PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

SHAD AND RIVER HERRING MANAGEMENT BOARD

The Westin Crystal City
Arlington, Virginia
Hybrid Meeting

August 6, 2024

Approved October 23, 2024

.

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ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Rep. Allison Hepler, ME (LA)
Cheri Patterson, NH, (AA)
Doug Grout, NH (GA)
Dan McKiernan, MA (AA)
Sarah Ferrara, MA, proxy for Rep. Peake (LA)
Ray Kane, MA (GA)
Phil Edwards, RI, proxy for J. McNamee (AA)
Eric Reid, RI, proxy for Sen. Sosnowski (LA)
Dr. Justin Davis, CT (AA)
Bill Hyatt, CT (GA)
John Mansicalco, NY, proxy for M. Gary (AA)
Jim Gilmore, NY, proxy for Sen. Thiele (LA)
Emerson Hasbrouck, NY (GA)
Heather Corbett, NJ, proxy for J. Cimino (AA)
Adam Nowalsky, NJ, proxy for Sen. Gopal (LA)
Kris Kuhn, PA, proxy for T. Schaeffer (AA)
Loren Lustig, PA (GA)
John Clark, DE (AA)
Craig Pugh, DE, proxy for Rep. Carson (LA)
Roy Miller, DE (GA)
Lynn Fegley, MD
Allison Colden, MD, proxy for Del. Stein (LA)
Pat Geer, VA, proxy for Jamie Green (AA)
Chris Batsavage, NC, proxy for K. Rawls (AA)
Chad Thomas, NC, proxy for Rep. Wray (LA)
Mel Bell, SC, proxy for Sen. Cromer (LA)
Malcolm Rhodes, SC (GA)
Spud Woodward, GA (GA)
Erika Burgess, FL, proxy for J. McCawley (AA)
Gary Jennings, FL (GA)
Ron Owens (PRFC)
Daniel Ryan (DC Fisheries) proxy for R. Cloyd
Rick Jacobson (USFWS), proxy for Wendi Weber

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Staff

Bob Beal
Toni Kerns
Tina Berger
Madeline Musante
Caitlin Starks
Jeff Kipp
Tracy Bauer
James Boyle
Katie Drew
Jainita Patel
Chelsea Tuohy

The Shad and River Herring Management Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia, via hybrid meeting, in-person, and webinar; Wednesday, August 7, 2024, and was called to order at 4:15 p.m. by Chair Lynn Fegley.

CALL TO ORDER

CHAIR LYNN FEGLEY: Welcome, everyone, to the Shad and River Herring Board meeting. I am Lynn Fegley, from the state of Maryland, and I am happy to serve as your Chair today. I have up with me, James Boyle, Dr. Katie Drew, Dr. Margaret Conroy, and also Dr. Adrian Jordaan is online, who is going to deliver our Peer Review.

I also want to point out that we have members of the Council online, and we're going to offer them an opportunity to ask questions after the Board discusses the Stock Assessment Report. We're going to be looking for one action today will require a motion, so please, be ready for that. I'll start with Board Consent.

APPROVAL OF AGENDA

The first thing is Approval of the Agenda. Does anybody have any changes or adjustments to the agenda they would like to propose? Okay, seeing none; is there any opposition to the agenda as it stands? Okay, we consider the agenda approved by consent.

APPROVAL OF PROCEEDINGS

CHAIR FEGLEY: The next one is approval of proceedings from October, 2023.

I was told to note that there are some inaccuracies, there are some people missing from the attendance list. Staff is working on correcting that. Is there any other changes or edits needed to the October proceedings? Okay, is there any opposition to the proceedings? All right, we'll consider that approved by consent.

PUBLIC COMMENT

CHAIR FEGLEY: Next on the agenda is public comment. Is there anybody in the room or online who would like to make comment on things that are not on the agenda? Okay, seeing no public comment, we are going to roll right into our agenda.

CONSIDER 2024 RIVER HERRING BENCHMARK STOCK ASSESSMENT

CHAIR FEGLEY: The first thing we're going to get is a Presentation of the Stock Assessment Report, and we're going to have that from Dr. Drew and Dr. Conroy, so take it away.

