

HISTORY OF THE TUNA CONFERENCES

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The Tuna Conferences were organized to provide a forum at which representatives of various organizations concerned with tunas, and later billfishes and sharks, would have the opportunity to exchange information and ideas. Except during the first few years, the conferences have been held at the University of California at Los Angeles Conference Center at Lake Arrowhead, California. Nearly all the attendees stay and eat at the Conference Center, which ensures that people from different organizations have ample time to talk with one another during breaks in the meetings. The conferences have always been dominated by biologists and oceanographers, but economists, fishermen, fish processors, representatives of sport-fishing interests, political scientists, and legal experts have also attended, and some of these have given presentations. The Chairman of the 33rd Tuna Conference, Samuel F. Herrick, Jr., is an economist. Tunas associated with dolphins are taken by the purse-seine fishery of the eastern Pacific Ocean, and some dolphins are accidentally killed during fishing operations. As a result, several organizations doing research on tunas in the eastern Pacific Ocean began studies on dolphins, and some of the results of those studies have been presented at Tuna Conferences. Michael D. Scott, co-chairman of the 48th Tuna Conference, is a marine mammalogist.

The first Tuna Conference was held in 1950, and they have been held each year thereafter (Table 1). At first, nearly all the attendees were from California, with a few from Washington, Oregon, Hawaii, the U.S. east coast, and countries other than the United States (Table 2). Many of the attendees from far-away places were probably visiting California for reasons other than attending the Tuna Conference. As time passed, more people from far-away places (and from northwestern Mexico) attended the Tuna Conferences. In 1994, for the first time, more than half the attendees at a Tuna Conference were from places other than California. Coincidentally, the caliber of the talks improved. Without doubt, the better talks lured more people from far-away places, and the inclusion of talks by people from far-away places resulted in programs that were of greater interest than would have been the case if nearly all the speakers had been from California. Unless travel funds are cut, the Tuna Conferences will probably continue to attract people from all over the world.

No information is available on the first Tuna Conference, and it is possible that proceedings of that conference were not prepared. Someone (I've forgotten who) told me that Dr. O.E. Sette of the U.S. Fish and Wildlife Service was probably primarily responsible for convening the first Tuna Conference.

The following persons participated in the second Tuna Conference:

American Tunaboat Association – Wilbert M. Chapman;

California Department of Fish and Game – Clarkson E. Blunt, Jr., Frances N. Clark,
Harry C. Godsil, Edward C. Greenhood;

Inter-American Tropical Tuna Commission – Franklin G. Alverson, Gerald V. Howard,
Rolf Juhl, Milner B. Schaefer;

Oregon Fish Commission – Edwin K. Holmberg, Donald L. McKernan;

Pacific Marine Fisheries Commission – John Gharrett;
Scripps Institution of Oceanography – Carl L. Hubbs, John Isaacs, Roger R. Revelle,
Warren S. Wooster;
U.S. Fish and Wildlife Service – Elbert H. Ahlstrom, Joseph E. King, William F.
Royce, Edward A. Schaeffers, Oscar E. Sette;
University of Washington – Richard Van Cleve;
Washington Department of Fisheries – Donald R. Johnson.

The agenda for the second Tuna Conference is reproduced in Appendix 1. It is rigidly structured, and the full report appears as if it was written by a rapporteur, rather than assembled by one or more editors from reports written by the speakers, as is the case now. The same style prevailed for the next 10 to 15 years, although the reports on the various subjects became longer and the overall reports appear to have been assembled by one or more editors from abstracts written by the speakers. The reports for the various organizations appeared as appendices in the reports of the 16th, 17th, and 18th Tuna Conferences, rather than at the beginning of the reports, as had been the case previously. After that the reports for the various organizations were dropped, although the Director of the Southwest Fisheries Science Center of the U.S. NMFS submitted a separately-bound report to the Tuna Conference each year for quite a few years after that. The 14th, 15th, 17th, 18th, 22nd, 23rd, 24th, and 26th Tuna Conferences included reviews of the tuna fisheries in various areas. The abstracts of the papers presented at the 12th Tuna Conference were published in Special Scientific Report 415 of the U.S. Fish and Wildlife Service. The preface to the report of the 24th Tuna Conference begins with the statement, “The contents of these abstracts are of an informal nature, and therefore are not to be quoted or cited without permission of the author(s),” and most of the subsequent reports contain similar statements. Except during the first few years, there were usually sessions on various subjects, *e.g.*, physiology and behavior, stock structure, *etc.* A panel discussion within the subject “Tuna Fisheries and Population Dynamics” was held at the 16th Tuna Conference, and panel discussions on various subjects have been held at subsequent conferences. The 30th Tuna Conference was the first to have an overall theme, “Unit Stock Management of Highly Migratory Species: Is it an Imperative?” Previous to the 40th Tuna Conference the abstracts were submitted to the Chairman at the conference, and he subsequently put them together and mailed the reports to the attendees. For the 40th Tuna Conference, however, the Chairman received the abstracts before the conference and distributed the report at the conference, and this procedure has been followed for all subsequent conferences. This was a considerable improvement over the previous system. Posters were first exhibited at the 41st Tuna Conference.

The sexes of the attendees are listed in Table 3. During the early years nearly all the attendees were men. Frances N. Clark of the CDFG attended the second through the sixth conferences, and Yvonne M.M. Bishop of the IATTC attended the seventh and eighth conferences. Jeanne Wexler of the IATTC was co-chair of the 42nd Tuna Conference—the first woman to serve in that capacity.

The totals in Tables 1, 2, and 3 differ from one another because they were compiled from lists prepared at different times.

Eastern Pacific Ocean Council (EPOC) meetings were held in conjunction with the 8th through 10th and the 12th through 26th Tuna Conferences. The Tuna Conferences extended

from Monday morning until noon on Wednesday, and the EPOC meetings began after lunch on Wednesday and lasted until Friday afternoon. Many people attended all or parts of both meetings. Tuna Conference presentations that were most likely to be of interest to oceanographers were given on Wednesday morning, and EPOC presentations that were most likely to be of interest to biologists were given on Wednesday afternoon. The EPOC meetings subsequent to that for 1975 probably ceased to be held in conjunction with the Tuna Conferences at about the time that the dates of the latter were switched from October to May. The more recent EPOC meetings have been held at various locations in the western United States; that for 2015 will be held at Fallen Leaf Lake, South Lake Tahoe, California, on September 20-23, 2015.

