

ACCOMPLISHMENTS OF THE TECHNICAL SUBCOMMITTEE OF THE  
CANADA-U.S. GROUND FISH COMMITTEE, 1960-2021

Contributors

S. Jergen Westrheim, Canada Fisheries Research Board, October 1984  
Tom Jow, California Department of Fish and Game, October 1984  
Robert L. Demory, Oregon Department of Fish and Wildlife, April 1992  
Mark E. Wilkins, National Marine Fisheries Service, AFSC, April 1995  
Mark E. Wilkins, National Marine Fisheries Service, AFSC, May 2001  
Richard D. Stanley, Canada Department of Fisheries and Oceans, June 2014  
Wayne A. Palsson, National Marine Fisheries Service, AFSC, September 2016 - 2021

June 25, 2021

Prepared and maintained at the request of the  
Canada-U.S. Groundfish Committee at their 1983 Meeting

## INTRODUCTION

### Purpose

The Technical Subcommittee (TSC) of the Canada-U.S. Groundfish Committee was formed in 1960 out of a need to coordinate fishery and scientific information resulting from the implementation of commercial groundfish fisheries operating in US and Canadian waters off the West Coast. Today, representatives from Canadian and American state and federal agencies meet annually to exchange information and to identify data gaps and information needs for groundfish stocks of mutual concern from California to Alaska. Each agency prepares a comprehensive annual report highlighting survey and research activities, including stock assessments. These reports are compiled into an annual TSC report that is published online ([www.psmfc.org/tsc2](http://www.psmfc.org/tsc2)). The TSC reviews agency reports and recommends collaborative work or plans workshops on topics of shared interest. Historically, the TSC has prepared catch databases that led to the development of the Pacific Fisheries Information Network (PacFIN) catch reporting system, hosted 24 scientific/management workshops, organized 25 working groups, and created the Committee of Age Reading Experts (CARE). Each year the committee discusses and recommends actions to improve and coordinate groundfish science among agencies and these recommendations are sent to agency heads and managers to inform research and management priorities.

### History

Before the U.S. and Canada implemented exclusive domestic fisheries off their respective coasts, commercial fishers from either country could fish in both American and Canadian waters. In 1959, an International Trawl Fishery Committee (later renamed the Canada-U.S. Groundfish Committee) was established by groundfish management and research agencies to track transboundary fisheries and examine biological questions pertinent to the stocks and fisheries. This committee established the TSC, which held its first meeting in 1960 and has held annual meetings ever since. Initial activities and concerns focused on reporting and resolving catch estimates, stock identification and assessment, tagging, ageing techniques, and hydroacoustic techniques. These earlier studies focused on Petrale, Rock, and English Soles; Lingcod; Pacific Ocean Perch; and Sablefish. The TSC has fostered new science and improved methodologies by forming workgroups to focus on specific problems and by holding workshops to bring scientists and managers together to discuss aspects of groundfish science that are of mutual concern. Some recent workshops include Trawl and Setline Survey Methods, Catch Reconstruction, Visual Survey Methods, and Electronic Data Capture Methods.

### Evolution

Over time, the TSC's role has changed with the implementation of new management and legislative authorities but the annual reports provide a common and concise forum to both disseminate information on current groundfish science and to learn about agency programs and activities. The TSC continues to highlight timely research topics, hold workshops, and establish workgroups, as well as send their recommendations to agency directors, fishery managers, and program managers to lay the foundation for trans-boundary coordination through open communication.

The Terms of Reference of the parent committee, and perforce, of TSC, were as follows:

1. To review proposed changes in trawl regulations affecting fisheries of mutual interest before they are implemented.
2. To review the effectiveness of existing regulations.
3. To exchange information on the status of bottomfish stocks of mutual concern and to coordinate wherever possible programs of research.
4. To recommend the continuance and further development of research programs in order to provide a basis for future management of the trawl fishery.

These terms of reference did not apply to Pacific Halibut, whose research and management are the responsibility of the International Pacific Halibut Commission (IPHC).

