

May 20, 2002

F/SWC2:RWB:FLF
CR0202-1.RWB

CRUISE REPORT

VESSEL: *Townsend Cromwell*, Cruise 02-02 (TC-276)

CRUISE PERIOD: 1-30 April 2002 (scheduled)
1-29 April 2002 (actual)

AREAS OF OPERATION: North Pacific, lee side of the Island of Hawaii (Kona coast), Island of Oahu (off southern coast), and Cross Seamount (Fig. 1)

ITINERARY:

1 April Embarked scientists Petri Ala-Laurila, Richard Brill, Dan Curran, Nuno Fraguso, Kerstin Fritches, Tom Kazama, Christina Larsen, Mike Musyl, and Eric Warrant. Departed Snug Harbor 1500. Transited to area off the leeward coast of the Island of Oahu. Began setting longline gear in effort to catch swordfish, blue sharks, and bigeye tuna for the placement of archival tags and pop-up satellite tags (PSATs).

2 April Retrieved longline gear. (Data on longline fishing and tagging operations are summarized in Tables 1, and 2.) Departed for north Pacific to continue longline operations.

3-16 April Arrived north Pacific fishing area and continued longline operations.

17-19 April Departed fishing area due to deteriorating weather conditions and transited south to Cross Seamount.

20-21 April Arrived Cross Seamount and continued longline operations to catch bigeye tuna and blue sharks for tagging. Main line became entangled in starboard propeller. Began transiting to Kailua-Kona (lee side of the Island of Hawaii) to effect repairs.

22 April Transited to Kailua-Kona.

- 23-25 April Arrived Kailua-Kona, effected repairs, and continued longline operations to catch blue sharks for tagging, and other pelagic fishes for tissue sampling. Began transit to Cross Seamount.
- 26-28 April Arrived Cross Seamount; continued and completed longline operations. Departed for Snug Harbor
- 29 April Arrived Snug Harbor. End of cruise.

MISSIONS AND RESULTS:

- A. Capture swordfish for placement of archival tags.

Placed PSATs on 17 swordfish (Table 3, Fig. 1).

- B. Capture blue sharks for placement of archival tags and to sample blood to determine biochemical indicators of delayed mortality.

Placed PSATs on 18 blue sharks (Table 3, Fig. 1) and obtained blood samples for measurement of biochemical predictors of post-release mortality.

- C. Opportunistically capture other sharks and large pelagic fish species for attachment of PSATs.

Placed PSATs on one bigeye tuna, two oceanic white tip sharks, three shortfin mako sharks, and six bigeye thresher sharks (Table 3, Fig. 1).

- D. Collect tissue samples for ongoing physiological/biochemical studies of tunas, billfishes, and other pelagic fish species.

Took tissue samples from bigeye, yellowfin and skipjack tunas, and swordfish for ongoing physiological and biochemical studies.

- E. Conduct experiments on vision in tunas and billfishes using isolated retinas and standard physiological techniques.

Conducted detailed studies on the visual capabilities of swordfish, tunas, mahimahi, escolar, and lancet fish using isolated retinas.

NARRATIVE SUMMARY:

A total of 19 longline sets (all but one nighttime) were conducted during the cruise. Chemical lights sticks (green) were used on every third dropper line. Squid was used as predominate bait in all sets, although sanma (*Cololabis saira*) and opelu (*Decapterus* spp.) were occasionally used (Table 1).

A total of 39 swordfish were captured (Table 2). Of these 17 were in sufficiently robust condition that PSATs were attached prior to release. This is a much higher success rate (# of fish tagged with PSATs relative to the number of fish caught) than achieved on a similar cruise last year (TC 01-01). The reason for the better success this year is unknown, although the gear was deployed starting two hours later (2200) this year than last year (2000).

A total of 98 blue sharks were captured (Table 2) and PSATs attached to 18 animals prior to release (Tables 2 and 3). The wire leaders used on the dropper lines between the lead weight and the hook this year clearly made a difference, in that only a few sharks were lost at the side of the boat. The wire leader, however, appeared to cause more damage to the integument of the swordfish and tunas than the monofilament dropper line. Clearly, when targeting sharks for attachment of PSATs wire dropper lines are preferable. However, when targeting swordfish, marlin, or tunas for attachment of PSATs, monofilament gear is preferable.

We also conducted trolling operations whenever possible during the day to capture tunas, mahimahi, and other pelagic fish species (Table 2) for tissue sampling.