Eight scholarships, the Tuna Conference scholarship, the Manuel Caboz Memorial scholarship, the Wildlife Computers scholarship, the Automatic Differentiation Model Builder scholarship, the Digital Globe (formerly GeoEye) scholarship, the Desert Stars Systems scholarship, the Margarita Tomlinson scholarship, and the John Tomlinson scholarship have been established to help defray the costs of attending the Tuna Conferences for students. These were first awarded for the 36th, 41st, 59th, 60th, 61st, 62nd, and 66th Tuna Conferences, respectively. In addition, the Southern California chapter of the American Institute of Fishery Research Biologists gave an award for the best paper presented at the 48th Tuna Conference. Students from universities in American Samoa, Australia, Belgium, Brazil, Canada, France, Italy, Japan, Mexico, Portugal, the Republic of China, Spain, the United Kingdom, and the United States have won these awards over the years. Additional information on the scholarships is given in Tables 4-15 of this report and on page 5 of the report for the 45th Tuna Conference.

In 2014, the International Seafood Sustainability Foundation (ISSF) paid for the transportation of the four award winners and three other students, Emily Loose (VIMS), Wessley Merten (University of Puerto Rico), and Matt Siskey (University of Maryland) to and from the 65th Tuna Conference. In 2015 the ISSF paid for the transportation of the seven award winners at the 66th Tuna Conference. In 2016 the ISSF paid for the transportation of the four award winners at the 67th Tuna Conference. In 2017 the ISSF paid for the transportation of the eight award winners at the 68th Tuna Conference. In 2018 the ISSF paid for the transportation of the seven award winners at the 69th Tuna Conference.

Some information on Captain Manuel Caboz, which will be of interest to many of the people attending the Tuna Conferences, appears in Appendix 2.

The Tuna Conference has a web page, <http://www.tunaconference.org>, with up-to-date information on recent conferences.

TABLE 1. Locations, dates, chairpersons, and numbers of attendees for Tuna Conferences. The abbreviations are as follows: BCF, U.S. Bureau of Commercial Fisheries; CAS, California Academy of Sciences; CDFG, California Department of Fish and Game; FWS, U.S. Fish and Wildlife Service; IATTC, Inter-American Tropical Tuna Commission; n.a., not available; NMFS, U.S. National Marine Fisheries Service; SIO, Scripps Institution of Oceanography; STOR Scripps Tuna Oceanography Research; VIMS, Virginia Institute of Marine Science.

No.	Location	Dates	Chairperson(s)	Attendees
1				
2	Del Mar	Oct. 30-Nov. 1, 1951	Oscar E. Sette, FWS	23
3	CAS, San Francisco	Nov. 6-8, 1952	Milner B. Schaefer, IATTC	27
4	CDFG, San Pedro	Nov. 8-9, 1953	Robert C. Wilson, CDFG	31
5	SIO, La Jolla	Nov. 3-5, 1954	Bell M. Shimada, IATTC	38
6	CAS, San Francisco	Nov. 15-17, 1955	Garth I. Murphy, FWS	32
7	SIO, La Jolla	Oct. 22-24, 1956	Leo Pinkas, CDFG	43
8	Lake Arrowhead	Oct. 21-24, 1957	Gerald V. Howard, IATTC	42
9	Lake Arrowhead	Oct. 27-29, 1958	Maurice Blackburn, STOR	49
10	Lake Arrowhead	Dec. 7-9, 1959	Harold B. Clemens, CDFG	43
11	Lake Arrowhead	Sep. 30-Oct. 2, 1960	James H. Johnson, BCF	50
12	Lake Arrowhead	Sep. 25-27, 1961	Clifford L. Peterson, IATTC	48
13	Lake Wilderness, Wash.	Oct. 2-3, 1962	Robert W. Holmes, STOR	35
14	Lake Arrowhead	Sep. 30-Oct. 2, 1963	Robert R. Bell, CDFG	n.a.
15	Lake Arrowhead	Sep. 28-30, 1964	Richard R. Whitney, BCF	n.a.
16	Lake Arrowhead	Sep. 27-29, 1965	James Joseph, IATTC	n.a.
17	Lake Arrowhead	Oct. 17-19, 1966	Alan R. Longhurst, STOR	n.a.
18	Lake Arrowhead	Nov. 6-8, 1967	William L. Craig, CDFG	n.a.
19	Lake Arrowhead	Oct. 14-16, 1968	Frank J. Hester, BCF	n.a.
20	Lake Arrowhead	Oct. 13-15, 1969	Craig J. Orange, IATTC	87
21	Lake Arrowhead	Oct. 12-14, 1970	Albert C. Jones, NMFS	77
22	Lake Arrowhead	Oct. 11-13, 1971	Francis Williams, STOR	84
23	Lake Arrowhead	Oct. 16-18, 1972	Robson A. Collins, CDFG	n.a.
24	Lake Arrowhead	Oct. 1-3, 1973	R. Michael Laurs, NMFS	82
25	Lake Arrowhead	Sep. 30-Oct. 2, 1974	Robert C. Francis, IATTC	61
26	Lake Arrowhead	Sep. 29-Oct. 1, 1975	Charles W. Hooker, CDFG	71
27	Lake Arrowhead	Sep. 26-29, 1976	William W. Fox, Jr., NMFS	47
28	Lake Arrowhead	Oct. 3-4, 1977	Robin L. Allen, IATTC	39
29	Lake Arrowhead	May 22-24, 1978	Fred Hagerman, CDFG	42
30	Lake Arrowhead	May 13-16, 1979	Gary T. Sakagawa, NMFS	59
31	Lake Arrowhead	May 11-14, 1980	Alex Wild, IATTC	49

TABLE 1. (continued)