The Terms of Reference remained unchanged until 1981 when modifications were approved by the member Governments to acknowledge the new management regimes arising from the 1977 promulgations of 200-mile economic zones by Canada and the United States. Following are the new terms of Reference:

1. Exchange information on the status of groundfish stocks of mutual concern and coordinate, whenever possible, desirable programs of research.
2. Recommend the continuance and further development of research programs having potential value as scientific basis for future management of the groundfish fishery.
3. Review the scientific and technical aspects of existing or proposed management strategies and their component regulations relevant to conservation of stocks or other scientific aspects of groundfish conservation and management of mutual interest.
4. Transmit approved recommendations and appropriate documentation to appropriate sectors of Canadian and U.S. governments and encourage implementation of these recommendations.

There was no change in the status of Pacific Halibut, but representatives of the IPHC have been regular attendees, as observers, at TSC meetings since 1969.

The TSC has exhibited considerable flexibility in reacting to the diverse problems of the dynamic groundfish fishery off western Canada and the United States. It has coordinated coastwide fishery statistics and research projects; created working groups to deal in depth with specific problems; scheduled workshops at which appropriate specialists met to jointly deal with specific problems and exchange data and information; and provided an on-going forum for

exchange of data, procedures, and regulations. The TSC has identified problems associated with the utilization and management of groundfish resources of importance to both countries, often well in advance of the public or agency awareness. Significant were the concerns expressed in 1962 by the TSC over the development of foreign fisheries and recommendations for stock assessments. TSC-coordinated Canada-U.S. research on Pacific Ocean Perch provided the basis for negotiation of bilateral fishing agreements between the United States and Japan and the USSR. Furthermore, the continually updated information provided the basis for quotas imposed in 1977 by Canada and the United States when they both promulgated their 200-mile zones of extended jurisdiction.

The importance of groundfish research and management activities was also recognized as both nations supported increases in fishing effort. Combined agency staff increased from 17 in 1960 to over 150 in 1983. In 1983, the TSC recommended that economists from each nation be invited to attend future meetings as observers. Both nations sent economists to the 1984 TSC meeting. In 1988, the TSC recommended to the Parent Committee that managers from both nations play a bigger role in the annual meetings, attending and participating in discussion sessions. Attendance at the TSC meetings by representatives of the Pacific and North Pacific Fishery Management Councils and their Canadian counterparts from the DFO Offshore Branch has been more regular since 1989.

#### Coordination and Recommendations

TSC coordinates studies and recommends actions resulting from its annual meetings, working groups, and workshops. The single most important coordinated project was that of creating the Pacific Marine Fisheries Commission (now the Pacific States Marine Fisheries Commission (PSMFC)) Groundfish Data Series (1956-1984). This project began at the 1960 meeting and resulted in the annual publication of groundfish landings by species by month by TSC-established International Statistical Area. Initially these records were limited to trawl landings in the California-B.C. Region (Areas 1A-5E), but were expanded to include groundfish landings of all gear (1973), and expanded northward in 1975 to include all of Alaska (Areas 7A-8C). A further refinement in 1982 was reporting annual landings of "other" rockfish (other than Pacific Ocean Perch) by species. The Data Series was last updated in 1984 for 1981 landings and has since been replaced by the Pacific Fisheries Information Network (PacFIN), operated and maintained by the PSMFC. Groundfish catch and survey data for Alaska are served via the Alaskan Fisheries Information Network (AKFIN), which is also operated and maintained by the PSMFC.

The following summarizes other key findings, actions, and recommendations during the past six decades:

