Atlantic States Marine Fisheries Commission

ASMFC Menhaden Technical Meeting

Baltimore, MD - January 9, 2012

TC Members
Amy Schueller (NOAA), Joe Smith (NOAA), Joe Grist (VA), Jeff Brust (NJ), Jason McNamee (RI), Micah Dean (MA), Alexi Sharov (MD), Behzad, Trish Murphy (NC)

ASMFC Staff
Genny Nesslage, Mike Waine

Audience
Steve Meyers (NMFS), Judd Crawford, Ron Lukens , Jeff Kaelin, Ken Hinman

Background
At its November meeting, the Atlantic Menhaden Management Board approved a new fishing mortality threshold ($F_{15\%MSP}$ = 1.32) and target ($F_{30\%MSP}$ = 0.62). The Board requested the Technical Committee explore methods to account for the uncertainty in the terminal year fishing mortality estimate (F_{2008}) as it relates to achieving the new fishing mortality reference points. The Board also requested the Technical Committee explore landing scenarios to achieve the new fishing mortality threshold immediately and the new fishing mortality target over a range of 1 to 5 years.

TC decision listed in red

Determine most appropriate methodology to account for uncertainty in terminal year F when estimating percent reduction in total landings

- Jeff – We're here to develop methodology to determine % reduction for TAC. Does the PID need to be ready for the February board meeting?
    - Mike – yes, but keep in mind methodology we develop will also apply for next assessment update (2012)
    - Alexi – to clarify, we're talking about methodology for setting TAC…not necessarily a % reduction.
    - Jeff – agreed, specific goal is how to best calculate terminal year F, given uncertainty.
- Behzad – what uncertainty are we talking about?
    - Jeff – we can decide which we want to incorporate (e.g. management uncertainty, scientific uncertainty, etc)
- Mike – specific task is how to characterize uncertainty in terminal year F in process of setting TAC.
    - Joe (VA) – Do we have the flexibility to *not* using just terminal year? Average across years?
    - Jeff – yes

- Alexi – task should be to develop the best procedure to set TAC so that F is just below threshold or at target (depending on goal). The problem is the lag between the terminal year & the TAC-setting year (in this case 2 yrs).
    - Behzad – variable recruitment in lag years is the chief source of uncertainty.
    - Alexi – after next assessment (this year), we will only have to project 1 year for setting 2013 quota
- Mike – keep in mind, the plan is to use the same methodology we develop today for future quota setting exercises (after 2012 quota update)…can't change our minds & come up with a new method.
- Alexi – can we develop methodology now, but not report actual TAC numbers until next assessment is complete (later this year)
    - Mike – That is more the Board's decision of whether to include it in the PID or not.
- Mike – first, need to decide whether we want to project from terminal year…or something else
    - Behzad / Joe (VA) / Others – don't want just terminal year…we DO want something else
- Joe (VA) – isn't PID due in 9 days?
    - Mike – yes, so let's get to work
- Joe (NC) – the boats were on factory-set quotas, because factory couldn't keep up with volume. Most recent years should be considered anomalous
    - Jay – so, will these 'anomalous' years be included in a moving average window?
    - Alexi – TC should explore both options: 1) use most recent terminal year (i.e. "keep your thumb on the population." 2) use a moving average to account for terminal year uncertainty.
- Micah – So, is this exercise separate from characterizing projection uncertainty?…assuming we're OK with the projection methods, this discussion is to account for uncertainty in #s we're projection/reducing *from?*
- Amy – we should talk about whether we want to use previous projection methodology first, and then discuss how to deal with terminal year uncertainty. Should we go over Jeff's % reduction spreadsheet first?
- Jeff – [*walks through his % reduction spreadsheet*]
- Alexi – but, this method is wrong…we're assuming the population hasn't changed between the terminal year and the TAC year, which we know isn't true
- Jeff – you raised these same concerns in a previous meeting/call, but we as TC decided on this method, acknowledging its limitations
- Alexi – but this assumes the population stays the same during the lag years
- Amy – what do you propose we do instead?
- Alexi – we should be projecting as little as possible (1 year: 2012-2013)…then apply F_{target} (or threshold, depending on goal) on that projected year…that is your TAC.
- Micah – this example is convenient in an assessment year, where there is very little lag between terminal yr and TAC year…at other times, there will still be a lag.