No.	Location	Dates	Chairperson(s)	Attendees
32	Lake Arrowhead	May 17-20, 1981	Doyle A. Hanan, CDFG	32
33	Lake Arrowhead	May 16-19, 1982	Samuel F. Herrick, Jr., NMFS	69
34	Lake Arrowhead	May 15-18, 1983	Robert J. Olson, IATTC	64
35	Lake Arrowhead	May 20-23, 1984	Andrew E. Dizon, NMFS	69
36	Lake Arrowhead	May 21-24, 1985	Kurt M. Schaefer, IATTC	74
37	Lake Arrowhead	May 18-21, 1986	Richard W. Brill, NMFS	65
38	Lake Arrowhead	May 17-20, 1987	Witold L. Klawe, IATTC	85
39	Lake Arrowhead	May 15-18, 1988	Norman W. Bartoo, NMFS	71
40	Lake Arrowhead	May 22-25, 1989	Michael G. Hinton, IATTC	72
41	Lake Arrowhead	May 21-24, 1990	Christopher H. Boggs, NMFS	93
42	Lake Arrowhead	May 20-23, 1991	Daniel Margulies and Jeanne B. Wexler, IATTC	77
43	Lake Arrowhead	May 8-21, 1992	Atilio L. Coan, Jr., and Alan R. Jackson, NMFS	69
44	Lake Arrowhead	May 17-20, 1993	Edward H. Everett and Richard G. Punsly, IATTC	84
45	Lake Arrowhead	May 23-26, 1994	Pierre Kleiber and Randall Rasmussen, NMFS	99
46	Lake Arrowhead	May 14-17, 1995	Ashley J. Mullen and Jenny M. Suter, IATTC	89
47	Lake Arrowhead	May 20-23, 1996	Norman W. Bartoo, Alan R. Jackson, and Randall Rasmussen, NMFS	92
48	Lake Arrowhead	May 19-22, 1997	Robert J. Olson and Michael D. Scott, IATTC	120
49	Lake Arrowhead	May 18-21, 1998	Christofer H. Boggs, NMFS	105
50	Lake Arrowhead	May 24-27, 1999	George M. Watters and JoyDeLee Marrow, IATTC	92
51	Lake Arrowhead	May 22-25, 2000	David Holts and Michelle DeLaFuente, NMFS	78
52	Lake Arrowhead	May 21-24, 2001	Mark Maunder and Sharon Hunt, IATTC	79
53	Lake Arrowhead	May 20-23, 2002	Keith Bigelow and Randy Chang, NMFS	59
54	Lake Arrowhead	May 13-16, 2003	Shelton Harley, IATTC	78
55	Lake Arrowhead	May 24-27, 2004	Paul Crone and Kevin Hill, NMFS	102
56	Lake Arrowhead	May 23-26, 2005	Simon Hoyle and Michael Hinton, IATTC	98
57	Lake Arrowhead	May 22-25, 2006	Russ Vetter and Suzy Kohin, NMFS	97
58	Lake Arrowhead	May 21-24, 2007	Jeanne Wexler and Daniel Margulies, IATTC	95
59	Lake Arrowhead	May 19-22, 2008	Heidi Dewar and John Hyde, NMFS	85
60	Lake Arrowhead	May 18-21, 2009	Alexandre Aires-da-Silva and Joydelee C. Marrow, IATTC	94
61	Lake Arrowhead	May 17-20, 2010	Suzanne Kohin and Sarah Shoffler, NMFS	106
62	Lake Arrowhead	May 16-19, 2011	Cleridy Lennert-Cody and Joydelee C. Marrow, IATTC	91

TABLE 1. (continued)

63	Lake Arrowhead	May 21-24, 2012	James Wraith and David Wells, NMFS	95
64	Lake Arrowhead	May 20-23, 2013	Daniel Fuller and Joydelee C. Marrow, IATTC	87
65	Lake Arrowhead	May 19-22, 2014	Nicholas C. Wegner and Stephanie Flores, NMFS	82
66	Lake Arrowhead	May 18-21, 2015	John Graves, VIMS, Carolina Minte-Vera, IATTC, and Joydelee C. Marrow, IATTC	90
67	Lake Arrowhead	May 16-19, 2016	Matthew T. Craig and Stephanie Flores, NMFS	59
68	Lake Arrowhead	May 15-18, 2017	Shane Griffiths, Leanne Duffy, Sofia Webber and Joydelee C. Marrow, IATTC	114
69	Lake Arrowhead	May 21-24, 2018	Barbara Muhling, Desiree Tommasi, Stephanie Flores and Freddie Logan, NMFS	92

TABLE 2. Numbers of attendees from organizations located in various areas. The codes for the headings are given on the next page. n.a. = not available.

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1																
2	16	4	3													23
3	18	5	4													27
4	21	8	2													31
5	22	7	4	2			2	1								38
6	20	7	3				2									32
7	32	4	3	2			2									43
8	31	4	3				3	1								42
9	33	7	4	1			2	2								49
10	33	4	4	1			1									43
11	38	7	3	1			1									50
12	38	3	3	2			2									48
13	15	11	3	2			2	1				1				35
14																n.a.
15																n.a.
16																n.a.
17																n.a.
18																n.a.
19																n.a.
20	56	8	2	14	1		2	2			2					87
21	54	6	3	11		2	1									77
22	54	2	4	11	1	3	6		2		1					84
23																n.a.
24	59	8	2	4		3	1	2	2	1						82
25	47		3	2		1	1	2			2	1		2		61
26	55	4	3	3		2		1			1	1		1		71
27	32	1	3	7			1		1		1	1				47
28	32	1	3	1							1	1				39
29	34	1	3	3			1									42
30	40	4	2	11			1					1				59
31	38	4	3				3				1					49
32	58	3	1	2		3	1		1		4	1	1	1		76
33	47	4	3	5		5			1		2		2			69
34	46	2	6	1	2	2			1		1	1	1		1	64
35	50	4	6	4					2				2	1		69
36	50	4	8	3		1	2	1			3	1			1	74
37	37	1	8	4		5	4		2		2		1	1		65
38	48	3	5	6		8	1	1	4		3	1	1	2	2	85
39	42	3	4	2		10	2	1	2		1	2		1	1	71
40	38	4	8	5		4	2	1		3	3		1	2	1	72
41	48	4	8	9		5	3		3	1	5	5		1	1	93
42	40	2	2	10		7	2	1	5		3	2	2	1		77
43	35	4	4	8		7	1	1	3		2	1	1		2	69

TABLE 2. (continued)