<b>Year</b>	<b>Key TSC Findings, Actions, and Recommendations</b>
1960	Petrale Sole stock delineation (tagging) and stock assessment to evaluate effectiveness, and problems associated with, the winter closure promulgated in 1958 for the B.C.-Oregon region. Results of the analyses led TSC to recommend abolishment of the closure.
1962	Reviewed stock assessments of Pacific Cod, and concluded that the substantial decline in abundance was not due to the fishery, and hence no regulations were necessary.
1964	Recommended coastwide stock-delineation analysis of English Sole, based on tagging. Results were published in PMFC Bulletin 7 (1969).
1965	Recommended compilation of a groundfish bibliography. Result was published as FRBC Tech. Rep. 246 (1971).
1967	Noted that: 1) collecting trawling effort by depth, as well as area, might eliminate the necessity of using qualification levels; and 2) catch-per-unit-effort as a measure of abundance has serious disadvantages, and a better measure is needed. In 1983 Canada published a report that utilized for the first time the depth arrays of landings and effort to allot trawling effort in a mixed-species fishery (Can. J. Fish. Aquat. Sci. Vol. 40).
1968	Continuing discussions of age-determination problems led U.S. agencies to establish an age-reading center in Seattle, Washington. Canadian specialists assisted in training readers to interpret Pacific Ocean Perch otoliths.
1969	Coordinated agency-wide update on Sablefish stock assessments and an FRBC-Washington Department of Fisheries (WDF; now Washington Department of Fish and Wildlife (WDFW)) stock assessment of Pacific Cod in Area 3C.
1972	Coordinated agency-wide reports on groundfish ageing techniques, biology of other rockfish, Area 3C Lingcod stock assessment, and Sablefish research programs.
1973	Coordinated coastwide Sablefish tagging, for stock delineation.
1976	Coordinated joint Canada-U.S. field test of biomass-estimation techniques on Pacific Ocean Perch in Queen Charlotte Sound. Coordinated preparation of "other" rockfish bibliography, published as FRBC Tech. Rep. 659 (1976).
1977	Coordinated joint Canada-Poland-U.S. field calibration of hydroacoustic equipment aboard the R/Vs G. B. REED, PROFESSOR SEIDLECKI, and MILLER FREEMAN, September 1977.
1979	Coordinated joint Canada-U.S. trawl survey of rockfish in the Dixon Entrance-Cape Ommaney Region, September 1979.
1960-80	Coordinated recommendations of regulations concerning stocks of mutual concern with respect to domestic and foreign fleets. Particular attention was paid to Pacific Ocean Perch.
1982	Created permanent working group called CARE (Committee of Age Reading Experts).

Year	Key TSC Findings, Actions, and Recommendations
1984	<p>Recommended that a fishery economic report be submitted annually by each country beginning in 1985.</p> <p>Coordinated species endorsements for the break and burn otolith age determination method.</p>
1986	<p>Coordinated division of PFM area 3C and International North Pacific Fisheries Commission (INPFC) Vancouver area into national components: 3C-S (U.S.) and 3C-N (Canada); Vancouver-S (U.S.) and Vancouver-N (Canada).</p> <p>Recognized Mr. Jergen Westrheim and Mr. Tom Jow for their long-standing involvement in the TSC and numerous contributions. Both would be retiring within the year.</p>
1987	<p>Terminated the move to establish a Pacific Ocean Perch working group. Nothing further could be accomplished considering state of stock (low) and current management strategies.</p> <p>Recommended that management agencies make attempts to determine bycatch, bycatch mortality and at-sea discard rates in all groundfish fisheries.</p>
1988	<p>Coordinated effort to revise the TSC agenda to focus more on transboundary stock issues and research, eliminate the U.S. section meeting as being redundant, and terminate the request for annual economic reports.</p> <p>Undertook measures to strongly encourage more participation in TSC meetings by resource management representatives from the North Pacific Fishery Management Council, PFM, and appropriate Canadian counterparts.</p>
1989	<p>Recommended that Canadian and U.S. managers begin deliberations on North Pacific Hake allocation.</p>
1990	<p>Recommended that a Sablefish symposium be developed for early 1992.</p> <p>Reiterated recommendation that managers deliberate North Pacific Hake allocation.</p>
1991	<p>Recommended that a Sablefish symposium be held in April 1993.</p> <p>Recommended that Oxytetracycline (OTC) injection, as a chemical marker, for age validation of Dover Sole and other important flatfish be undertaken in the proposed 1992 flatfish survey.</p> <p>Reiterated the need for rapid settlement of North Pacific Hake allocation between the two countries.</p> <p>Recommended that the HAL (Historic Annotated Landing) database be given one final review by contributing agencies and, subsequent to review, be made available upon request.</p>