2024 RIVER HERRING BENCHMARK STOCK ASSESSMENT

DR. MARGARET CONROY: I am going to be presenting to you the 2024 River Herring Benchmark Stock Assessment. This Stock Assessment is a product of the ASMFC River Herring SAS and the Shad and River Herring TC. River herring is still a data poor species complex that is challenging to assess but we've made some progress since the 2012 Benchmark. We have an improved understanding of the stock structure. We've added some new datasets. We have abundance trends and/or mortality estimates for 84 rivers representing 105 stocks of river herring. We have refined the methods for trend analysis and Z estimates, and we have some new modeling approaches, including hierarchical growth model for each species, as stochastic SPR reference point model, a habitat model and have done some work on data-limited bycatch cap options.

In this presentation I will go through stock structure, then data, methods, stock status followed by bycatch caps and research recommendations. For stock structure, for the last benchmark we assessed river herring at the river level, and then pooled up to states to summarize the trends, and we developed Z reference points as a coastwide level.

But the SAS felt that using stock regions to pool data and summarize trends was more biologically meaningful than using states. In this assessment we assessed alewife and blueback herring at the river level wherever possible. Then used genetic stock regions to pool data where necessary for reference points and to summarize trends.

Our stock regions are based on genetic work by Reid et al. (2018). Here you see our stock regions, on the left are alewife, on the right are blueback herring. The points are the points that were used by Reid et al to determine these. For alewife we used three stock regions, the Northern New England, Southern New England and Mid-Atlantic.

For blueback herring we used five regions, Canada, Northern New England, of course we used only the U.S. portion of this region, Mid-New England, Southern New England, Mid-Atlantic and South Atlantic. Moving on to data. We're going to talk about landings and bycatch, and then indices and run counts.

Our total removals are going to be presented as river herring removals, because it is difficult to separate by species, especially for the historical landings. We present in weight and numbers, which means some translation there, so commercial landings and bycatch and weight are converted to numbers.

Recreational total catch in numbers is converted to weight. Our conversions are based on the average size of river herring for each sector, where sampling was available. Here are our total removals in weight. Note that the historical ones may be incomplete. The yellow is the U.S. commercial landings from ACCSP, the blue is the foreign fleet landings, the pink is the U.S. recreational landings, and the green is bycatch.

We see here that the total removals have declined significantly since the 1950s and '60s, and in the last 10 years total removals averaged about 2.67 million pounds per year, with just about 4 percent of the reported landings at the height of the directed fishery. The overall pattern is similar for removals in numbers of fish, which are shown here.

In the last 10 years the total removals average 6.83 million fish per year, which is approximately 4 percent of the average reported landings as at the peak of the directed fishery. If we zoom in on the more recent years, we can see that there hasn't been much of a trend in total removals since the mid-1990s. Note that the estimates of recreational catch start in 1982, again those are in the pink, and the estimates of bycatch start in 1989 in the green. Recreational removals have generally been small and have high PSEs, and bycatch estimates make up a significant component of the current removals. Here you see the proportion of river herring removals for those recent years, and again we see the commercial landings in yellow, foreign fleet landings in blue, recreational landings in pink, and bycatch in green.

Note that bycatch has been about 30 to 75 percent of removals since 1989. It was much lower than average in 2020 to 2022. Let's look at that recent change. On the left here are some numbers from 2005 to 20019, and we'll call that the older period, and 2020 to 2022 we will call that the recent period. You note that the estimates of bycatch for 2022 were lower than in previous years, and they made up a smaller percentage of the overall removals.

The bycatch averaged about 757,000 pounds per year in that older period, whereas it was only about 200,000 pounds per year in the recent period. That translates to about 281 million fish per year in the older period versus 0.75 million fish per year in the recent period. In the older period it was about 20 percent, the bycatch was about 27 percent of total removals in weight, and 35 percent have showed a removal in numbers, whereas in those recent three years was about only 7.5 percent of total removals in weight, or 10 percent of total removals in numbers.

This is due in part to lower effort in Atlantic herring and mackerel fleets in recent years, but there was also lower observer coverage and port sampling in those years, especially in the Mid-Atlantic midwater trawls. Bycatch makes up a higher proportion of total removals by numbers, because the average size of the river herring in the bycatch is smaller than the river herring in the in-river fisheries. Here we see the bycatch length composition, with alewife on the left and blueback herring on the right.

The top row is the in-river directed fishery sampling, the middle row is the in-river fishery independent sampling, and the bottom is the NEFOP bycatch sampling. Length information collected by observers shows that the ocean bycatch, that bottom panel, contains small river herring, defined here as less than 200 millimeters that are not seen in in-river monitoring, indicating that the ocean fisheries are catching juvenile and immature river herring, as well as mature adults.