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
44	47	1	3	6		14	1		3	1	3		1	2	2	84
45	35	10	11	9		14	1		5		7	5	1	1		99
46	41	3	19	5	2	7	1	1	1		3	2	1	1	2	89
47	40	6	15	11	1	2	1	2	1		6	2	1	4		92
48	50	8	18	16	1	7	1	1	4	1	5	4		4		120
49	40	2	16	21	1	7	3	1	5		2	2	1	4		105
50	44	6	10	12	-	3	-	2	4	-	4	3	2	-	2	92
51	31	6	11	11	0	1	-	1	5	1	5	3	-	3	-	78
52	38	2	15	5	2	3	2	-	3	-	5	3	-	1	-	79
53	21	3	17	4	1	1	2	1	2	-	1	4	-	1	1	59
54	27	3	12	13	-	4	2	-	6	-	4	4	2	-	1	78
55	50	6	16	6	1	5	3	1	2	-	5	5	2	-	-	102
56	42	4	13	11	2	3	5	1	8	-	2	5	-	2	-	98
57	54	4	16	9	-	6	3	-	1	-	-	2	1	1	-	97
58	41	8	18	9	-	3	3	1	1	-	4	4	2	-	1	95
59	37	7	16	16	1	3	3	-	-	-	1	2	-	-	-	85
60	44	8	12	17	-	-	1	-	3	-	5	4	-	-	-	94
61	54	6	12	14	-	3	1	2	6	-	3	3	-	1	1	106
62	49	4	13	14	-	1	2	-	1	-	2	5	-	-	-	91
63	43	6	9	13	-	4	2	2	3	-	1	8	2	-	.2	95
64	43	5	3	24	-	2	1	1	2	-	2	4	-	-	-	87
65	37	5	4	21	-	1	-	2	3	-	1	1	1	1	-	77
66	39	7	5	16	2	6	1	-	4	-	2	8	-	-	-	90
67	36	5	4	6	1	1	2	1	-	-	-	3	-	-	-	59
68	58	6	6	19	3	4	2	1	2	-	5	7	-	-	1	114
69	52	7	7	10	2	2	1	1	3	-	1	4	1	-	1	92

- 1 California
- 2 Oregon, Washington, and Alaska
- 3 Hawaii
- 4 U.S. Atlantic and Gulf coasts (excluding Puerto Rico)
- 5 other U.S.
- 6 Mexico
- 7 Canada
- 8 Other western hemisphere (including Puerto Rico)
- 9 Europe (including USSR and former USSR)
- 10 Africa
- 11 Asia (excluding Pakistan and Sri Lanka)
- 12 Australia and New Zealand
- 13 New Caledonia
- 14 Pacific islands (excluding Hawaii and New Caledonia)
- 15 Indian Ocean (including Pakistan and Sri Lanka)

TABLE 3. Numbers of male and female attendees. It was not always possible to determine a person's sex from his or her name, particularly when only initials were used for the first and second names. n.a. = not available

Conference	Men	Women	Unknown	Total
1				
2	22	1		23
3	26	1		27
4	30	1		31
5	37	1		38
6	31	1		32
7	42	1		43
8	41	1		42
9	49	0		49
10	43	0		43
11	50	0		50
12	47	1		48
13	34	1		35
14				n.a.
15				n.a.
16				n.a.
17				n.a.
18				n.a.
19				n.a.
20	86	1		87
21	75	2		77
22	83	1		84
23				n.a.
24	78	4		82
25	58	3		61
26	66	5		71
27	43	4		47
28	37	2		39
29	39	3		42
30	54	4	1	59
31	48	1		49
32	62	2	12	76
33	51	2	16	69
34	61	3		64
35	61	7	1	69
36	66	8		74
37	56	8	1	65
38	73	11	1	85
39	61	9	1	71
40	62	9	1	72
41	84	9		93
42	65	12		77

TABLE 3. (continued)

Conference	Men	Women	Unknown	Total
43	59	9	1	69
44	75	8	1	84
45	90	9		99
46	78	11		89
47	73	18	1	92
48	94	23	3	120
49	86	18	1	105
50	67	20	5	92
51	59	15	4	78
52	63	12	4	79
53	44	11	4	59
54	56	17	5	78
55	78	20	4	102
56	70	24	4	98
57	65	27	5	97
58	62	28	5	95
59	56	26	3	85
60	65	29		94
61	77	27	2	106
62	56	35		91
63	65	30		95
64	52	35		87
65	55	27		82
66	60	30		90
67	41	18		59
68	72	42		114
69	55	37		92

TABLE 4. Recipients of Tuna Conference scholarships. The abbreviations are as follows: CICIMAR, Centro Interdisciplinario de Ciencias Marinas; IFREMER, Institut Français de Recherche pour l'Exploitation de la Mer; VIMS, Virginia Institute of Marine Science.

Conference	Name(s)	Affiliation(s)	Presentation(s)
36	José Goulart	Univ. of California at Davis	none
37	Barbara A. Block	Duke Univ.	Strategies for elevating brain and eye temperatures in tunas, sharks, and billfishes
37	Cheryl Watson	Astoria, Oregon	none
38	Miguel Ross	CICIMAR	none
38	Chi-Lu Sun	Univ. of Miami	none
39	Kae Lynne Yamanaka	Univ. of British Columbia	Estimates of age, growth and spawning of yellowfin tuna, <i>Thunnus albacares</i> , in the Philippines, as determined from the examination of increments on sagittal otoliths
40	Nancy Chartier	VIMS	Catch-handling trends of Virginia's recreational tuna fishery: the effects of killing and storage methods on the quality of northern bluefin tuna, <i>Thunnus thynnus</i>
40	James N. Ianelli	Univ. of Washington	Preliminary results of microconstituent variability in yellowfin otoliths
41	Charles Barr	VIMS	Evaluation of food and feeding of northern bluefin tuna (<i>Thunnus thynnus</i>) and yellowfin tuna (<i>Thunnus albacares</i>) off the coast of Virginia
42	Troy Buckley	Dept. Mar. Wild. Res., American Samoa	Feeding habits of yellowfin tuna at fish aggregation devices in American Samoa
42	James Masuoka	Univ. of California at San Diego	A novel zinc-binding serum protein from albacore (<i>Thunnus alalunga</i>): is it species specific?
42	Gabriel Nuñez Marquez	CICIMAR	Length-frequency distribution of yellowfin tuna caught in Mexican waters, 1989
43	Agustin Hernandez-Herrera	CICIMAR	Some aspects of reproduction in sailfish (<i>Istiophorus platypterus</i>) from La Paz and Cabo San Lucas, B.C.S., Mexico
44	Paul R. Wade	U.S. NMFS	A Bayesian approach to the population dynamics and management of the eastern spinner dolphin, <i>Stenella longirostris orientalis</i>
45	Daniel R. Scoles	VIMS	Global phylogeny of mackerels of the genus <i>Scomber</i>
46	Yu-Min Yeh	National Taiwan Univ.	The relationship between CPUE and abundance of albacore in the South Pacific
47	Vincent P. Buonaccorsi	VIMS	A comparative approach to genetic stock identification in the blue marlin, <i>Makaira nigricans</i>