Year	Key TSC Findings, Actions, and Recommendations
1992	<p>Recommended that the cooperation between U.S. and Canadian scientists continue in the hydroacoustic survey of North Pacific Hake and that the two agencies (DFO and NMFS) cooperate in the design and implementation of surveys to assess other transboundary stocks, e.g. Yellowtail Rockfish, Sablefish, etc. In particular, the utility of expanding the U.S. bottom trawl survey into Canada should be examined.</p> <p>Recommended that member agencies direct significant efforts toward research validating the ageing criteria for thornyheads and rockfish species.</p> <p>Recommended measures to assure the success of planned Dover Sole age validation involving release of tagged and OTC-injected (or otherwise marked) fish.</p> <p>Recommended that a rockfish management workshop be convened to discuss rockfish management options and to advocate appropriate measures to manage this valuable marine resource.</p> <p>Recommended that Canadian and U.S. managers initiate discussions to develop management plans in their respective countries to insure that conservation mandates are met with regard to Yellowtail Rockfish.</p> <p>Once again, recommended bilateral discussions between Canadian and U.S. governments on allocation of North Pacific Hake resume as soon as possible and encouraged work towards agreement to resolve allocation before conservation issues become more serious.</p>
1993	<p>Reaffirmed the need for age validation of Dover Sole and Arrowtooth Flounder, raising the possibilities of alternative methods such as radioisotope dating and use of alternative otolith marking compounds.</p> <p>Clarified issues to be discussed at the rockfish management workshop. Proposed that the focus should be on management approaches for nearshore rockfish stocks and not on presentations on rockfish biology which, though informative, would detract from the objectives of this workshop.</p> <p>Reaffirmed its recommendation to pursue a standard, well-documented procedure with the U.S. Food and Drug Administration for approving the use of OTC for fish age validation.</p> <p>Noting that the combined Canada-U.S. harvest of North Pacific Hake continues to exceed the Acceptable Biological Catch and that this level of harvest is considered undesirable, recommended that bilateral negotiations again be encouraged to arrive at a quick resolution to this issue.</p>

Year	Key TSC Findings, Actions, and Recommendations
1994	<p>Recommended to itself, measures to facilitate timely exchange and dissemination of the information in agency TSC reports. The objective was to minimize routine reporting of activities and allow discussions during the annual TSC meeting to focus on addressing the issues of concern solicited from member agencies and the Parent Committee in advance of the meeting.</p> <p>Recommended that the two previous (1984 and 1992) reports detailing the accomplishments of the TSC, be combined, updated to the present, and submitted to the TSC.</p> <p>Supported wide distribution of the Nearshore Rockfish Management Workshop summary document. Noting that all objectives of the workshop were not achieved, the TSC recommended that a future workshop should be considered to identify management alternatives for nearshore rockfish and other species in the absence of reliable fishery and biological data.</p> <p>Reiterated their concern and recommendation for quick resolution of the Canada-U.S. North Pacific Hake allocation issue.</p>
1995	<p>Requested each member agency to summarize any cost-recovery or user-pay programs that are used by their agency.</p> <p>Recommended following up the 1994 Nearshore Rockfishes Management Workshop by convening to explore and develop recommendations for management strategies.</p>
1996	<p>Recommended U.S. and Canada jointly review Lingcod stock assessments and facilitate collaboration of stock assessment teams of both countries, in view of the transboundary issues involved.</p> <p>Requested that agencies involved in research or management of mackerels or sardines begin submitting summaries of this work in 1997.</p>
1997	<p>Recommended establishing internet home pages for TSC and CARE on the PSMFC website to facilitate dissemination of information and reports.</p> <p>Asked Parent Committee to consider urging NMFS to support development and adoption of a multispecies fishery management plan for pelagic species, including mackerels and Pacific Sardine.</p> <p>Recommended that Parent Committee pursue development of a formal coordinated physical and biological oceanographic monitoring program for the west coast of North America</p>