Moving on to data, so our run counts and indices. The TC reviewed a wide range of state, federal and academic datasets, and in deciding what to use in a trend analysis, a run count or survey was used if it had 10 or more years of data, had consistent methodology or changes in methods were accounted for, and it encountered river herring in at least 10 percent of the trials over the time period.

Some surveys or run counts with less than 10 years of data were accepted for use in the next assessment update. For alewife we used 52 datasets for trend analysis, 23 of those are run counts, 10 are adult in-river surveys, 11 are recruitment surveys and 8 are ocean mixed-stock surveys.

For blueback herring, we used 42 datasets for the trend analysis, that is 10 run counts, 13 adult in-river surveys, 12 recruitment surveys and 7 ocean mixed-stock surveys. In addition, we had 14 run counts that are not separated to species. Now the SAS assumes that run counts are more like indices than true population counts. They represent trends in abundance, but other factors like passage rate, amount of spawning habitat below the page level counts, environmental factors, et cetera. I mean we don't know how much of the spawning population is actually being counted each year.

The different types of datasets are not distributed equally across the coast. These maps show alewife on the left, blueback herring on the right, and the data sources by shape. Run counts, if they are species specific, are shown by yellow circles here. If they are combined species they are shown by an asterisk.

The adult fishery independent surveys are shown by a blue square, and the pink triangle denotes young of year or juvenile indices. You will note that most of the run counts are in the northern region, and most of the surveys are in the Mid-Atlantic Region. The South Atlantic Region for blueback herring is particularly data poor.

That was our data, now we're going to move on to methods. For methods we will first seek a trend analysis, then on mortality comparisons to reference points, and then the habitat model. For trend analysis we looked at Mann-Kendall trends, which detect an increasing or decreasing trend over the time series.

We also looked at auto aggressive integrated moving average. We used that to minimize measurement area and decreased variants, and then we looked at the probability that the terminal year of that ARIMA index is greater than either the reference year of 2009, or greater than the 25th percentile of the time series.

We used 2009, which was the year Amendment 2 was adopted for river herring as the reference year, to try to address the question of whether river herring abundance has changed since management action was taken. This trend analysis was applied to run counts, indices, and life history characteristics.

We found very few significant trends in our life history trends analysis, so that would include maximum age, mean length, mean length at age, and percent repeat spawners. There are also some difficulties interpreting those trends. For example, does declining recruit spawner percentage indicate decreased survival in elder fish, or does it indicate that there is higher recruitment and more first-time spawners?

It was hard to determine that without a lot of additional data on recruitment or abundance. Because of this, the TC/SAS did not rely on these results for status information, but you can look at the assessment report for detailed results. After the trend analysis, we looked at total mortality compared to reference points.

We estimated Z from age data from in-river monitoring using the Poisson GML method. We used the age of full maturity as the age of full selectivity, which was Age 5 for most of the stock region. We applied this for years with at least 30 samples of at least 3 fully selected ages. Then we calculated a stochastic Z 40 percent SPR reference point. To do this, instead of using point estimates for the input, like mortality, maturity, et cetera, we drew from distribution of parameters, and created a distribution of Z 40 percent SPR estimates. We developed these reference points for each stock region. The probability of Z being above the Z 40 percent SPR reference point incorporates uncertainty from both the Z estimates and the reference point.

Note that our total mortality was based on adult mortality only, with no influence of juvenile mortality. Another way that we tried to assess the data was by using a habitat model. This model is a simulation model to look at the affects of habitat loss on the productivity of alewife and blueback herring in each stock region.

It is similar to the model that would be used for American shad during the 2020 benchmark, but the life history information and habitat data were updated to reflect alewife and blueback herring stock regions. All of our results are in the Assessment Report in detail. If you look at Table 20 and Table 39, it gives you a river-by-river summary.

In this presentation, I'm going to summarize the results coastwide and by stock region. The tables that I will show you, the Mann-Kendall Trend over the entire time series, the Mann-Kendall Trend since 2009, the probability of the latest year of the ARIMA being above the 25th percentile, and also of it being above the index of the 2009, and the probability of Z being above the Z 40 percent SPR reference point in the most recent year..

On to stock status. We're first going to discuss what we learned from the habitat model, then the Mann-Kendall Trends, then the ARIMA comparison to reference and then the total mortality comparison to reference. There are a lot of stock status challenges for river herring. River herring abundance is affected by a number of factors.

Affected by directed fishing, bycatch, habitat loss and degradation, passage mortality, and environmental factors including predation and climate change. Also, each river system has its own challenges, and for almost all stocks we have only one data source. To add even more challenges, all of our datasets on abundance and mortality start well after the peak of the directed fishery in the 1960s and the collapse of landings during the 1970s.