47	Jan Cordes	VIMS	Mitochondrial DNA analysis of white marlin, <i>Tetrapturus albidus</i> , population structure
48	Robert J. Allman	Florida State Univ.	Growth and mortality of little tunny (<i>Euthynnus alletteratus</i>) larvae off the Mississippi River plume and Panama City, Florida
48	Marta C. Gomez-Buckley	Univ. of Washington	Use of statistical bootstrapping for sample-size determination to estimate length-frequency distributions for Pacific albacore tuna, (<i>Thunnus alalunga</i>)
49	M. Shiham Adam	Imperial College	Estimates of skipjack tuna growth parameters from the Maldivian pole and line fishery using tag recapture data
49	Vincent P. Buonaccorsi	VIMS	Microsatellite evolution within and among species of the Istiophoridae
50	none		
51	Ralph Mana	Kagoshima Univ.	Structural features of the olfactory system of bigeye tuna, <i>Thunnus obesus</i> , and striped marlin, <i>Tetrapturus audax</i> , in connection with pelagic mode of life
51	Robyn Wingrove	Univ. of Charleston	Population structure of dolphin, <i>Coryphaena hippurus</i> , in the western central Atlantic, Caribbean Sea, and Gulf of Mexico, inferred from mitochondrial DNA variation
52	Nathaniel Newlands	Univ. of British Columbia	Aerial surveying of Atlantic bluefin tuna (<i>Thunnus thynnus</i>), Gulf of Maine: relative abundance estimates under alternative spatial sampling strategies
53	Chugey Sepulveda	Scripps Institution of Oceanography	The swimming energetics of the eastern Pacific bonito (<i>Sarda chiliensis</i>): one step closer to understanding the tuna-bonito relationship
54	none		
55	Juan Pedro Arias Aréchiga	CICIMAR	Fishing oceanography of the Gulf of Tehuantepec: the case of the yellowfin tuna, <i>Thunnus albacares</i>
55	Francois Royer	IFREMER	A modeling framework for studying bluefin tuna behavior in its environment
55	Chugey A. Sepulveda	Scripps Institution of Oceanography	The thermal biology of the slender tuna, <i>Allothunnus fallai</i>
55	Rebecca Shuford	Univ. of South Carolina	Otolith microchemical analysis of juvenile yellowfin tuna from nursery areas in the Atlantic Ocean
56	Walter Golet	Univ. of New Hampshire	Analysis of shape and fat content in the Gulf of Maine bluefin tunas (<i>Thunnus thynnus</i>)
56	John Logan	Univ. of New Hampshire	Analysis of forage preferences and movement patterns of Atlan-

			tic bluefin tuna (<i>Thunnus thynnus</i>) using carbon and nitrogen stable isotopes
56	Ramzi Mirshak	Dalhousie Univ.	Towards mapping thermocline depth in the equatorial Pacific with satellite altimetry
56	John E. Richert	Univ. of California at Davis	Spatio-temporal variability in the trophic ecology of large pelagic fishes of the southern Gulf of California
57	Daniel Cartamil	Scripps Institution of Oceanography	Acoustic telemetry studies of common thresher shark (<i>Alopias vulpinus</i>) movement patterns in the Southern California Bight
57	Dámaris López Medina	CICIMAR	Spatio-temporal variability of yellowfin tuna catches in adjacent waters to the Isla Marias, Mexico
57	John E. Richert	Univ. of California at Davis	Spatio-temporal variability in the trophic ecology of large pelagic fishes of the southern Gulf of California
57	Luis Antonio Valdovinos-Jacobo	CICIMAR	Conceptual migratory model of Monterey Spanish mackerel (<i>Scomberomorus concolor</i>) in the Gulf of California
58	Fernando Arias Olaiz	CICIMAR	Spatial-temporal distributions of the relative abundance of the sailfish (<i>Istiophorus platypterus</i>) in the Mexican Pacific Ocean
58	Juleen Dickson	California State Univ. at Fullerton	Medial red muscle development in the yellowfin tuna, <i>Thunnus albacares</i>
58	Yoshiki Kato	Univ. of Tokyo	Effect of ocean turbulence on survival and ingestion of tuna, <i>Thunnus</i> , larvae
58	Catherine Purcell	Univ. of Southern California	Connectivity of striped marlin populations in the Pacific
58	Arturo Tripp Valdez	CICIMAR	Trophic ecology of the dolphinfish <i>Coryphaena hippurus</i> (Linnaeus, 1758) in two areas of the south of the Gulf of California
58	Nicholas C. Wegner	Scripps Institution of Oceanography	Specialization for gill rigidity in ram-ventilating teleosts
59	Bridgett Ferris	Univ. of Washington	Factors affecting the accumulation of mercury in four tuna species: diet vs. life history
59	Amber Michaud	Univ. of San Diego	Population structure of shortfin mako (<i>Isurus oxyrinchus</i>) in the Pacific Ocean as inferred through mitochondrial DNA
59	Tara Scott	VIMS	Adjusting economic productivity to account for undesirable harvest: application to the California/Oregon drift gillnet fishery
60	A. Jason Phillips	Oregon State Univ.	Linking U.S. Pacific albacore CPUE to fine scale satellite environmental data
61	Melanie Hutchinson	Univ. of Hawaii	Effects of Nd/PR alloy on catch rates of pelagic and coastal shark species
62	Mitchell Zischke	Univ. of Queensland	Out with the old and in with the new: estimating recreational

			catch and effort for the specialized pelagic sportfish fishery off eastern Australia
63	Maria J. Juan-Jorda	Univ. de la Coruña	Life histories of tunas and their relatives: predicting species responses to fishing and ocean changes
64	Felipe Carvalho	Univ. of Florida	Using pelagic fish movement data to estimate, predict and model CPUE
65	Ching-Ping Lu	Texas A. and M. Univ.	Population structure of genetic informative data differentiation in Pacific swordfish (<i>Xiphias gladius</i>) using high resolution melting analysis (HRMA)
66	Matt Siskey	Univ. of Maryland	Historical effects of fishing on age structure and stock mixing in Northwest Atlantic bluefin tuna fisheries
67	Kady Lyons	University of Calgary	Bioaccumulation of organochlorines in three species of predatory sharks occupying multiple trophic levels
68	Zahirah Dhurmeea	University of Mauritius	Reproductive biology and lipid dynamics of albacore tuna (<i>Thunnus alalunga</i>) in the western Indian Ocean
69	Zahirah Dhurmeea	University of Mauritius	Spatial variation in fatty acid trophic markers and stable isotopes in albacore tuna (<i>Thunnus alalunga</i>) in the western Indian Ocean