- Alexi – so, our options are to do annual updates (so the lag is always just 1 year)…or do biannual updates & project at most 2 years
- Jay – how is this different from the projections that Amy has already developed?
- Alexi – I believe we need to develop an analysis that calculates the probability that projected F will exceed $F_{reference}$…then show landings level associated with that probability.
- Amy – so are you suggesting we use landings (estimated, if necessary) to predict what F would be? [*walks us through her spreadsheet*]
- Amy – [*shows plot of F vs Landings*] there is lots of variability in a landings vs F relationship…an F of 1.14 could mean ~200-600 kmt
- Amy – would prefer a method that provides the board with something like " if landings are set at this level, there is a __% probability that F will be below $F_{reference}$"
- Alexi – this is what I'm talking about, but the question is how to do it.
- Mike - [*puts up Amy's constant landings white paper – group discusses tables/figures*]
- Behzad – we should calculate the probability that F will exceed $F_{reference}$, over a range of TAC values, to fill out the sigmoid curve…essentially do Amy's constant landings projections over a range of landings levels.
    - Alexi – this is a good approach to follow
    - Amy – also interested in seeing what this looks like.
    - Jeff – so we really only need to do this out 1-3yrs
    - Amy – the number of years to project is no extra work, it's just pulling a given years' "slice" of data from the output…the extra work is in iterating the projection over a range of landings levels.
- Jay – do we run the risk of the results indicating that an extremely low level of landings is required to achieve a desirable level of risk?
    - Micah – that desirable level of risk should be decided by managers
- Joe (VA) – which inputs are we using for these projections…just the terminal year? Or do we have the flexibility to use an average of the most recent years?
    - Amy – yes, we have flexibility, but there are a lot of switches in the ADMB code…
- Amy – honestly, the most important input is our choice of recruitment…all the other inputs don't have nearly as much influence
- Behzad – [*walks us through Gulf menhaden example…plots of probability* $F > F_{reference}$ *over a range of catch limits*]
- Jeff – so, realistically can Amy and/or Jay do this in time for PID?
- Alexi – there are a lot of details we still need to figure out…choices on how to do projections (inputs, assumptions, etc).
- Alexi – wants to make sure we are providing a methodology w/*example* data (term yr 2008)…and actual decision making should take place from updated data, after assessment (term yr 2011)
- Alexi – if we go with a constant landings approach, the fishery may not use the full extent of expoitable biomass in a high abundance year, but may also harvest a little too much in a lean abundance year.

[10 MIN BREAK]

- Jeff – to recap: we have until next Tuesday to come up with a methodology for the PID…a method to calculate harvest levels that will achieve target & threshold and a time frame for doing so. The methods will be presented with the most recent data, but actions should only be taken on data produced from next assessment. The projections will be modified to provide the probability F> $F_{reference}$ at a range of harvest levels. We have recent work from gulf menhaden as an example. Does everyone agree?
    - Alexi – yes & no… only part still uncomfortable with is keeping an option to somehow use average of terminal year Fs. This is not necessarily required anymore.
- Jeff – we have a lot of decisions to be made regarding inputs…but, need to decide method first.
- Amy – unclear of what managers are asking…we shouldn't be advising how long it should take to phase in target F implementation
    - Mike – you (as TC) are not advising which range of years is best…just to describe the harvest scenarios to achieve the target over 1 to 5 years.
- Alexi/Jeff – sounds like we are pretty much agreed on an approach, now just need to settle on details.
- Jeff – again, is this work possible in the timeframe available?
    - Amy, Jay & Alexi - all have the projection code and offer to pitch in
- Behzad – lets create a spreadsheet to structure our discussion of inputs
- Mike – [*starts a projection inputs spreadsheet…see Appendix 1*]
    - Numbers at age – options:
        - terminal year – *used previously for projections*
        - use MCB outcomes to project forward
            - Genny – if using this option, should consider also resampling from full time series for other inputs
        - **[TC decides to use BAM terminal year as projection input in near term; TC also decides to move towards projecting forward from BAM MCB outcomes]**
    - Recruitment – options:
        - no S-R relationship, non-parametric bootstrap on full TS
        - no S-R relationship, non-parametric bootstrap on truncated TS (1990-2007) – *used previously for projections*
        - Beverton-Holt S-R – *TC previously decided the S-R relationship is poorly defined, therefore BH will not be used*
        - Random values, based on specified dist (e.g., uniform, normal, etc)
        - Time-series approach
        - Sine function
        - Alexi – we could also use JAI to estimate absolute recruitment value (use a regression between JAI and BAM age-0 values)
            - Jeff – this only works for projecting to $F_{threshold}$ (1yr of values)…not F_{target} (up to 5 yrs out)
        - Joe (VA) – what does Amy suggest?