The habitat model tells us that a significant amount of river herring spawning habitat has been lost or made difficult to access, due to dams. In these maps here, blueback herring is on the left, alewife is on the right. It shows how many dams are in each part of the river. The darker, redder colors indicate river herring have more barriers to accessing the habitat.

For instance, that darkest red area, the river herring would have to cross upward of a dozen dams to get to those areas. The loss of access to spawning habitat results in a lower potential abundance. Here I will show you alewife. The Y value here is the

coastwide alewife abundance in millions of fish, and across the bottom there are three scenarios.

There is a no passage scenario on the left, a no dams scenario on the right, and the current scenario in the middle. Historical abundance of spawning alewife was predicted to be 352 million fish under the no dam scenario. Abundance under the no passage scenario was 87 million spawning fish, which is a reduction of about 75 percent. Current levels of passage don't provide much improvement over the no passage scenario. Analogously for blueback herring, we see the same figure, the mean historical abundance of blueback herring was predicted to be 63 million spawning fish under the no dam scenario. Abundance under the no passage scenario was 41 million spawning fish, which is a reduction of about 35 percent.

Again, current levels of passage do not provide much improvement over the no passage scenario. What is our habitat model telling us? Well, alewife and blueback herring are depleted, relative to historic level. The habitat model indicates that the overall productivity of the stock is lower now than it was for an unexploited population in an unaltered landscape.

But this doesn't incorporate fishing mortality, so it doesn't provide an estimate of true current abundance. Moving on to our abundance trends, this is a figure showing abundance trends over the full time series. On the left is alewife, in the middle is blueback herring, and on the right is river herring unspecified.

The abundance trends are denoted by a red downward pointing triangle if they are decreasing, a green upward pointing triangle if they are increasing, and if there is no significant trend it is denoted by a black square. As you see, there is no clear coastwide trends. More of the northern regions seemed to have more positive trends, but even within the regions there are differences from river to river.

Then if we look at the trends since 2009, since our reference year, you see even fewer significant trends. You see one decreasing significant trend in blueback, which is the Santee Cooper River. You see two increasing trends for alewife, two for blueback and two for river herring. The alewife increasing trends are the Damariscotta River run counts and the Merry Meeting Bay young of year index.

Both of those are in northern New England, and the blueback increasing trends are again, Merry Meeting Bay young of year index, and that is in the Canada/Northern New England Region, and Albemarle Sound adult index in the Mid-Atlantic. The ARIMA results compared to the 2009 reference year shown here. It's the probability of the most recent year of the index being above the 2009 value. The shape indicates the type of data, either survey or run count.

The run count species-specific are circles, run count combined species are diamonds, square is your adult fishery independent surveys and then triangle is young of year or juvenile. As for color, the darker blue indicates a higher probability. The darker red indicates a lower probability, and lighter colors indicate around a 50 percent probability of being above the 2009 value.

You can see that the northern points tend to be darker, and there are more light-colored and redder symbols on the map in Southern New England and Mid-Atlantic areas, indicating lower probabilities of being above the reference period. Here you see the probability of the most recent Z estimate being above the Z reference point.

In this case, shape again indicates the type of data and for color, darker red indicates a higher probability. Darker blue indicates a lower probability, and the lighter colors more of a 50 percent probability of being above the Z 40 percent SPR reference points. Most rivers had a higher than 50 percent chance of total mortality being above the Z reference point, with the more northern regions having a higher probability than the Mid-Atlantic. You think that is a little counter intuitive from what we just told you about the abundance

trend, but out of 105 stocks for which we have data, we only had 26 that had both Z and adult abundance trends. That was a little bit hard to draw conclusions.

To summarize, our stock status here on the left we look at the time series trends since 2009. The left-hand column is a significant negative trend, the middle is no significant trend, and the right is increasing significant trend. Now the middle column there is the number of datasets with a greater than 50 percent probability of the terminal year being greater than a 2009 value based on that ARIMA.

On the right we see the number of rivers with a greater than 50 percent probability that the mortality in the latest year is greater than the reference point. You see here for alewife that there is no clear coastwide trend since Amendment 2. There are very few significant trends, but those that are significant are positive.

Note that high values are better for the middle column, and high values are worse in the right-hand column. You see there is one significant positive trend in Northern New England and three in the mixed stock ocean, and all the others are nonsignificant. As for the latest year of the ARIMA being higher than the 2009 value, 92 percent of the Northern New England rivers for which we have values were greater, 67 in Southern New England, 65 percent in Mid-Atlantic and 67 percent in the mixed stock ocean, so that's good.

