trawls are summarized in Table 5.)

15-16 April Transited to Snug Harbor.

16 April Arrived Snug Harbor 0800; disembarked scientists. End of cruise.

MISSIONS AND RESULTS:

- A. Capture bigeye tuna for the placement of archival tags.
- Captured 24 bigeye tuna that were suitable for the placement of archival tags (Table 3).
- B. Capture other pelagic species to collect tissue samples for ongoing physiological and biochemical studies.
1. Captured six mahimahi (*Coryphæna hippurus*) from which gill tissue samples were obtained to complete studies on the energetic costs of osmoregulation in pelagic fishes.
 2. Took tissue samples from two bigeye tuna that were too badly injured to have archival tags implanted.
- C. Conduct CTD transects to examine effects of ongoing volcanic activity on phytoplankton abundance.
- Completed 16 CTD stations (Table 4).
- D. Perform IK trawls to capture larval swordfish for ongoing age and growth, and subpopulation studies.
1. Completed 15 IK trawls (Table 5). Captured two juvenile swordfish (*Xiphias gladius*).
 2. In addition to the results listed above, eleven sharks were opportunistically tagged for the National Research

Institute of Far Seas Fisheries Research Laboratory in Shimizu, Japan. Results of tagging operations are given in Table 6.

**SCIENTIFIC
PERSONNEL:**

Richard W. Brill, Chief Scientist, Senior Fellow, Joint Institute for Marine and Atmospheric Research (JIMAR), University of Hawaii (UH).

Nancy Ash, Fishery Biologist, JIMAR, UH

Dan Curran, Fishery Biologist, JIMAR, UH

Robert Humphreys, Fishery Biologist, National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center (SWFSC), Honolulu Laboratory (HL)

Thomas Kazama, Fishery Biologist, NMFS, SWFSC, HL

Mike Musyl, Fishery Biologist, JIMAR, UH

Submitted by:

Richard W. Brill
Chief Scientist

Approved by:

R. Michael Laurs
Director, Honolulu Laboratory

Attachments

Table 1.--Summary of longline sets.

ID #	Date	Set or haulback	Start time (h)	Start--end locations	# of hooks	Hooks per float	Approx. hook depth (m) from TDR
1	03/27/98	s	22:26	N 21 20.35 W 158 33.41 - N 21 24.59 W 158 28.25	≈200	5	--
1	03/28/98	h	08:06	N 21 23.15 W 158 31.32 - N 21 29.85 W 158 29.68			
2	03/28/98	s	12:46	N 21 24.05 W 158 26.09 - N 21 24.87 W 158 19.89	≈200	20	--
2	03/28/98	h	20:01	N 21 26.37 W 158 25.89 - N 21 26.39 W 158 21.73			
3	03/29/98	s	09:03	N 21 14.74 W 158 19.54 - N 21 17.42 W 158 16.10	≈220	20	27
3	03/29/98	h	18:03	N 21 17.02 W 158 19.73 - N 21 18.27 W 158 17.62			
4	04/01/98	s	19:55	N 19 25.70 W 156 09.50 - N 19 21.41 W 156 08.75	≈200	5	70
4	04/02/98	h	06:05	N 19 25.45 W 156 06.47 - N 19 21.21 W 156 07.25			
5	04/02/98	s	08:40	N 19 21.95 W 156 14.02 - N 19 17.61 W 156 13.61	≈200	20	23
5	04/02/98	h	18:03	N 19 24.42 W 156 11.99 - N 19 20.52 W 156 12.57			
6	04/02/98	s	20:32	N 19 21.34 W 156 06.39 - N 19 26.61 W 156 05.60	≈200	5	--
6	04/03/98	h	06:01	N 19 23.97 W 156 02.59 - N 19 19.66 W 156 03.22			
7	04/03/98	s	18:02	N 19 22.65 W 156 09.85 - N 19 31.58 W 156 16.59	≈400	5	95

7	04/04/98	h	06:24	N 19 26.99 W 156 09.40 - N 19 37.74 W 156 14.24			
8	04/04/98	s	19:08	N 19 20.60 W 156 05.67 - N 19 26.40 W 156 13.73	≈400	5	120
8	04/05/98	h	06:09	N 19 25.51 W 156 07.70 - N 19 21.55 W 156 02.62			
9	04/05/98	s	22:31	N 19 26.76 W 156 10.13 - N 19 14.19 W 156 06.93	≈400	5	20
9	04/06/98	h	06:00	N 19 19.81 W 156 05.16 - N 19 04.94 W 156 05.54			
10	04/06/98	s	18:15	N 19 27.94 W 156 08.02 - N 19 17.38 W 156 06.03	≈400	5	50
10	04/07/98	h	06:01	N 19 12.89 W 156 02.51 - N 19 06.01 W 156 11.96			
11	04/07/98	s	19:00	N 19 27.92 W 156 11.94 - N 19 15.87 W 156 12.01	≈400	5	100
11	04/08/98	h	06:28	N 19 17.79 W 156 06.25 - N 19 11.03 W 156 14.59			
12	04/08/98	s	18:54	N 19 19.59 W 156 05.99 - N 19 12.76 W 156 06.37	≈200	5	75
12	04/09/98	h	05:57	N 19 08.72 W 156 11.56 - N 19 05.49 W 156 19.75			
13	04/09/98	s	20:58	N 19 22.74 W 156 07.78 - N 19 15.55 W 156 07.50	≈220	5	100
13	04/10/98	h	06:03	N 19 14.35 W 156 07.69 - N 19 09.49 W 156 13.60			
14	04/10/98	s	18:56	N 19 20.34 W 156 06.59 - N 19 13.53 W 156 06.77	≈200	5	40-100

