

DRAFT SUMMARY MINUTES
Scientific and Statistical Committee

Pacific Fishery Management Council
Doubletree by Hilton Sacramento
Sacramento Room
2001 Point West Way
Sacramento, CA 95815
Telephone: 916-929-8855

April 6-7, 2017

Members in Attendance

Dr. Aaron Berger, National Marine Fisheries Service Northwest Fisheries Science Center, Newport, OR
Dr. Evelyn Brown, Lummi Nation, Bellingham, WA
Dr. John Budrick, California Department of Fish and Wildlife, Belmont, CA
Mr. Alan Byrne, Idaho Department of Fish and Game, Boise, ID
Dr. Martin Dorn, National Marine Fisheries Service Alaska Fisheries Science Center, Seattle, WA
Dr. John Field, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Owen Hamel, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Michael Harte, Oregon State University, Corvallis, OR
Dr. Dan Holland, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Galen Johnson, Northwest Indian Fisheries Commission, Olympia, WA
Dr. Kevin Piner, National Marine Fisheries Service Southwest Fisheries Science Center, La Jolla, CA
Dr. André Punt, University of Washington, Seattle, WA (Absent on day 1)
Dr. David Sampson, Oregon Department of Fish and Wildlife, Newport, OR
Dr. William Satterthwaite, SSC Chair, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Cameron Speir, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Tien-Shui Tsou, Washington Department of Fish and Wildlife, Olympia, WA

Members Absent

None.

SSC Recusals for the April 2017 Meeting		
SSC Member	Issue	Reason
Dr. John Field	Review the Draft, “Implementing a Next Generation Stock Assessment Enterprise: An Update to NOAA Fisheries’ Stock Assessment Improvement Plan”	Dr. Field contributed to the draft document

A. Call to Order

Chairman Will Satterthwaite called the meeting to order at 10:30 a.m. Mr. Tracy briefed the SSC on the issues to be discussed this week.

E. Salmon Management

2. Methodology Review Preliminary Topic Selection

The Scientific and Statistical Committee (SSC) met with Mr. Larrie LaVoy (NMFS West Coast Region) to discuss possible methodology review topics for 2017. The most recent Chinook Fishery Regulation Assessment Model (FRAM) documentation published on the Council website is dated October, 2008. The Model Evaluation Workgroup (MEW) plans to update the FRAM documentation to reflect changes that have been incorporated into the model since then. The Salmon Technical Team and the Sacramento River Winter Chinook Workgroup had no new items for methodology review topics.

Specific items for possible review are listed below with the responsible party listed in parentheses:

- Chinook FRAM model documentation including FRAM algorithms and a user’s manual (MEW).

It may be possible for the SSC Salmon Subcommittee to review the FRAM documentation with a webinar rather than an in-person meeting.

1. Sacramento River Winter Chinook Harvest Control Rule Review

Dr. Michael O’Farrell (Southwest Fisheries Science Center) presented the Sacramento River winter Chinook management strategy evaluation (MSE) to the Scientific and Statistical Committee (SSC). This MSE builds upon a previous analysis reviewed and endorsed by the SSC in March 2014 ([Agenda Item F.8.a, Attachment 2, March 2014](#)) and preseason abundance forecast approaches reviewed in November 2016 ([Agenda Item D.2, Attachment 1, November 2016](#)). It evaluates nine alternative control rules across a single forecast method and four scenarios for productivity and observation error.

The SSC commends the analysts for this MSE work, which represents an important step in evaluating these alternative control rules.

The MSE considers the long-term results for the alternative scenarios across the nine control rules,

but there may be a need to explore more scenarios including those with lower productivity. This could be accomplished by taking the subset of the MSE results (across simulations and years) that are similar to current conditions. The analysts should also consider the following alternative scenarios: (1) lower average productivity; (2) longer or more variable number of years of drought-related high water temperature; and (3) alternative temperature-productivity relationships.

The proportion of time that the allowable age-3 impact rate specified by each control rule is greater than or equal to 0.2 is displayed in Figure 3. However, the pattern of allowable impact rates varies greatly among the control rules. A better display of this information would be a table showing the proportion of years with allowable impact rates within different ranges. This would illustrate both the frequency and magnitude of change in allowable impact rates.