But then on the right the number of rivers where the mortality is higher than the reference point is pretty high in Northern New England at 72 percent of them, 78 percent of them in Southern New England and you know, Mid-Atlantic none, so that's great. The more northern regions seem to have more positive trends, but also higher Z estimates.

But even within the regions there are differences from river to river, in terms of trends and a Z estimate. This is the analogous information for blueback herring. Similar to alewife there is no clear coastwide trends, while the northern region seemed to have more positive trends, they also have higher Z estimates.

Again, even within regions, there are differences from river to river, in terms of the trends and the Z estimate. There were no species-specific run counts for indices for the Southern New England Region for blueback herring, so as you see here, we only show the mixed species run counts. In summary, there are no clear coastwide trends since Amendment 2.

Some systems are showing positive trends, some negative, and many know the technical trends. The Northern Region seemed to have more positive trends, but a lot of variability even within regions. Run counts increasing trends may be influenced by increased passage efficiency, as well. The Northern Regions have put a lot of effort into habitat restoration and dam removal, but still have states further south, and they have not seen the same positive trend in run counts and indices. In Northern New England stock region also accounts for the majority of the directed catch in recent years, while states in Middle New England, Southern New England and Mid-Atlantic stock regions have closed their fisheries. What other factors are affecting river herring abundance? One of them may be the bycatch influence. Reid et al in 2022 looked at the genetic composition of ocean bycatch from Cape Cod, Long Island Sound, New Jersey area, which has historically had a high fishing effort and high estimates of river herring bycatch.

In this area the majority of alewife bycatch was from the Southern New England stock region, and the majority of the blueback herring bycatch was from the Mid-Atlantic stock region. These are two stock regions that have more negative trends in recent years, despite habitat restoration efforts and directed fishery closures.

Let's move on to talking about possible bycatch cap measures. Concerns about the impacts of ocean bycatch led the Board to include a TOR to develop methods to calculate biologically based caps for a

limit on bycatch of river herring in ocean fisheries. A proof-of-concept approach was developed, using data limited methods, so that if that bycatch cap based on trends in alewife and blueback herring abundance.

We used the iSmooth and the iSlope methods, these were peer reviewed in the 2020 index-based methods and Control Rules Research Track Assessment. These methods have the highest medium catch among the methods that achieve rebuilding more than 50 percent of the time. The iSmooth and iSlope are conceptually very similar. Slope have been the index in recent years we've used to develop a multiplier that is applied to the recent catch, with or without additional buffers.

Basically, if the index is decreasing the bycatch cap would decrease. Then if the index was increasing, the cap would increase. The data required for this is catch data and index data. The catch data we looked at was the Northeast Fisheries Science Center species specific coastwide bycatch estimates.

The index data for the ocean mix stock indices was the Northeast Fisheries Science Center Bottom Trawl and NEAMAP. For run counts for alewife, you look at the sum of the Southern New England run count, and for blueback herring we looked at the sum of the Mid-Atlantic run count and these were the stock regions, remember that comprise most of the bycatch being studied by Reid et al in 2022.

The final numbers would depend on the method, choice of index, and what kind of buffers are in place. We ran through some seemingly reasonable numbers, and found that our estimates had lower, they were lower than the current bycatch count, lower than the coastwide bycatch estimates, but higher than recent estimates of catch against the current cap, because remember, not all the coastwide bycatch of river herring counts against the current cap.

There were pros and cons to using an index-based bycatch cap. The pros it is more biologically based than the current historical average approach. As your indices decline caps will decline. If indices increase the caps can go up. The cons are that it is based on index data only, it's not a population model, and it assumes a relationship between a bycatch and the population abundance, although we know that bycatch is only one factor that is protecting river herring abundance. In order to finalize anything, it would need more work in consultation with managers on the scope and implementation. What we did was species-specific, and the current caps are shad and river herring combined. The caps we came up with are coastwide, but the current caps are based on specific fisheries and gear area combinations.

Data limited methods need more management input on risk and buffer levels, and monitoring at a biologically meaningful scale is difficult. Not all bycatch affects all rivers or stock regions equally, and the current monitoring doesn't include genetics. The TC/SAS strongly supported the species distribution modeling approach as an alternative or a complement to the catch cap.