Year	Key TSC Findings, Actions, and Recommendations
1998	<p>Added annual discussions of Marine Protected Areas (MPA) to the agenda, including the role of MPAs in management and conservation of groundfish, research refugia, and Essential Fish Habitat.</p> <p>Recommended that researchers involved in collection and analysis of Pacific Sardine data review the most recent information on stock structure and discuss appropriate assessment configurations.</p> <p>Recommended to Parent Committee that it support a joint Canada-U.S. technical review meeting of North Pacific Hake stock assessments and recommend to U.S. and Canadian managers a range of yield options for 1999.</p> <p>Inter-Jurisdictional Fisheries Act funding focus shifted from coastal pelagics to nearshore rockfishes, available monies earmarked to fund new research. Necessitated interagency coordination to plan and prioritize research programs, including evaluating existing refugia and the placement of proposed refugia.</p>
1999	<p>TSC website became operational and proved to be an effective way to exchange information and agency reports. Discussed whether website can be used as the primary mode of circulating the final annual report of each TSC meeting. Asked Parent Committee for guidance as to the advisability of this suggestion.</p> <p>Asked member agencies to assess the potential for conducting joint Canada-U.S. stock assessment reviews for transboundary stocks of Lingcod and Yellowtail Rockfish.</p> <p>Requested that PSMFC present annual summaries of their groundfish activities, particularly PacFIN.</p>
2000	<p>Recommended interagency coordination of Sablefish survey activity in the form of a survey planning working group to review methodologies and examine the potential for coordination.</p> <p>Recommended exploring among member agencies the potential for establishing a coordinated collection and cataloguing of tissue samples for genetic studies of critical groundfish species. Such a program would lead to a tissue sample bank with the potential for access by investigators from cooperating agencies.</p>
2001	<p>Recommended disbanding the Yellowtail Rockfish and Lingcod working groups.</p> <p>Recommended that Canadian and U.S. managers develop a process to discuss yield options to prevent overharvest of trans-boundary stocks.</p> <p>Recommended development of an updated format for the annual TSC summary and that it be posted on the PSMFC website.</p>
2003	<p>DFO requested permission to attend the U.S. trawl survey workshop.</p>

Year	Key TSC Findings, Actions, and Recommendations
2004	<p>Recommended formation of a Sablefish Working Group and workshop to discuss Sablefish survey methods and calibration.</p> <p>Discontinued the TSC Sardine Working Group given the official creation of a tri-national committee.</p> <p>Invited Moss Landing Marine Lab to participate in CARE.</p> <p>Recommended the formation of a trawl survey working group.</p>
2006	Recommended supporting a workshop on acoustic telemetry.
2008	Recommends that assessments of trans-boundary groundfish boundary stocks would benefit from closer collaboration among the different research and managements agencies.
2010	Recommended that a letter be sent to the NMFS AFSC Fisheries Monitoring and Analysis Division (FMA) inviting that agency to send a representative to future TSC meetings.
2011	Recommended that a workshop be held among agencies to determine the best methods for reconstructing historical commercial catches.
2012	Recommended a workshop be held on the topic of visual survey methods for use in rockfish stock assessments.
2013	Recommended a study of the long-term health exposures and issues for age readers resulting from ageing structures and the identification of ergonomic methods for their mitigation.
2014	<p>Recommended updating the TSC accomplishments document.</p> <p>Recommended that CARE report on the various studies of the long-term storage of otoliths and identify those methods that have proven to work well.</p>
2015	Recommended sharing data for all tagged species where transboundary tag interception may occur and urges agencies in both countries to enable data exchange; Investigate formal sharing agreements for tagging data among agencies as needed.
2016	<p>Based on the successful Electronic Data Workshop held in conjunction with the 2016 Western Groundfish Conference, recommended that a similar workshop should be considered for the 2018 WGC.</p> <p>Encouraged that, given the recent interest in fish maturity studies, efforts between governmental, academic, and other entities such as expanded Maturity Assessment and Reproductive Variability of Life Stages (MARVLS) workshops be continued.</p> <p>Requested cooperation among agencies to exchange data through the TSC Working Group on Groundfish Tagging Data, especially sharing sablefish data.</p>