TABLE 5. Recipients of Manuel Caboz Memorial scholarships. The abbreviations are as follows: CICESE, Centro de Investigación Científica y de Educación Superior de Ensenada; CICIMAR, Centro Interdisciplinario de Ciencias Marinas; IFREMER, Institut Français de Recherche pour l'Exploitation de la Mer; IRD, Institut de Recherche pour le Développement; ORSTOM, Office de la Recherche Scientifique et Technique d'Outre-Mer; UABC, Universidad Autónoma de Baja California; VIMS, Virginia Institute of Marine Science.

Conference	Name	Affiliation	Presentation
41	Simon R. Thorold	Australian Inst. Mar. Sci.	A novel method for collection of larval and juvenile scombrids
42	Daniel Scoles	VIMS	Mitochondrial DNA restriction fragment analysis of Pacific yellowfin tuna
43	Lee Morgan	VIMS	Allozyme analysis of striped marlin population structure
44	José Manuel Grijalva-Chon	CICESE	Mitochondrial DNA analysis of north Pacific swordfish (<i>Xiphias gladius</i>)
45	Laurent Dagorn	ORSTOM	Studying tuna school movements, using an artificial neural network applied to remote-sensing data from SEAS station and concurrent data from fishing fleets
46	Margarita Margolles Sierra	CICESE	Age determination of north Pacific albacore, <i>Thunnus alalunga</i> , based on osseous structures
47	Anthony C. Chatwin	Inst. Ocean., Univ. São Paulo	Estimates of abundance of the little Atlantic tunny, <i>Euthynnus alletteratus</i> , and the frigate mackerels, <i>Auxis</i> spp., in southeastern Brazilian waters
48	Gisela Heckel	UABC	Evasive behavior of spotted and spinner dolphins (<i>Stenella attenuata</i> and <i>Stenella longirostris</i>) during fishing of yellowfin tuna (<i>Thunnus albacares</i>) in the eastern Pacific Ocean
49	Brian Hanrahan	Univ. of Massachusetts	Estimating bluefin tuna (<i>Thunnus thynnus thynnus</i>) school size from limited observational data
50	Brett Falterman	VIMS	Population structure of the black marlin, <i>Makaira indica</i> , inferred from analysis of nuclear and mitochondrial molecular markers

TABLE 5. (continued)

Conference	Name	Affiliation	Presentation
51	Arnaud Bertrand	IRD	Influence of prey distribution on tuna catchability with a longline: a question of scale
52	Christelle Ravier	IFREMER	Retrospective analysis of historical data to investigate eastern Atlantic bluefin tuna population dynamics
53	Charlotte Girard	Université de Strasbourg	FADS: fish aggregating devices or fish attracting devices?
54	Terrence Dammannagoda	Queensland Univ. of Technology	Genetic stock structure and inferred migratory patterns of skipjack tuna (<i>Katsuwonus pelamis</i>) and yellowfin tuna (<i>Thunnus albacares</i>) stocks around Sri Lanka
55	Andrij. J. Horodysky	VIMS	Survival and habitat preferences of white marlin (<i>Tetrapturus albidus</i>) released from the western North Atlantic recreational fishery
56	Mathieu Doray	IFREMER	The distribution and the dynamics of large pelagic fish aggregations around moored FADS in Martinique (Lesser Antilles) and their contribution to local fisheries
57	Sarah Glaser	Scripps Institution of Oceanography	Predation by juvenile albacore in the California Current System and impacts on growth
58	Andreas Walli	Stanford Univ.	Estimating feeding from visceral warming in Pacific bluefin tuna: lab and field measurements
59	Ryan W. Schloesser	Texas A. and M. Univ.	Natal origin of Atlantic bluefin tuna (<i>Thunnus thynnus</i>) from the Gulf of St. Lawrence based on $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ in otoliths
60	George L. Shillinger	Stanford Univ.	Pop-up satellite tags reveal movements and behaviors of Pacific bluefin tuna in the southern Pacific Ocean

TABLE 5. (continued)

Name	Affiliation	Presentation	
61	Brad Smith	Texas A. and M. Univ.	Use of nuclear genetic markers and Bayesian genetic clustering to infer population admixture and neighboring stock bycatch in Atlantic swordfish (<i>Xiphias gladius</i>)
62	C. Anela Choy	Univ. of Hawaii	FAT-scinating pelagic fishes: comparing fatty acid biomarker profiles in Hawaiian surface and deep-dwelling predators
63	Iker Zudaire	AZTI-Tecnalia	Lipid class composition and energy allocation during reproduction of yellowfin tuna in the western Indian Ocean: comparison between FADs and free-swimming schools
64	Lela Schlenker	VIMS	Evaluating post-release mortality of white marlin (<i>Kajikia albida</i>) caught in the recreational fishery: biochemical and physiological indicators of lethal stress
65	Jon Lopez	AZTI-Tecnalia	Diel behaviour of by-catch and tuna species at drifting fish aggregating devices (DFADS) in the western Indian Ocean as assessed by fishers' echo-sounder buoys
66	Maite Pons	Univ. of Washington	Setting total allowable catches leads to rebuilding of tuna and billfish stocks
67	Sam Williams	University of Queensland	Genetic analysis of Black Marlin (<i>Istiompax indica</i>) from the central Indo-Pacific reveals multiple populations
68	Nadya Mamoozadeh	VIMS	An assessment of genetic population structure for striped marlin (<i>Kajikia audax</i>) in the Pacific and Indian Oceans using genome-wide SNPs

TABLE 6. Recipient of the American Institute of Fishery Research Biologists (Southern California chapter) award for the best paper presented at that conference. NMFS stands for National Marine Fisheries Service.