        - Amy – depends on whether you believe that we are in a different productivity regime now as opposed to the past (a truncated vs full time series).
    - Jay – suggest we go with projection settings previously decided upon: no S-R, non-parametric re-sampling of recruitment from truncated time-series.
    - Jeff – if in future we decide to purse MCB inputs for #s at age projection, will need to consider full time series
        - Amy – this option can't be accomplished in short time period for the PID
        - Alexi – maybe do an interim version for PID, but better to do this correctly, even if it takes more time
    - Genny – to be clear, are we suggesting to use the JAI for projecting recruitment to threshold and non-parametric resampling based on truncated TS (1990-2007) for projecting out multiple years for target?
    - Everyone – agreed
    - **[TC agrees to use relationship between JAI and BAM age-0 to predict recruitment for years where JAI are available (projecting for $F_{threshold}$); will use non-parametric bootstrap of BAM recruitments from truncated time series (1990-2007) for years where JAI are unavailable (projecting for F_{target})]**

[LUNCH]

- Jeff – we're doing well on time, so will take comments from audience

- Jeff K – confusion as to whether we're planning on managing toward the threshold or the target. Prefers a multi-year specification so that there is less year-to-year variability/uncertainty in management implications. Generally nervous about letting the board select a desirable probability of risk…they may have no idea

- Ken – believes we should be managing toward the target. Shouldn't rush to get numbers into the PID. Shouldn't rush to put junk numbers in there. Is hopeful that proposed management actions should increase chances of good recruitment.

- Ron – concur with Jeff K's comments. Concerned with the pace of work…if developing a long-term structure to manage fishery, should do it correctly.

[BACK to TC]

- Alexi – which projections are we considering? constant landings, or constant F?
    - Jeff – constant landings
    - Micah – how do we expect to evaluate the performance of this method of quota setting? If we choose a constant landings approach in shooting for

F_{target} in say 3 yrs…what do we do in 3 yrs when we find out that we've been fishing well below or above F_{target}?

- Jeff – back to discussion of inputs:
  - M, Weight & Fecundity-at-age –
    - **[TC decides to use median of truncated time series 1990-2007]**
  - Landings – what is the range and step-size over which to project the probability that $F>F_{reference}$
    - Amy - will run once, look at results and then manually determine the range and step to fill out sigmoid probability curve
  - Allocation (Reduction v Bait) –
    - Amy - 40kmt bait / 150kmt reduction was used in previous projections
    - Genny – should use most recent allocation split, let board decide if they want to deviate
    - Joe (VA)/Micah – use a simple 5yr avg of recent allocation splits. TC should let the board debate the allocation issue.
    - Jay – want record to show that a 5 yr average was an arbitrary choice for simplicity's sake…did not choose for any other reason.
    - **[TC decides to use 5 yr average of allocation splits ~25%]**
  - Amy - back to recruitment…clear on most inputs now, except for using the JAI for short-term recruitment projection…which years to use?
    - Alexi – for any projection years that JAI is available, use that to predict recruitment (from JAI v BAM age-0 regression, instead of random resampling from observed values).
  - Alexi – what about bait landings? When will those be available for incorporation into this projection methodology?
    - Joe (VA)/Jeff – 2011 landings will not be available till well after April-ish
    - Amy – has several bait landings spreadsheet…but they don't always match.
    - Micah/others – should rely on state compliance report data, then use ACCSP to fill holes
  - Amy – what's the expectation for the write-up of methods/results/conclusions? Won't have time to do both projections and write the report.
    - Jeff agrees to write up a TC report using Amy's previous projection white paper and meeting notes.