14	04/11/98	h	05:56	N 19 11.53 W 156 09.99 - N 19 07.91 W 156 14.80			
15	04/12/98	s	18:52	N 19 26.05 W 156 08.24 - N 19 19.65 W 156 07.41	≈200	5	--
15	04/13/98	h	05:59	N 19 14.07 W 156 03.64 - N 19 12.27 W 156 08.41			
16	04/13/98	s	21:20	N 19 28.04 W 156 08.17 - N 19 18.27 W 156 06.92	≈200	5	30-60
16	04/14/98	h	06:00	N 19 19.35 W 156 01.99 - N 19 07.01 W 156 07.67			

Table 2.--Summary of fish captured during longline operations.

ID #	Species captured (* = species identification tentative)
1	none
2	2 bigeye thresher sharks (<i>Alopias profundus</i>)
3	1 bigeye tuna (<i>Thunnus obesus</i>), 2 blue sharks (<i>Prionace glauca</i>), 1 bigeye thresher shark
4	1 bigeye tuna, 1 swordfish (<i>Xiphias gladius</i>), 1 blue shark
5	4 yellowfin tuna (<i>Thunnus albacares</i>), 1 shortbill spearfish (<i>Tetrapturus angustirostris</i>), 4 lancet fish (<i>Alepisaurus ferox</i>), 1 blue shark, 1 unidentified shark
6	1 bigeye tuna, 1 mahimahi (<i>Coryphaena hippurus</i>)
7	1 bigeye tuna, 2 swordfish, 2 blue sharks, 1 mahimahi, 2 shorbill spearfish, 1 *luvar (<i>Luvarus imperialis</i>), 1 crocodile shark (<i>Pseudocarcharias kamoharai</i>), 1 lancet fish
8	2 bigeye tuna, 2 bigeye thresher shark
9	1 bigeye tuna, 1 yellowfin tuna, 1 skipjack tuna (<i>Katsuwonus pelamis</i>), 1 bigeye thresher shark, 2 blue sharks
10	2 bigeye tuna, 2 thresher sharks, 1 shortbill spearfish
11	9 bigeye tuna, 1 swordfish, 1 mahimahi, 1 pelagic stingray (<i>Dasyatis violacea</i>), 2 shortbill spearfish, 1 *oil fish (<i>Rovetus pretiosus</i>), 1 bigeye thresher shark
12	14 bigeye tuna, 1 ono (<i>Acanthocybium solandri</i>)
13	3 bigeye tuna
14	5 bigeye tuna, 1 striped marlin (<i>Tetrapturus audax</i>), 1 bigeye thresher shark
15	1 swordfish, 1 mahimahi, 1 bigeye thresher shark, 1 blue shark
16	2 bigeye tuna, 1 swordfish, 1 skipjack tuna, 1 blue shark, 1 oceanic whitetip shark (<i>Carcharhinus longimanus</i>), one unidentified shark

Table 3.--Summary of archival tag deployed on bigeye tuna.

Archival Tag #	Tag Prog.	Floy Tag #	Date	Latitude (N)	Longitude (W)	Time (h)	Hook Type	Bait	Fork length (cm)	Tag placement*	Surgical Time
478	4	--	4/2	19 23.624	156 07.237	649	swordfish	sanma	--	IM	ca. 30"
469	4	5201	4/4	19 35	156 13	1005	circle	squid	102	IM	<60"
647	4	5204	4/5	19 22.9	156 03.96	905	circle	squid	86	IP	ca. 1.5-2'
476	4	5203	4/5	19 24.56	156 07.33	642	circle	squid	100	IM	<45"
622	4	5202	4/7	19 11.64	156 04.04	640	circle	sanma	127	IM	ca. 1'30"
523	4	5205	4/7	19 07.06	156 09.36	850	circle	squid	76	IP	ca. 3'
565	4	5209	4/8	19 16.02	156 07.69	716	circle	sanma	126	IM	<1'45"
572	4	5207	4/8	19 17.57	156 06.31	651	circle	sanma	87	IM	<1'30"
576	4	5206	4/8	19 17.57	156 06.31	640	circle	sanma	99	IM	<1'
642	4	5210	4/8	19 13.78	156 10.43	842	circle	squid	103	IM	<1'30"
581	4	5211	4/8	19 13.72	156 10.49	852	circle	squid	103	IM	<2'
841	4	5218	4/9	19 05.75	156 17.40	850	circle	squid	103	IM	<2'
518	4	5219	4/9	19 05.45	156 19.12	910	circle	squid	103	IM	<2'
651	4	5212	4/9	19 08.31	156 11.86	624	circle	sanma	127	IM	<2'
563	4	5213	4/9	19 07.56	156 12.96	705	swordfish	sanma	129	IM	<2'
509	4	5217	4/9	19 07.58	156 12.77	700	swordfish	sanma	131	IM	<2'
534	4	5216	4/9	19 08.19	156 12.15	640	circle	sanma	133	IM	<2'
537	4	5215	4/9	19 08.25	156 12.03	630	circle	sanma	123	IM	<2'
781	4	5214	4/10	19 13.54	156 08.63	645	circle	sanma	104	IM	<2'
482	4	5220	4/10	19 11.28	156 10.27	810	circle	sanma	129	IM	<2'
636	4	5224	4/11	19 08.97	156 12.87	725	circle	squid	131	IM	ca. 1'
915	4	5222	4/11	19 07.93	156 14.21	830	circle	squid	127	IM	<1'30"
575	4	5221	4/11	19 08.18	156 13.62	818	circle	squid	113	IM	ca. 1'
459	4	5225	4/14	19 09.61	156 04.58	840	circle	squid	128	IM	<1'30"