Conference	Name	Affiliation	Presentation
48	Richard W. Brill	U.S. NMFS	How water temperature limits the vertical movements of pelagic fishes

TABLE 7. Recipient of Wildlife Computers, Inc., student scholarships. VIMS stands for Virginia Institute of Marine Science.

Conference	Name	Affiliation	Presentation
59	Chi H. Lam	Univ. of Southern California	Using time series analysis techniques to analyze animal movement data from archival and pop-up archival tags
60	Daniel Dutton	VIMS	Habitat utilization of blue marlin (<i>Makaira nigricans</i>) inferred from pop-up satellite archival tags and niche partitioning with other istiophorids
61	Daniel Madigan	Stanford Univ.	Habitat utilization and trophic ecology of three co-occurring tuna species in the eastern Pacific Ocean
62	Heather Marshall	Univ. of Massachusetts at Dartmouth	Habitat utilization and movement patterns of juvenile porbeagle sharks (<i>Lamna nasus</i>) in the northwest Atlantic
63	Stephanie Snyder	Scripps Institution of Oceanography	Scratching the surface: can water column characteristics explain albacore movements?
64	Frederic Vandeperre	Univ. of the Azores	Essential pelagic habitat of juvenile blue shark (<i>Prionace glauca</i>) in the North Atlantic
65	Scott Lynch	Univ. of Massachusetts at Dartmouth	Do pop-up satellite tags affect the swimming energetics and kinematics of juvenile sharks?
66	Ashley Stoehr	Univ. of Massachusetts at Dartmouth	Thermal effects on aerobic muscle function in a deep-diving teleost and shark
67	Nerea Lezama-Ochoa	Azti-Technalia	Incidental catch of Manta and Mobula rays in the Eastern Pacific Ocean
68	Ashley Stoehr	University of Massachusetts Dartmouth	Morphological and physiological specializations for sustained swimming in swordfish: through the thermocline and back again
69	Daniel Coffey	University of Hawaii at Manoa	Assessing blue shark habitat preferences under changing climate

TABLE 8. Recipients of Automatic Differentiation Model Builder student scholarships. CICMAR stands for Centro Interdisciplinario de Ciencias Marinas, VIMS stands for Virginia Institute of Marine Science.

Conference	Name	Affiliation	Presentation
60	Eunjung Kim	Univ. of Hawaii	Simulating the effect of FAD density on large scale movements
61	Jordan Watson	Univ. of Washington	Trade-offs in the design of fishery closures: silky shark bycatch management in the eastern Pacific Ocean tuna purse seine fishery
63	Raul O. Martínez-Rincón	CICIMAR	Comparative performance of generalized additive models and boosted regression trees for statistical modeling of incidental catch of wahoo (<i>Acanthocybium solandri</i>) in the Mexican purse-seine fishery
64	Chi Hin Lam		Movements and oceanographic associations of bigeye tuna (<i>Thunnus obesus</i>) in the NW Atlantic determined by popup satellite archival tags
66	Lisa Ailloud		Potential impacts of minimum weight regulations for Pacific bluefin tuna (<i>Thunnus orientalis</i>)
68	Lisa Ailloud	VIMS	Estimating catch-at-age of western Atlantic bluefin tuna: can we do better than cohort slicing?
69	Molly Morse	Univ. of Massachusetts Dartmouth	How do stock assessments perform for mixed Atlantic Bluefin stocks?

TABLE 9. Recipients of the Digital Globe (formerly GeoEye) student scholarship award. IRD stands for Institut de Recherche pour le Développement.

Conference	Name	Affiliation	Presentation
61	Megan Bailey	Univ. of British Columbia	The cost of juvenile fishing: by-catch in the western and central Pacific Ocean tuna purse seine fishery
62	Marriane Robert	Université Libre de Bruselle	Tuna in free-swimming schools are in better condition than those associated with natural floating objects: why do they associate with floating objects?
63	Niriniony Rabehagaso	IRD	Growth of two oceanic sharks, blue shark (<i>Prionace glauca</i>) and silky shark (<i>Carcharhinus falciformis</i>) assessed by back-calculation from vertebrae in the southwest Indian Ocean
64	Benjamin Galuardi	Univ. of Massachusetts at Dartmouth	Tracking sailfish from a Yucatan “hotspot”

TABLE 10. Recipients of the Desert Star Systems scholarship award.

Conference	Name	Affiliation	Presentation
62	Jenny Fenton	Nova Southeastern Univ.	Post-release survival and habitat utilization of juvenile swordfish in the Florida Straits recreational fishery
63	Mitchell Zischke	Univ. of Queensland	Age, growth, reproductive biology and assessment of wahoo, <i>Acanthocybium solandri</i> , off eastern Australia
64	Maria José Juan Jorda	Univ. de la Coruña	Life history correlates of vulnerability in tuna and mackerels
65	Nerea Lezama-Ochoa	AZTI-Tecnalia	Study of biodiversity in the by-catch communities of the pelagic ecosystem and the use of Maxent species distribution model to predict the potential habitat suitability under future scenarios of climate change in the eastern Pacific Ocean

66	Veronica Quesnell	Texas A. and M. Univ.	Utilization of otolith chemistry to examine swordfish (<i>Xiphias gladius</i>) connectivity throughout the North Pacific Ocean
67	Isabel Haro	University of Queensland	Reproductive biology of Wahoo (<i>Acanthocybium solandri</i>) in the Galápagos Marine Reserve
68	Arif Malik	Flinders University	The transition to regional endothermy in Pacific bluefin tuna, <i>Thunnus orientalis</i>

TABLE 11. Recipient of the Margarita Tomlinson scholarship award.

Conference	Name	Affiliation	Presentation
66	Jon Lopez	AZTI-Tecnalia	Environmental preferences of tuna and non-tuna species associated with drifting fish aggregating devices (DFADs) in the Atlantic Ocean, ascertained through fishers' echosounder buoys
68	Samantha Huff	Duke University	Age of maturity of Pacific bluefin tuna
69	Blanca Orue Montaner	Univ. of the Basque Country	Spatiotemporal distribution of tuna and non-tuna species associated with Drifting Fish Aggregating Devices(DFADs) in the Indian Ocean ascertained through fishery-independent data

TABLE 12. Recipient of the John Tomlinson scholarship award.