RECORDS:

The following forms, logs, charts, and data records were kept and given to the Honolulu Laboratory upon termination of the cruise. These include all data captured onto computer storage media during the cruise. All the records are filed there unless indicated otherwise in parentheses.

ADCP DOPPLER ping data files
 SEAS system data files
 Deck Log-Weather Observation Sheet
 Marine Operations Log (NOAA)
 Project Area and Operations Chartlets
 Station Number and Activity Log
 Special Time and Attendance Report (filed with Admin.)

SCIENTIFIC

PERSONNEL:

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Submitted by: _____
Richard W. Brill
Chief Scientist

Approved by: _____
R. Michael Laurs
Director, Honolulu Laboratory

Attachments

Table 1, Summary of longline sets

Set #	Date	Start Time		latitude, start	longitude, start	latitude, end	longitude, end	approx. # of hooks
1	04/01/02	08:00 PM	deploy	21° 28.343	158° 28.405	21° 31.236	158° 30.572	200
1	04/02/02	08:00 AM	retrieve	21° 32.032	158° 34.299	21° 35.729	158° 34.505	
2	04/03/02	10:00 PM	deploy	26° 41.669	158° 08.556	26° 45.5	158° 45.5	470
2	04/04/02	08:00 AM	retrieve	26° 38.283	158° 05.902	26° 39.872	157° 58.515	
3	04/04/02	10:00 PM	deploy	28° 24.006	157° 59.417	28° 24.0	157° 59.4	470
3	04/05/02	08:00 AM	retrieve	28° 25.667	157° 45.7	28° 32.311	157° 50.280	
4	04/05/02	10:00 PM	deploy	30° 19.142	158° 00.356	30° 22.2	158° 09.1	430
4	04/06/02	08:00 AM	retrieve	30° 16.424	158° 04.704	30° 14.182	158° 08.411	
5	04/06/02	10:00 PM	deploy	30° 16.565	158° 30.292	30° 19.065	158° 41.323	500
5	04/07/02	06:30 AM	retrieve	30° 17.885	159° 29.773	30° 20.950	158° 36.374	
6	04/07/02	10:00 PM	deploy	30° 39.494	159° 17.250	30° 42.844	159° 36.581	500
6	04/08/02	06:30 AM	retrieve	30° 43.241	159° 35.739	30° 44.159	159° 36.483	
7	04/09/02	08:00 AM	deploy	30° 46.009	159° 58.125	30° 39.129	160° 07.040	500
7	04/09/02	03:00 PM	retrieve	30° 46.918	159° 59.103	30° 41.775	160° 04.45	
8	04/09/02	10:00 PM	deploy	31° 03.966	160° 01.207	30° 55.068	160° 04.536	500
8	04/10/02	06:30 AM	retrieve	30° 53.518	160° 05.044	30° 53.563	160° 04.651	
9	04/10/02	10:00 PM	deploy	31° 01.059	160° 08.454	30° 54.356	160° 15.074	500
9	04/11/02	06:30 AM	retrieve	31° 00.560	160° 09.050	30° 57.937	160° 11.366	
10	04/11/02	10:00 PM	deploy	31° 09.824	160° 08.483	31° 01.059	160° 08.454	500
10	04/12/02	06:30 AM	retrieve	31° 07.654	160° 03.635	31° 02.382	160° 08.658	
11	04/12/02	10:00 PM	deploy	30° 52.257	161° 24.028	30° 58.494	161° 31.778	500
11	04/13/02	06:30 AM	retrieve	30° 50.846	161° 19.135	30° 56.013	161° 24.724	
12	04/13/02	10:00 PM	deploy	31° 35.247	162° 23.021	31° 36.379	162° 12.349	500
12	04/14/02	06:30 AM	retrieve	31° 33.325	162° 23.680	31° 37.726	162° 14.816	
13	04/14/02	10:00 PM	deploy	30° 03.165	161° 09.290	29° 58.237	161° 17.930	470
13	04/15/02	06:30 AM	retrieve	29° 57.051	161° 09.785	29° 5.678	161° 17.832	
14	04/15/02	10:00 PM	deploy	30° 25.906	160° 53.715	30° 30.618	161° 04.337	470
14	04/16/02	06:30 AM	retrieve	30° 23.768	160° 53.645	30° 28.114	161° 00.916	
15	04/20/02	08:00 PM	deploy	18° 33.314	158° 13.589	18° 30.197	158° 02.262	600
15	04/21/02	08:00 AM	retrieve	18° 21.718	158° 17.372	18° 15.276	158° 08.762	
16	04/23/02	06:00 PM	deploy	19° 11.394	156° 10.814	19° 22.788	156° 21.072	800
16	04/24/02	12:00 AM	retrieve	19° 20.295	156° 10.595	19° 20.295	156° 10.871	
17	04/24/02	06:00 PM	deploy	19° 18.851	156° 18.802	19° 37.273	156° 19.410	800
17	04/25/02	12:00 AM	retrieve	19° 18.523	156° 10.925	19° 35.383	156° 09.674	
18	04/25/02	06:00 PM	deploy	18° 38.791	157° 59.030	18° 36.551	157° 49.339	450
18	04/26/02	12:00 AM	retrieve	18° 35.710	157° 56.870	18° 31.288	157° 47.995	
19	04/26/02	06:00 PM	deploy	18° 36.652	158° 06.612	18° 34.845	157° 56.851	450
19	04/27/02	12:00 AM	retrieve	18° 32.155	158° 07.762	18° 30.726	157° 57.743	