SSC Notes:

The age-2 impact rate is unknown but subsumed into natural mortality estimates used in the analysis, with no response to changes in fishing intensity. The analysts are encouraged to explore if linking age-2 and age-3 impact rates makes a difference in the MSE results.

The realized age-3 impact rate displayed in Figure 3 of the SRWCW Report 1 of Agenda Item E.1.a represents only one of two processes which differentiate the realized impact rate from the control rule impact rate in each year (implementation error in the "realized" impact rate describing the probability of being impacted for each fish, but not demographic stochasticity in the binomial process used to determine the integer number of fish harvested). The actual realized impact rate, representing both processes, should be displayed.

Relative to the Winship et al. model reviewed in 2014: Abundance forecasts are made separately for each sex and for hatchery versus natural origin fish. A temperature covariate was added for egg to fry survivorship.

All scenarios include implementation error, but the last scenario has no observation error in the forecast.

Could autocorrelation in implementation error be considered? Abundance of target stocks?

Investigate if there is a relationship between reconstructed ocean abundance and impact rate and/or implementation error and, if so, consider including these factors in the model.

G. Coastal Pelagic Species Management

2. Central Subpopulation of Northern Anchovy (CNSA) Overfishing Limit (OFL) Process

The Scientific and Statistical Committee (SSC) discussed the joint SSC/Coastal Pelagic Species Management Team (CPSMT) report “Central Subpopulation of Northern Anchovy Overfishing Limit Process” ([Agenda Item G.2.a, Joint SSC/CPSMT Report, April 2017](#)), as well as a request by Mr. Chuck Tracy (PFMC) to consider the merits of the status quo overfishing limit (OFL) for the central subpopulation of northern anchovy (CSNA), recommendations for OFL determination in the future, and the best interim approach if the preferred method for establishing an OFL is not yet available.

The SSC reiterates its concern that the current OFL is based on a model using data from over two decades ago and collected under dramatically different environmental and abundance conditions ([Agenda Item G.4.a, Supplemental SSC Report, November 2016](#)). However, the SSC also reiterates the need for methodology review of the updated acoustic trawl method (ATM) survey before using the ATM biomass estimate for the CSNA as a basis for management reference points ([Agenda Item C.3.b, Supplemental SSC Report, April 2011](#)). The SSC supports holding an ATM methodology review in early 2018 ([Agenda Item G.3.a, Supplemental SSC Report, April 2017](#)).

In the absence of an approved biomass estimate for the CSNA, the only available option for a new OFL is option A, which would involve updating the Conrad (1991) analysis with data on catch and abundance through 1994 as reported in Jacobson et al. (1995). However, the analysis would still be based on outdated information, and would not be responsive to changes in stock abundance.

In the near term, an approach based on an approved CSNA biomass estimate from the ATM survey (Option C or D) would be an improvement on the status quo because it would make use of more recent information and be more responsive to changes in stock abundance. Option D would require multiple years of data to smooth over, thus Option C would likely be available sooner than Option D.

Although more time consuming, a full assessment, as called for in Option B, has the advantage of making use of the widest range of information about the CSNA. Full stock assessments are generally the preferred approach when sufficient data are available. However, a stock assessment would be sensitive to biological assumptions that may be more consequential for short-lived and dynamic stocks such as northern anchovy. Consequently, there is no way to ensure that a stock assessment would be superior to a simpler approach without evaluating the diagnostics from a completed model. This approach would also require a new assessment (or accepted projection method) every time a new biomass estimate was needed to update the OFL.

The SSC considers all of the options listed in the joint SSC/CPSMT report as potentially viable and would review a well-documented technical analysis based on any of the options identified in the report. The SSC would work with the analysts to identify an appropriate review mechanism.

In choosing the F_{MSY} proxy, care must be taken to choose a value that is applicable to the type of biomass (e.g., total versus spawning stock biomass) estimated by the survey. Any new OFL calculation would require consideration of the appropriate acceptable biological catch control rule.