Discuss methods for reaching target F over rage of yrs (1 to 5)

- Mike – are we OK with applying the threshold projection methodology we just specified towards the target projections?
  - Jeff/others – yes, that's the intention
- Jeff K – frustrated that it isn't clear whether we're managing this fishery to the threshold or target.

- Jeff - Do we want to consider a step-wise reduction in landings to achieve a desired level of risk of $F>F_{target}$, as opposed to the currently proposed constant landings projections?
    - Amy – would like to see outcome of constant landings projections first before attempting a progressive landings reduction scenario
    - Micah – would be helpful to have board direction on what is a desirable probability of $F>F_{target}$…we won't really know how big to make progressive steps without that information.
- Genny – believes the board may not have intended a 1-year timeline for achieving F_{target}…thinks the board may be scared by the results of even the 5-year timeline. Maybe provide an initial timeframe selection & produce other scenarios after board feedback.
- Mike – the board may not intend to include the landing scenarios for achieving F_{target} as part of the PID

- Alexi/Jay – we should be concerned about using "interim" data (2008 projected→ 2010) to describe/show methodology. The numbers could be misleading to the public, since they will be abandoned once the new assessment is complete.
    - Amy/Jeff/Others – agreed
    - Jay – can we present our chosen methodology, but not the results of the procedure using old assessment data?
    - Jeff – let's call Bob Beal for an answer [*Jeff calls Bob*]

[10 MIN BREAK]

- Jeff – asked Bob whether we can *not* provide interim numbers. Bob says it's best to provide them to the board and let them decide whether to include them in the PID.
- Jeff – also asked Bob *when* these numbers were needed… Bob says, it's OK to leave "holes" in PID…and fill them in at the board meeting or soon thereafter. This gives us ~1 month to complete analysis.
- Mike – preferably the results are reviewed by TC, then go out the board members a day or two before the meeting
- Amy – will provide the results to the TC by Friday 1/27. Conf call on the 1/30 at 3 PM to discuss.

Other business

- Jeff - Compliance reports due April 1st…also need state bait landings for input to MSVPA update by end of February or early March.
- Mike – reviews assessment timeline [*see Appendix 2*]
- Jeff – data confidentiality…do the members of the SAS need it to do their work?
    - Genny – No. As long as Jeff only shows *total* coastwide bait landings to SAS, then no-one beside Jeff needs confidential access.

Appendix 1. Inputs for the projections.

Inputs	light gray = by Feb Board Meeting		dark gray = ongoing
# at age	terminal year		MCMC
recruitment	Non Par, no S/R, truncated time 90-07	JAIs (thresh only) for available years	Non Par, no S/R, full time
M at age	median 90-07		
weight at age	median 90-07		
fecundity at age	median 90-07		
landings	based on curve, step and range		
allocation	mean of last 5 yrs		

Appendix 2. Stock assessment update schedule. **Please note this is a tentative schedule and subject to change.**

Event	Deadline	Contact
Compile 2011 Reduction Landings	4/6/2012	Joe Smith (Joseph.W.Smith@noaa.gov)
Compile 2011 Bait Landings	4/6/2012	Jeff Brust (jeffrey.brust@dep.state.nj.us)
Compile 2011 JAI and Adult Indices	4/6/2012	Rob Latour (latour@vims.edu)
•North Carolina alosine seine survey		
•Virginia striped bass seine survey		
•Maryland striped bass seine survey		
•Connecticut seine survey		
•New Jersey seine survey		
•New York seine survey		
•Rhode Island seine survey		
•Potomac River pound net survey		
Update MSVPA M Matrix	4/6/2012	
All Data and write ups to Beaufort Lab for BAM	4/13/2012	Amy Schueller (Amy.Schueller@noaa.gov)
Assessment Workshop	~5/14/2012	Mike Waine (waine@asmfc.org)
SAS finalizes Assessment Report	6/18/2012	Mike Waine (waine@asmfc.org)
TC Review at ASMFC TC Meeting Week	~6/25/12	Mike Waine (waine@asmfc.org)
Final Assessment to Board For August Meeting	**7/18/2012**	**Mike Waine (waine@asmfc.org)**