Conference	Name	Affiliation	Presentation
66	Carlo Pecoraro	Univ. of Bologna	Genomic analysis of population structure of yellowfin tuna (<i>Thunnus albacares</i>) at the global scale

TABLE 13. Recipient of the Monterey Bay Aquarium Scholarship

Conference	Name	Affiliation	Presentation
68	Maite Pons	University of Washington	Management differences among stocks and tuna regional fisheries management organizations
69	Maite Erauskin-Extramaiana	University of Basque Country	Climate change impact in past and future distribution of six tuna species

TABLE 14. Recipient of the Big Data Scholarship

Conference	Name	Affiliation	Presentation
68	Maëlle Cornic	Texas A & M University at Galveston	Spatiotemporal distribution of yellowfin tuna and bigeye tuna larvae across oceanographic features in the Gulf of Mexico
69	Floriaan Devloo-Delva	University of Tasmania	How genomics can identify sampling bias, common breeding grounds and sex-determination markers in school sharks

TABLE 15. Recipient of the American Fisherman's Research Foundation Scholarship

Conference	Name	Affiliation	Presentation
69	Christina Hernandez	MIT-WHOI Joint Program in Oceanography	Larval habitat suitability for Atlantic bluefin tuna spawned in the Slope Sea

APPENDIX 1
AGENDA FOR SECOND TUNA CONFERENCE

- I. Consideration of agenda
- II. Review of 1951 program and brief account of fishery of the region
 - 1. Oregon Fish Commission
 - 2. Washington Department of Fisheries
 - 3. Hawaii Division of Fish and Game
 - 4. South Pacific Fishery Investigations (U.S. FWS, Stanford?)
 - 5. Scripps Institution of Oceanography
 - 6. Inter-American Tropical Tuna Commission
 - 7. California Department of Fish and Game
 - 9. Tuna Boat Owners' Association
- III. Methods and results of racial population studies
 - 1. California Department of Fish and Game
 - 2. Pacific Oceanic Fisheries Investigations (U.S. FWS, Hawaii)
 - 3. Oregon Fish Commission
- IV. Methods and results of marking studies
 - 1. U.S. FWS (Seattle)
 - 2. Pacific Oceanic Fisheries Investigations
- V. Methods and results of studies of the distribution in relation to the environment
 - 1. Pacific Oceanic Fisheries Investigations
- VI. Methods and results of spawning studies
 - 1. Pacific Oceanic Fisheries Investigations
- VII. Methods and results of age and growth studies
 - 1. Oregon Fish Commission
 - 2. Hawaii Division of Fish and Game
 - 3. Pacific Oceanic Fisheries Investigations
 - 4. California Department of Fish and Game
- VIII. Methods and results of catch analysis studies
 - 1. Oregon Fish Commission
 - 2. California Department of Fish and Game
 - 3. Inter-American Tropical Tuna Commission
 - 4. Pacific Oceanic Fisheries Investigations (Japanese mothership expedition)
- IX. Report of scouting trips
 - 1. South Pacific Fishery Investigations
 - 2. U.S. FWS (Seattle)
 - 3. California Department of Fish and Game
 - 4. Pacific Oceanic Fisheries Investigations
- X. Tuna reaction studies
 - 1. Pacific Oceanic Fisheries Investigations
- XI. Forecast of 1952 program, with recommendations for future research and outlining possible cooperative studies
 - 1. Washington Department of Fisheries

2. Oregon Fish Commission
3. South Pacific Fishery Investigations
4. California Department of Fish and Game
5. Inter-American Tropical Tuna Commission
6. U.S. FWS (Seattle)
7. Pacific Oceanic Fisheries Investigations
8. Tuna Boat Owners' Association
9. Scripps Institution of Oceanography
- XII. Standardization and exchange of albacore length-frequency data
- XIII. Problems in sampling the commercial catch: how often? how to get random sample?
- XIV. Consideration of block number assignment for use in recording areas of tuna catches
- XV. Consideration of inviting Latin American representation at future Tuna Conferences
- XVI. Consideration of inviting industry representatives to audit future meetings
- XVII. Discussion of future Tuna Conference: when, where, chairman?

APPENDIX 2

Manuel Correia Caboz, 1929-1988

The information in this appendix comes from an obituary published in the San Diego Union on July 10, 1988, notes made by Dr. Michael G. Hinton when he spoke with Mrs. Názare Caboz in 1990, and data in the IATTC catch-and-effort statistics files.

Manuel Caboz was born in Madeira, Portugal, on May 14, 1929. His father moved his family to Venezuela after Manuel finished high school. Manuel then migrated from Venezuela to the United States in 1947 or 1948, married Názare Rodrigues, daughter of the captain of the *Sun Victoria*, a baitboat with a fish-carrying capacity of 335 metric tons (mt) built in 1937, and then went to work as a crew member on that vessel. He became a captain for the first time in 1956 aboard the *St. Matthews*, a 235-mt baitboat built in 1945. He subsequently became owner or part-owner of the *American Queen*, a 445-mt baitboat built in 1949 (converted to a 405-mt purse seiner in 1960); the *Jeanette C.*, an 820-mt purse seiner built in 1967; another *American Queen*, a 1020-mt purse seiner built in 1972; the *Nazare Mary*, a 950-mt purse seiner built in 1974; and the *Carol Virginia*, a 905-mt purse seiner built in 1980. He died of cancer on July 6, 1988. He was managing owner of the *Carol Virginia* at that time.

In spite of his busy schedule, Captain Caboz was very active in community affairs. He was a member of the Board of Directors of the American Tunaboat Association, holding various offices in that organization since 1974. He was one of the founding directors of the U.S. Tuna Foundation, organized in 1977, which represents the interests of American canneries and of owners of American tuna vessels. He was also one of the founders of the Southern California Bank, which was established in 1979, and he was an active member of the St. Agnes Roman Catholic Church in San Diego.

He was survived by his wife, Názare R. Caboz, and four daughters, three of whom married captains of tuna boats.

Captain Caboz had often expressed his belief in the importance of a good education, so, in recognition of this, the Caboz family established the Caboz Memorial Scholarship Fund shortly after his death. Tuna biologists from all over the world have benefited from this generous gift. The first scholarship was awarded in 1990.