Literature Cited:

Jacobson, L.D., Lo, N.C.H., Herrick Jr., S. F., and Bishop, T. 1995. Spawning biomass of northern anchovy in 1995 and status of the coastal pelagic fishery during 1994. NOAA Southwest Fisheries Science Center Administrative Report LJ-95-11.

Conrad, J.M. 1991. A bioeconomic analysis of the northern anchovy. NOAA Southwest Fisheries Science Center Administrative Report LJ-91-26.

SSC Notes:

F_{MSY} proxies may need to be converted from instantaneous rates to annual fractions.

The SSC notes that some recent requests could lead to blurring the line between review body and workgroup. If the SSC participates extensively in the development and execution of analyses, that may compromise its independence during subsequent review to determine best available science.

5. Final Action on Sardine Assessment, Specifications, and Management Measures

The Scientific and Statistical Committee (SSC) reviewed the 2017 stock assessment of the northern subpopulation of Pacific sardine. Drs. Kevin Hill and Paul Crone (Southwest Fisheries Science Center) presented the results of the stock assessment and Dr. André Punt (SSC) provided an overview of the Stock Assessment Review (STAR) Panel report. The SSC appreciates the effort put forth by the stock assessment team to improve the assessment model in response to previous full and update assessment concerns.

The SSC endorses the 2017 Pacific sardine base case assessment model (termed model ALT in the assessment document) as the best available science for use in managing the northern subpopulation of Pacific sardine. The base case model uses an integrated assessment approach to estimate age 1+ biomass at the start of the 2017/2018 fishing year (1 July 2017). This model is more stable, shows improved fit to recent surveys, and has improved retrospective patterns and thus is an improvement over the 2014 full assessment model and subsequent update assessments. Major differences include starting the assessment in 2005 rather than 1993, excluding the Daily Egg Production Method and Total Egg Production indices, and changing model specifications for natural mortality, weight-at-age, survey selectivity, catchability, and steepness of the stock-recruitment relationship.

There is no direct information on the size of the 2016 year-class, so it is estimated from the stock-recruitment relationship. As a result, there is considerable uncertainty associated with the estimate of age-1+ biomass in 2017. A substantial proportion of total biomass will be from that incoming cohort of uncertain size, especially when the stock size is estimated to be low, as it is presently. There are additional key uncertainties associated with natural mortality, weight-at-age, survey selectivity, and catchability.

The estimate for total age-1+ biomass on 1 July 2017 is 86,586 mt. The SSC recommends an overfishing limit (OFL) of 16,957 mt and that the base model be considered a category 1 assessment with a default sigma (σ) of 0.36 to be used in determining the acceptable biological catch.

The SSC reiterates that the assessment and OFL are only for the northern subpopulation of Pacific sardine, although some portion of the U.S. catch in each year is likely from the southern subpopulation.

There may be benefits to the survey-based approach advocated by the stock assessment team, and the planned early 2018 review of this survey could provide further information on the suitability of this approach. There would be less uncertainty in the calculation of the OFL when using a survey-based approach if the time-lag between conducting the survey and the start of the fishing year was minimized. Further evaluation of a survey-based assessment approach through a management strategy evaluation would be beneficial.

SSC Notes:

The 2017 base assessment uses catch and biological samples from three fleets, a southern MexCal fleet operating in two separate seasons and a non-seasonal northern PNW fleet, and a single ATM survey index of abundance (estimates and age compositions) from 2006 to 2016. Seasonal selectivity patterns were modeled for the MexCal fleet to better capture changes in availability at size (or age) due to migration, and an annual selectivity pattern was modeled for the PNW fleet. The ATM survey includes seasonal abundance observations in some years, and all age 1+ fish were assumed to be fully selected by the survey. The model was fit to the catch, survey abundance index, and age composition data from the three fleets and the survey.

The sardine STAT has indicated a preference for future assessments to be survey-based, where the main sources of data will be the summer ATM survey estimate and associated age-composition information to project age-1+ sardine to the start of the following fishing year. Although a potentially feasible approach in principle, the SSC agrees that further methodological developments and review will be needed, as indicated in the STAR Panel report, to resolve interim population dynamics during the one-year time lag between the most recent survey observations and estimates of age-1+ stock status for use in management.