Table 2 Summary of fish captured during longline operations

Date	Species	Scientific Name	Technique	Qty
04/02/02	Crocodile shark	<i>Pseudocarcharias kamoharai</i>	Longline	1
	Swordfish	<i>Xiphias gladius</i>	Longline	1
	Bigeye thresher shark	<i>Alopias superciliosus</i>	Longline	1
	Blue Shark	<i>Prionace glauca</i>	Longline	1
	Mahi Mahi	<i>Coryphaena hippurus</i>	Troll	2
04/04/04	Shortfin mako	<i>Isurus oxyrinchus</i>	Longline	1
	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	1
04/05/02	Blue shark	<i>Prionace glauca</i>	Longline	1
04/06/02	Blue shark	<i>Prionace glauca</i>	Longline	2
	Swordfish	<i>Xiphias gladius</i>	Longline	3
04/07/02	Blue shark	<i>Prionace glauca</i>	Longline	3
	Escolar	<i>Lepidocybium flavobrunneum</i>	Longline	1
	Swordfish	<i>Xiphias gladius</i>	Longline	6
04/08/02	Swordfish	<i>Xiphias gladius</i>	Longline	3
04/09/02	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	3
04/09/02	Blue shark	<i>Prionace glauca</i>	Longline	2
04/10/02	Blue shark	<i>Prionace glauca</i>	Longline	12
	Swordfish	<i>Xiphias gladius</i>	Longline	3
04/11/02	Blue shark	<i>Prionace glauca</i>	Longline	10
	Swordfish	<i>Xiphias gladius</i>	Longline	3
	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	1
04/12/02	Blue shark	<i>Prionace glauca</i>	Longline	14
	Swordfish	<i>Xiphias gladius</i>	Longline	3
	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	1
04/13/02	Blue shark	<i>Prionace glauca</i>	Longline	5
	Swordfish	<i>Xiphias gladius</i>	Longline	4
	Shortfin mako	<i>Isurus oxyrinchus</i>	Longline	1
	Escolar	<i>Lepidocybium flavobrunneum</i>	Longline	4
04/14/02	Blue shark	<i>Prionace glauca</i>	Longline	13
	Swordfish	<i>Xiphias gladius</i>	Longline	1
	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	1
04/16/02	Blue shark	<i>Prionace glauca</i>	Longline	2
	Escolar	<i>Lepidocybium flavobrunneum</i>	Longline	1
	Swordfish	<i>Xiphias gladius</i>	Longline	2
04/17/02	Blue shark	<i>Prionace glauca</i>	Longline	6
	Swordfish	<i>Xiphias gladius</i>	Longline	9
	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	1
04/18/02	Mahimahi	<i>Coryphaena hippurus</i>	Troll	1
04/19/02	Mahimahi	<i>Coryphaena hippurus</i>	Troll	4
04/20/02	Skipjack	<i>Katsuwonus pelamis</i>	Troll	1
	Mahimahi	<i>Coryphaena hippurus</i>	Troll	1
	Ono / Wahoo	<i>Acanthocybium solandri</i>	Troll	1
04/21/02	Mahimahi	<i>Coryphaena hippurus</i>	Longline	2
	Escolar	<i>Lepidocybium flavobrunneum</i>	Longline	6
	Bigeye tuna	<i>Thunnus obesus</i>	Longline	1
	Snake mackerel	<i>Gempylus serpens</i>	Longline	3
	Great barracuda	<i>Sphyraena barracuda</i>	Longline	1
	Blue shark	<i>Prionace glauca</i>	Longline	5
	Silky shark	<i>Carcharhinus falciformis</i>	Longline	1
	Oceanic white tip	<i>Carcharhinus longimanus</i>	Longline	1
04/23/02	Skipjack tuna	<i>Katsuwonus pelamis</i>	Troll	1
04/24/02	Mahimahi	<i>Coryphaena hippurus</i>	Longline	4
	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	1