Year	Key TSC Findings, Actions, and Recommendations
2017	<p>Recommended that a TSC member be on the Western Groundfish Organizing Committee in future years.</p> <p>Recommended that TSC sponsor workshop or sponsored session at the 2018 WGC; topics could include marine mammal depredation on longline gear, coast-wide assessments, managing and assessing cryptic species assemblages, and the use and management of rockfish descending devices.</p> <p>Requested that CARE re-examine Yelloweye Rockfish ageing methods.</p>
2018	<p>Encouraged the NPFMC and PFMC to regularly provide a representative and report to the TSC.</p> <p>Requested that CARE continue to review yelloweye rockfish aging techniques, further examine the use of otolith morphometrics to identify cryptic species, and evaluate the machine reading of otoliths using near-infrared light as a valid method.</p> <p>Encouraged DFO to provide a management representative to the TSC.</p> <p>Recommended investigating and making parties aware that there is a question of Canadian and US jurisdiction in the Dixon Entrance transboundary area.</p> <p>Agreed to work with staff at the NWFSC to identify a representative who is able to attend the annual TSC meeting in late April, as scheduled.</p>
2019	<p>The TSC recommends that CARE consider ageing lingcod otoliths from fish for which spines have also been collected using NI-spec.</p> <p>The TSC recommends to CARE that they preserve a record of ageing methods for use as teaching tools.</p> <p>The TSC recommends that additional guidance be drafted (by the Chair) to shorten and highlight agency research for inclusion in the annual reports. Also, the TSC recommends finalizing annual report sooner to make them more available to a broader audience.</p> <p>The TSC recognizes that ecological conditions along the west coast of North America are changing quickly. The TSC requests that the Parent Committee advocate for continued, or increased, survey efforts by member agencies to document and understand these changes.</p> <p>The TSC notes that the increase in areas closed to fisheries has also precluded survey efforts in these areas. The TSC recommends that the Parent Committee reach out to member agencies to make clear the disadvantages of this policy with regard to survey time series, which also compromises the ability to evaluate the efficacy of closed areas.</p>

## Working Groups

As the groundfish fisheries increased in complexity, the TSC responded by creating working groups to undertake specific problems between meetings, and usually submit written reports to subsequent meetings. During 1969-2014, TSC created 25 temporary working groups, and in 1982, a standing group called CARE (Committee of Age Reading Experts) was created. Following is a chronological list of working groups:

WORKING GROUP		TIME ESTABLISHED	RESULTS
1.	Lingcod stock assessment in Area 3C	1969	Report submitted at 1970 TSC Meeting
2.	Sablefish stock assessment, coastwide	1969	Report submitted at 1970 TSC Meeting
3.	Pacific Ocean Perch stock assessment, B.C.-Oregon	1970	Report submitted to 1972 TSC Meeting, 1972 INPFC Meeting, and published as FRBC Tech. Rep. 369 (1972)
4.	Pacific Ocean Perch stock assessment -- II. B.C.-Oregon	1973	Report submitted to 1974 TSC Meeting, 1974 INPFC Meeting, and published as FRBC Tech. Rep. 690 (1977)
5.	Pacific Cod stock assessment in Area 3C	1973	Report submitted to 1974 TSC Meeting
6.	Identify species and areas of concern other than Pacific Ocean Perch and Sablefish	1973	Report submitted to 1974 TSC Meeting
7.	Other rockfish species composition, landings, effort, and LPUE	1975	Report submitted to 1977 TSC Meeting, 1977 INPFC Meeting, and published as WDF Tech. Rep. 34 (1977)
8.	Pacific Cod/Lingcod/Petrale Sole multispecies stock assessment in Area 3C	1976	Postponed due to priority changes in one agency. Dissolved in 1978.

WORKING GROUP		TIME ESTABLISHED	RESULTS
9.	Pacific Cod/Lingcod/Rock Sole multispecies stock assessment in Areas 5A and 5B	1976	Postponed due to priority changes in one agency. Dissolved in 1978.
10.	Sablefish statistics, biology, and stock assessment	1977	Report submitted to the 1978 TSC Meeting
11.	Shelf rockfish stock assessment	1977	Reported to Interim 1977 TSC Meeting
12.	Pacific Ocean Perch	1977	Report submitted to 1978 TSC Meeting
13.	Pacific Ocean Perch stock assessment in Area 3C	1981	Report submitted to 1982 TSC Meeting
14.	North Pacific Hake stock assessment, coastwide	1981	Report submitted to 1982 TSC Meeting
15.	Sablefish stock assessment, coastwide	1982	Report submitted to the 1983 TSC Meeting
16.	Sablefish tagging evaluation	1983	Report submitted at 1984 TSC Meeting
17.	North Pacific Hake. Joint Canada-U.S. stock assessment with special attention to a technical fix on migration.	1981	Progress report submitted to TSC in 1989. Work was to continue.
18.	Dover Sole. Stock delineation using all tag return data from all west coast studies.	1985	Accepted for publication by the North American Journal of Fisheries Management, 1990.
19.	Yellowtail Rockfish. Provide joint Canada-U.S. stock assessment.	1988	Progress report submitted to TSC in 1990.
20.	TSC report. Develop proposed standards and format for new TSC report.	2002	Created 2002.