The main sources of uncertainty in the assessment include:

- longevity and the associated change in the natural mortality rate (from 0.4yr^{-1} to 0.6yr^{-1});*
- the estimated low value (0.36) of steepness;*
- sample sizes and treatment of empirical weight-at-age data from the fisheries and the ATM survey;*
- stationarity of population weight-at-age (not time-varying);*
- the use of a single, time-invariant age-length key to translate survey length compositions to age compositions;*
- ATM survey selectivity parameterization;*
- the survey estimate of catchability (1.1) is unrealistically high given some sardine are not available to the survey (e.g., beyond inshore extent of survey); and*
- ongoing concerns in general about acoustic species identification, target strength estimation, and boundary zone (sea floor, surface, and shore) observations associated with the ATM survey.*

Changing the parameterization of the ATM survey selectivity from the base model assumption that it is uniform for fish age-1 and older to a logistic function similar to that used in recent assessments changes the age-1+ biomass from 86,586 mt to 153,020 mt. The SSC recommends further investigation into the parameterization of survey selectivity.

The SCC notes that a substantial proportion (0.33 on average over the most recent 5 years) of that biomass estimate used for management is expected to come from the stock recruitment relationship (i.e., age-0 fish the previous year).

The approach for using empirical weight-at-age that is done for North Pacific pollock could be a viable option for the sardine assessment.

A table that reports the proportion of the population at age-1 would be a beneficial addition for evaluating how influential the unknown incoming age-1 year class is when projecting to total age-1+ biomass on July 1 for management purposes.

Catchability estimates may be volatile when conducting new or update assessments with new survey data, which could potentially pose a problem with update assessments. Inclusion of a prior on catchability in an update assessment is something that the SSC would consider if it was necessary to stabilize the model.

Consideration of key uncertainties, including the propagation of uncertainty in population dynamics, when projecting age-1+ biomass to the year following the ATM survey should be included in future evaluations of the performance of survey-based assessment approaches.

3. Methodology Review Planning

The Scientific and Statistical Committee (SSC) endorses the request for a Council-sponsored Coastal Pelagic Species (CPS) Methodology Review planned for early 2018. The request was presented by Mr. Dale Sweetnam (Southwest Fisheries Science Center; SWFSC) and focuses on the acoustic trawl method (ATM) survey for assessing CPS ([Agenda Item G.3.a, SWFSC Report, April 2017](#)). The SSC notes that this document includes a comprehensive list of topics to be addressed. The SSC CPS Subcommittee will work with the SWFSC and advisory bodies to develop meeting-specific Terms of Reference and identify specific topics to be addressed at the meeting.

The SSC recommends that the list of topics to be considered during the review meeting be expanded to include any revision to the method discussed during the February 2017 Pacific Sardine Stock Assessment Review Panel ([Agenda Item G.5.a, STAR Panel Report, April 2017](#)) for projecting the results of the ATM survey forward to enable computation of overfishing limits. The 2011 review focused on Pacific sardine, but the 2018 review should place more emphasis on other CPS species, in particular the central subpopulation of northern anchovy.

Review the Draft, “Implementing a Next Generation Stock Assessment Enterprise: An Update to NOAA Fisheries’ Stock Assessment Improvement Plan”

NOTE: The SSC discussed this item to prepare the following report to be submitted in the advance June 2017 Council briefing book. This item is labeled Agenda Item C.5.a, SSC Report, June 2017 in the June briefing book.

The Scientific and Statistical Committee (SSC) reviewed the draft document “Implementing A Next Generation Stock Assessment Enterprise: An Update to NOAA Fisheries’ Stock Assessment Improvement Plan” (Agenda Item C.5, Attachment 1, June 2017). Unlike the previous Stock Assessment Improvement Plan, which included tactical suggestions that resulted in changes to procedures, the current document takes a higher-level view with fewer details that could be implemented.

Although many aspects of the current plan are likely to improve future stock assessments, other parts of the plan need more clarification. While social and economic data and analyses have an important role in fisheries management to evaluate impacts, it is unclear how social and economic data can be directly used within stock assessments as opposed to Management Strategy Evaluations. The role of social and economic data and analyses needs to be more clearly defined and examples of potential use provided, or else their inclusion in the plan should be reconsidered. The plan also describes new approaches to characterize stock assessment uncertainty to assist in decision-making. The plan should include discussion of how the outcomes of new approaches such as ensemble modeling could be used within the context of Council decision making and how this will lead to demonstrable benefits in management outcomes.