Date	Species	Scientific Name	Technique	Qty
	Swordfish	<i>Xiphias gladius</i>	Longline	1
	Bigeye tuna	<i>Thunnus obesus</i>	Longline	1
	Great barracuda	<i>Sphyraena barracuda</i>	Longline	1
	Blue shark	<i>Prionace glauca</i>	Longline	8
	Shortfin mako	<i>Isurus oxyrinchus</i>	Longline	1
04/25/02	Mahimahi	<i>Coryphaena hippurus</i>	Longline	6
	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	1
	Blue shark	<i>Prionace glauca</i>	Longline	6
	Oceanic white tip	<i>Carcharhinus longimanus</i>	Longline	1
	Brown shark	(unidentified)	Longline	1
04/26/02	Yellowfin tuna	<i>Thunnus albacares</i>	Troll	6
	Bigeye tuna	<i>Thunnus obesus</i>	Troll	11
	Skipjack tuna	<i>Katsuwonus pelamis</i>	Troll	6
	Mahimahi	<i>Coryphaena hippurus</i>	Troll	3
04/27/02	Blue shark	<i>Prionace glauca</i>	Longline	3
	Bigeye thresher shark	<i>Alopias superciliosus</i>	Longline	5
	Bigeye tuna	<i>Thunnus obesus</i>	Longline	1
	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	1
	Escolar	<i>Lepidocybium flavobrunneum</i>	Longline	1
	Mahimahi	<i>Coryphaena hippurus</i>	Longline	3
04/28/02	Blue shark	<i>Prionace glauca</i>	Longline	5
	Bigeye thresher shark	<i>Alopias superciliosus</i>	Longline	2
	Bigeye tuna	<i>Thunnus obesus</i>	Longline	1
	Long snout lancetfish	<i>Alepisaurus ferox</i>	Longline	1
	Mahimahi	<i>Coryphaena hippurus</i>	Longline	5

Total Catch

Species	Qty
Bigeye thresher shark	8
Bigeye tuna	15
Blue Shark	98
Brown shark	1
Crocodile shark	1
Escolar	13
Great barracuda	2
Long snout lancetfish	12
Mahimahi	31
Oceanic white tip	2
Ono / Wahoo	1
Shortfin mako	3
Silky shark	1
Skipjack tuna	8
Snake mackerel	3
Swordfish	39
Yellowfin tuna	6

Total 244

SPECIES	Latitude	Longitude	04/ 02	04/ 04	04/ 05	04/ 06	04/ 07	04/ 08	04/ 09	04/ 10	04/ 11	04/ 12	04/ 13	04/ 14	04/ 16	04/ 17	04/ 21	04/ 24	04/ 25	04/ 27	04/ 28	Grand Total
	29.9493	161.1661													1							1
	30.3221	158.5271					1															1
	30.3481	158.5969					1															1
	30.3490	158.6148					1															1
	30.4089	160.9328														1						1
	30.4300	160.9585														1						1
	30.4488	160.9801														1						1
	30.4530	160.9895														1						1
	30.4659	161.0134														1						1
	30.7132	159.5111						1														1
	30.7163	159.5002						1														1
	30.9555	160.0828								1												1
	31.0021	160.1937									1											1
	31.0340	160.0031								1												1
	31.0540	160.1481										1										1
	31.5469	162.3391												1								1
swordfish Total			1				3	2		2	1		1	1	1	5						17
white-tip	18.3568	158.2864															1					1
	19.2964	156.1830																	1			1
white-tip Total																	1		1			2
Grand Total			2	1	1	2	4	2	2	11	1	2	2	1	1	5	1	1	1	5	2	47

Figure 1

Locations where PSAT were applied to various pelagic fish species.