WORKING GROUP		TIME ESTABLISHED	RESULTS
21.	Sardine Working Group discontinued.	2003	
22.	Sablefish. To facilitate coordination of survey, ageing, tagging and data exchange, and prepare for symposium.	2004	Created 2004, discontinued 2013.
23.	Trawl survey. Develop standards and share methodologies.	2005	Annual meetings.
24.	GIS. Organize a habitat-mapping workshop.	2006	Organized a workshop
25.	Yelloweye Rockfish.	2006	Coordinate research, discontinued 2013

During the 58<sup>th</sup> TSC meeting in 2017, members reviewed these working groups and recommended that the following working groups remain active as there are stock assessments for stocks that straddle transboundary areas in development:

1. Lingcod 3C
2. Yellowtail rockfish
3. Sablefish

At any time in the future, should issues arise that require a working group, the TSC will reactivate other working groups.

### Workshops

During 1978-2018, 24 workshops have been scheduled by TSC to provide opportunities for specialists to meet and deal with specific technical problems. Following is a chronological list of workshops:

WORKSHOP		TIME	PLACE
1.	Age determination	April, 1978	Nanaimo, B.C.
2.	Hydroacoustics	April, 1978	Seattle, WA

3.	Sablefish	February, 1978	Seattle, WA
4.	Recreational fisheries	1980	Monterey, CA
5.	Lingcod	1981	Nanaimo, B.C.
6.	North Pacific Hake	1982	Seattle, WA
7.	Age determination I	January, 1983	Pacific Grove, CA
8.	Age determination II	April, 1983	Seattle, WA
9.	Age determination III	August, 1983	Nanaimo, B.C.
10.	Sablefish symposium*	April, 1993	Seattle, WA
11.	Nearshore rockfish management*	April, 1994	Portland, OR
12.	Lingcod assessment	March, 1997	Olympia, WA
13.	Sardine symposium*	May 2000	La Jolla, CA
14.	Trawl survey meeting (semi-annual)	February 2003-2007, 2011	Seattle, WA
15.	Sablefish Working Group.	February, 2004	Victoria, BC
16.	Habitat mapping	March, 2006	Richmond, BC
17.	Sablefish	February, 2007	Seattle, WA
18.	Yelloweye Rockfish	April, 2007	Santa Cruz, CA
19.	Field data acquisition	April, 2009	Seattle, WA
20.	Trawl and setline survey methods*	March, 2011	Seattle, WA
21.	Catch reconstruction	May, 2012	Newport Beach, CA
22.	Visual survey methods*	April, 2014	Seattle, WA
23.	Electronic Data Capture*	February, 2016	Newport, OR

- |     |   |                |             |
|-----|---|----------------|-------------|
| 24. | Use of Descending Devices to mitigate rockfish barotrauma (Sponsored session at the 20th Western Groundfish Conference) | February, 2018 | Seaside, CA |
|-----|---|----------------|-------------|
- 

- Proceedings available at <http://www.psmfc.org/tsc2>

## EXCHANGES

Note that CARE has conducted many otolith exchanges since the inception of CARE. These are summarized in the annual CARE report included within the annual TSC report. For example, see P. 107, TSC final report for 2006 for otolith exchanges from 1988-2006 <http://www.psmfc.org/tsc2/TSCFinal%20for%20Website2006.pdf> or P. 364. [http://www.psmfc.org/tsc2/2013\\_draft\\_Final\\_Report\\_III.pdf](http://www.psmfc.org/tsc2/2013_draft_Final_Report_III.pdf).

- 1960 Synopsis of otter trawl regulations in effect January 1, 1960.
- 1961 Summary of Petrale Sole tagging experiment results.
- 1962 Summaries of recent Petrale Sole tagging and returns.
- 1963 Catalogue of market sampling techniques used by Canada, Washington, Oregon, and California.
- Revised summary of otter trawl regulations in effect July 1, 1963. Preliminary results of tagging experiments of all agencies (exchanged annually after 1963).
- 1966 Groundfish tag release inventory, 1955 onward (updated annually). Preliminary results of completed tagging experiments.
- 1969 Synopsis of otter trawl regulations in effect July 1, 1969.
- 1970 Synopsis of otter trawl regulations and their rationale as of July 1, 1970.
- 1971 Historic trawl fishery data of all agencies. Current market sampling techniques of all agencies.
- 1975 Summary of coastal groundfish regulations in effect July 1, 1975.
- 1979 List of reports published by TSC agencies for the past year (appended to TSC annual report 1979 and annually thereafter).
- 1997 Logbooks used by member agencies to collect groundfish fishery information, including example logbook pages (appended to TSC annual report 1997 and annually thereafter).
- 1998 Information pertaining to the use of GIS systems used by member agencies, such as software, basemaps, and sources of bathymetric data (appended to TSC annual report 1997 and annually thereafter).