The plan notes that the number of assessments desired generally exceeds the capacity of the system to produce them. To address this issue, the plan should put greater emphasis on training and retention of stock assessment scientists, as the number of qualified scientists limits the quantity and quality of assessments. One of the major successes of the original stock assessment improvement plan was to train highly-skilled assessment scientists, many of whom consequently joined stock assessment programs throughout the nation.

Streamlining the assessment and review process is another solution for increasing the number of stock assessments conducted. However the current review process appears to be working reasonably well for the Pacific region with respect to the number of assessments and thoroughness of review. Streamlining the process may be beneficial, but should not come at the expense of assessment quality and review thoroughness.

The plan could be improved by more careful use of terminology. For example, the term “process error” is not carefully defined, and is used in places to refer to model uncertainty. Another example is the use of the terms “operational models” and “research models.” The practice of doing benchmark or full assessments followed by one or more update assessments is well established at PFMC. It is unclear how the distinction between operational and research models relates to benchmark and update assessments, nor is it clear how making this distinction would help to streamline the assessment process. The SSC also notes that collaboration on stock assessments includes organizations beyond those listed in the plan, such as states and tribal partners, and that these partners also provide data for inclusion in assessments.

Finally, although the majority of the plan is aimed at strategic issues, some aspects of the plan have a more narrow and prescriptive focus than is desirable. In particular, Box 10.2, which addresses assessment terms of reference for the peer-review process, may be better handled regionally based on national standard guidelines, rather than in a strategic science plan. Similarly, the part of the document that provides details on scoring for stock assessment prioritization seems out of place in a science planning document.

SSC Subcommittee Assignments, April 2017

Salmon	Groundfish	Coastal Pelagic Species	Highly Migratory Species	Economics	Ecosystem-Based Management
Galen Johnson	David Sampson	André Punt	Kevin Piner	Cameron Speir	Martin Dorn
John Budrick	Aaron Berger	Aaron Berger	Aaron Berger	Michael Harte	Evelyn Brown
Alan Byrne	John Budrick	Evelyn Brown	John Field	Dan Holland	John Field
Owen Hamel	Martin Dorn	John Budrick	Michael Harte	André Punt	Michael Harte
Michael Harte	John Field	Alan Byrne	Dan Holland	David Sampson	Dan Holland
Will Satterthwaite	Owen Hamel	John Field	André Punt		Galen Johnson
Cameron Speir	André Punt	Owen Hamel	David Sampson		Kevin Piner
	Tien-Shui Tsou	Will Satterthwaite			André Punt
		Tien-Shui Tsou			Will Satterthwaite
					Tien-Shui Tsou

Bold denotes Subcommittee Chairperson

Council Meeting Dates	Location	Likely SSC Mtg Dates	Major Topics
March 7-14, 2017 Advisory Bodies may begin Tue, March 7 Council Session may begin Wed, March 8	Hilton Vancouver Washington 301 W. Sixth Street Vancouver, WA 98660 USA Phone: 360-993-4500	Two-day SSC Session Tue, March 7 – Wed, March 8	Identify Salmon Management Objectives (possible test fishery alternatives) Salmon Review/Pre-I Stock Prod., Hist. Catch Recon. WS Reports CA Current IEA Report Sablefish Ecosystem Indicators Identify New FEP Initiatives
April 6-12, 2017 Advisory Bodies may begin Thurs, April 6 Council Session may begin Fri, April 7	DoubleTree by Hilton Sacramento 2001 Point West Way Sacramento, CA 95815 Phone: 916-929-8855 or 1-800-686-3775	Two-day SSC Session Thu, April 6 – Fri, April 7	Pacific Sardine Assessment Salmon Methodology Topic Selection Anchovy OFL Process
June 7-14, 2017 Advisory Bodies begin Wed, June 7 Council Session begins Fri, June 9	DoubleTree by Hilton Spokane City Center 322 N. Spokane Falls Court Spokane, WA 99201 Phone: 509-455-9600	One-day SSC GF Subcm Session Wed, June 7 Two-day SSC Session Thu, June 8 – Fri, June 9	Pacific Mackerel Assessment Groundfish Update Assessments & Cowcod Catch Report 5-year IFQ Program Review 2019-2020 Groundfish Spex Planning CCC Meeting Update
September 12-18, 2017 Advisory Bodies may begin Tue, Sept 12 Council Session may begin Wed, Sept 13	The Riverside Hotel 2900 Chinden Blvd Boise, ID 83714 Phone: 208-343-1871	Two-day SSC Session Tue, Sep 12 – Wed, Sep 13 Two-day SSC Ecosystem Subcommittee Session Thu, Sep 14 - Fri, Sep 15	Groundfish Assessments Review 2019-2020 Groundfish Spex Groundfish Stock Assessment Methodology Review Topic Selection Groundfish EFH Analyses Off-year Science Improvements Salmon Methodology Topic Priorities