*IP = intraperitoneal, IM = intramuscular

Table 4.--Summary of CTD stations.

Date	Time	Location
4/4	1235	N 19 49.90 - W 156 09.36
4/4	1453	N 19 39.90 - W 156 08.60
4/4	1630	N 19 30.1 - W 156 06.09
4/4	1816	N 19 20.03 - W 156 05.01
4/5	1130	N 19 09.8 - W 156 09.2
4/5	1326	N 19 19.9 - W 156 09.7
4/5	1517	N 19 30.1 - W 156 09.8
4/5	1701	N 19 40.02 - W 156 09.97
4/5	1921	N 19 50.60 - W 156 10.38
4/8	1023	N 19 11.18 - W 156 14.78
4/8	1220	N 19 18.2 - W 156 06.5
4/9	1010	N 19 10.05 - W 156 18.31
4/9	1200	N 19 20 - W 156 19
4/9	1335	N 19 30 - W 156 19
4/9	1525	N 19 39.92 - W 156 18.43
4/9	1726	N 19 50.11 - W 156 19.03

Table 5.--Summary of IK trawls.

Date	Time* (start)	Location (start)	Location (end)
4/13	1035	N 19 18.57 - W 155 55.8	N 19 13.69 - W 155 55.6
4/13	1150	N 19 13.3 - W 155 56.8	N 19 14.2 - W 155 57.0
4/13	1303	N 19 14.6 - W 155 56.5	N 19 16.36 - W 155 54.97
4/13	1425	N 19 16.58 - W 155 55.14	N 19.17.9 - W 155 54.2
4/13	1515	N 19 18.0 - W 155 54.1	N 19 21.24 - W 155 54.92
4/13	1618	N 19 21.25 - W 155 54.82	N 19 25.21 - W 155 55.43
4/13	1727	N 19 25 43 - W 155 55.59	N 19 28.74 - W 155 57.24
4/14	1218	N 19 16.5 - W 155 54.0	N 19 20.5 - W 155 54.5
4/14	1316	N 19 20.9 - W 155 54.8	N 19 22.9 - W 155 55.8
4/15	0010	N 19 22.0 - W 155 57.2	N 19 16.9 - W 155 58.4
4/15	0116	N 19 16.4 - W 155 58.5	N 19 10.8 - W 155 59.0
4/15	0225	N 19 10.5 - W 155 59.0	N 19 06.2 - W 155 59.2
4/15	0359	N 19 07.66 - W 155 57.00	N 19 11.23 - W 155 56.37
4/15	0503	N 19 11.31 - W 155 56.28	N 19 14.35 - W 155 55.04
4/15	0610	N 19 14.62 - W 155 54.90	N 19 18.67 - W155 54.29

*All tows were approximately 1 h duration.

Table 6.--Sharks tagged and released. All lengths are estimated.

Tag #	Date	Species	Latitude	Longitude	Length (cm)
S1611	3/28	bigeye thresher	N 21 26	W 158 22	183
S1613	3/29	bigeye thresher	N 21 27	W 158 18	183
S1614	3/29	blue shark	N 21 17	W 158 17	183
S1616	4/2	blue shark	N 19 25	W 156 09	183
S1616	4/2	blue shark	N 19 20	W 156 11	213
S1620	4/5	bigeye thresher	N 19 24	W 156 07	183
S1621	4/6	blue shark	N 19 18	W 156 04	213
S1622	4/13	blue shark	N 19 11	W 156 08	183
S1623	4/14	blue shark	N 19 10	W 156 03	152
S1624	4/14	unidentified	N 19 09	W 156 04	213
S1625	4/14	oceanic whitetip	N 19 09	W 156 05	183