History of TSC meeting locations, hosts, and chairpersons.

<b><u>YEAR</u></b>	<b><u>DATES</u></b>	<b><u>LOCATION</u></b>	<b><u>HOST</u></b>	<b><u>CHAIR</u></b>
1984	June 20-22	Nanaimo, BC	Westrheim	Rigby
1985	June 25-27	Juneau, AK	Morrison	Westrheim
1986	June 19-19	Ashland, OR	Demory	Westrheim
1987	June 9-11	Seattle, WA	Jagiello	Demory
1988	June 7-9	Carmel, CA	Henry	Demory
1989	June 6-9	Ladysmith, BC	Saunders	Jagiello
1990	June 5-7	Sitka, AK	Bracken	Jagiello
1991	June 4-6	Newport, OR	Barss	Wilkins
1992	May 5-7	Seattle, WA	Jagiello	Wilkins
1993	May 5-7	Point Lobos, CA	Thomas	Saunders
1994	May 3-5	Nanaimo, BC	Saunders	Saunders
1995	May 2-3	Seattle, WA	O'Connell	Bracken
1996	May 7-9	Newport, OR	Barss	O'Connell
1997	May 6-8	Tiburon, CA	Thomas	Barss
1998	May 5-7	Olympia, WA	Jagiello	Barss
1999	May 4-6	Seattle, WA	Methot	Barnes
2000	May 9-10	Nanaimo, BC	Saunders	Barnes
2001	May 8-10	Newport, OR	Schmitt	Schmitt
2002	May 7-8	Point Lobos, CA	Barnes	Methot
2003	May 6-7	Sitka, AK	O'Connell	Jagiello
2004	May 4-5	Coupeville, WA	Wilkins	Jagiello
2005	May 3-4	Parksville, BC	Stanley	Stanley
2006	May 2-3	Otter Rock, OR	Parker	Stanley
2007	April 24-25	Santa Cruz, CA	Field	Brylinsky
2008	May 6-7	Seattle, WA	Wilkins	Brylinsky
2009	May 5-6	Juneau, AK	Clausen	Clausen
2010	May 5-6	Nanaimo, BC	Stanley	Clausen
2011	May 3-4	Astoria, OR	Phillips	Clausen
2012	May 1-2	Newport Beach, CA	Larinto	Clausen
2013	April 30-May 1	Seattle, WA	Palsson	Larinto
2014	April 29-30	Seattle, WA	Dykstra	Larinto
2015	April 28-29	Sidney, BC	Yamanaka	Larinto
2016	April 26-27	Newport, OR	Whitman	Yamanaka
2017	April 25-26	Juneau, AK	Heifetz	Yamanaka
2018	April 24-25	Santa Cruz, CA	Moss	Lowry
2019	April 23-24	Olympia, WA	Lowry	Lowry
2020	Cancelled	Due to Covid		Lowry

## ACKNOWLEDGMENTS

In the 2000 version, the authors thanked all members of the Technical Subcommittee (Messrs. Jow, Thomas, Rigby, Bracken, Robinson, Barss, Tagart, Jagielo, Wilkins, Wilderbuer, and Drs. Adams, Lenarz, MacCall, Methot, and Tyler) and the Parent Committee (Dr. Harville, Messrs. Thornburgh, Six, Hanson, Phillips, and Zyblut and Ms. Adams) for reviewing the manuscript. For the 2014 and 2016 versions, the author thanks Ms. Lynne Yamanaka for reviewing the manuscript. For the 2017 version, the author thanks Ms. Lynne Yamanaka and Ms. Traci Larinto for reviewing the manuscript. For the 2018 and 2019 version the author thanks Dr. Dayv Lowry and Stephen Phillips for their review.