<p>November 14-20, 2017 Advisory Bodies may begin Tue, Nov 14 Council Session may begin Wed, Nov 15</p>	<p><u>Hilton Orange County/Costa Mesa</u> 3050 Bristol Street Costa Mesa, CA 92626 Phone: 714-540-7000</p>	<p>Two-day SSC Session Tue, Nov 14 – Wed, Nov 15</p>	<p>CPS Methodology Topic Selection CPS SAFE Groundfish Stock Assessments (if needed) & Rebuilding Analyses 2019-2020 Groundfish Spex Groundfish Stock Assessment Methodology Topic Priorities Salmon Methodology Review Research Planning</p>
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Proposed Workshops and SSC Subcommittee Meetings for 2017 and 2018

Workshop/Meeting		Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
1	Sardine Assessment Review	Feb. 21-24	Council/ La Jolla, CA	Punt (Chair), Satterthwaite, and Brown	2 CIE	CPSMT CPSAS	Griffin
2	Groundfish Pre-Assessment Workshop	Mar. 21-22	Council/ Portland, OR	Hamel (Chair), GF Subcommittee	None	GMT GAP	DeVore
3	CPS Methodology Review	Apr. 17-18	Council/ La Jolla, CA	Punt (Chair), Hamel, + Brown	1 or 2 CIE + SWFSC Assessment Scientist	CPSMT CPSAS	Griffin
4	P. Mackerel Update Review	May 1	Webinar	CPS Subcommittee	None	CPSMT CPSAS	Griffin
5	5-year IFQ Program Review	May 24-25	Council/ Seattle, WA	GF & Economics Subcommittees	None	None	Seeger
6	Groundfish Update Assessments & Cowcod Catch Report Review	June 7	Council/ Spokane, WA	GF Subcommittee	None	GMT GAP	DeVore
7	Lingcod & Yelloweye STAR Panel	June 26-30	Council/ Seattle, WA	Sampson (Chair) + Piner	2 CIE	GMT GAP	DeVore
8	Yellowtail RF & POP STAR Panel	July 10-14	Council/ Seattle, WA	Field (Chair) + Budrick	2 CIE	GMT GAP	DeVore
9	Blue/Deacon RF & CA Scorp. STAR Panel	July 24-28	Council/ Santa Cruz, CA	Dorn (Chair) + Hamel	2 CIE	GMT GAP	DeVore

Proposed Workshops and SSC Subcommittee Meetings for 2017 and 2018

Workshop/Meeting		Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
10	CCIEA Indicator Review	Sep. 14-15	Council/ Boise, ID	Ecosystem Subcommittee	None	None	Dahl
11	Groundfish Mop-up	Sep. 25-29	Council/ Seattle, WA	GF Subcommittee	None ¹	GMT ²	DeVore
12	Salmon Methodology Review	Oct. TBD	Council/ Portland, OR	Salmon Subcommittee	None	STT SAS MEW	Ehlke
13	SCS6 Meeting	Jan. 17-19, 2018	Council & NMFS/ So Cal TBD	Satterthwaite, Punt, + 2(?) TBD	TBD	None	DeVore Others? TBD

PFMC
05/10/17