Model river herring distributions and identify potential "hot spots," where the risk of bycatch is increasing, and use time/area closures to minimize bycatch, instead of an in-season catch cap approach. This avoids some of the issues with intensive monitoring needs with the catch cap approach, but the models need to be developed further. On to research recommendations. The research recommendations are shown in full in the assessment report, along with the updates on what we have accomplished thus far.

Last year we highlighted some of the selected recommendations. A high priority short term research recommendation for assessment methodology is to continue development of the habitat model or similar models to predict the potential impacts of climate change on the river herring distribution and stock persistence and develop targets for rivers undergoing restoration. Some high priority short-term recommendations for

research and data collection are to develop consistent aging protocols across all states.

To establish a database of existing data sources with comprehensive meta data and recommendations for use. To expand observer and port sampling coverage including genetic sampling, to better quantify incidental catch of river herring. Studies to quantify and prove and implement standard practices for fish passage efficiency, and to evaluate and validate hydroacoustic methods to quantify river herring spawning run numbers in major river systems. Any questions?

PEER REVIEW PANEL REPORT

CHAIR FEGLEY: Thank you, Dr. Conroy, that is just an impressive amount of work. I think what I would like to do, unless there is loud objection and protest, is move right on to the Peer Review Report, and then take questions together. Dr. Jordaan, I apologize if I'm mispronouncing your name. If you're ready, let's go ahead with the Peer Review, and then we'll discuss.

DR. ADRIAN JORDAAN: According to my data, I've been mispronouncing our last name. We'll be okay, thank you so much. First of all, I would like to thank the River Herring Technical Committee and Stock Assessment Subcommittee, and I'm going to just call that the SAS, because I'm not going to say all those words every time.

But I would like to comment on them for their efforts around this stock assessment, and we're really happy to be a part of the group that got to review it. The Review Workshop was June 4-7 in Arlington, Virginia, and our scientific review focused on the data inputs, analytical methods, results, and overall quality of the stock assessment. Obviously, you have all had access to the materials, so we can go to the next slide. The Scientific Review Panel was a Chair and two additional technical reviewers with expertise in anadromous fish ecology and population dynamics, stock assessment modeling, data limited methods, fish passage, and bycatch estimation.

I fulfill some of those, so I was very fortunate to have Dr. Heather Bowlby from the Fisheries and Oceans Canada, who has had experience working on river herring, although virtual estimate ranks currently, but a rich experience in stock assessment and Dr. John Weiderman, who also spends time on the Science Statistical Committee with me on the New England Fisheries Management Council, and has a lot f experience working with stock assessments, so a really great group of people, and think hopefully we did the assessment justice in our review.

While not mentioned here, I'll probably mention this a couple times. This remains a data limited complex of stocks, as Dr. Conroy mentioned, and they remain depleted from a coastwide perspective. This follows a decade or more of restoration efforts and moratoria in numbers of states., simply haven't improved status beyond some marginal improvements.

However, most of the population trends themselves are flat. I try not to get in the weeds here too much, but when I say population trends, I really do mean the run counts, the indices, and all the life history indices as well. But for right now just talking mostly about the population trends, where there was high variability in many of those surveys, and there just was a lack of ability to detect trends.

While no official statement was made regarding the current rates of mortality, total mortality was quite high in many of the individual stocks, as pointed out by Dr. Conroy's presentation. It was sort of spread throughout the assessment, but within one of the statistical catch-at-age models on the Monument River. There was certainly an indication that there was high mortality occurring during the ocean period of their life history of river herring.

Many members of the public and managers brought up concerns over the potential high levels of discard mortality, or at least about the lack of current monitoring of that mortality. The new habitat-

based model shows a lot of promise, and indicates a lower productivity overall, due to damage and habitat loss.

We certainly as a group encouraged the continued development of that to bring in more information about how the habitat varied in quality, as well as trying to use information that sort of tied it, grounded the habitat model to some of the other aspects of their life history. One of the big, honestly one of the biggest positive things of the habitat model, parts of the model itself was also the growth modeling and other sort of synthesis of information that occurred as part of that.

Those were really encouraging and a monumental amount of effort, primarily by Dan Stitch, so I'll give him a call out at this point. Based on the current methodology analyses and interpretation of results, we believe that the assessment provides the best available science. But again, I think that there are just in general with river herring a way to go to bring these stocks to a more data rich scenario would allow us to say more about the sources of mortality and provide better recommendations for management action. I'm going to step through each of the TORs that we had, as a part of the review. The first was to evaluate the choice of stock structure. We really, as a group, thought that the use of the genetic information to aggregate the information into these broader regions that were not defined, necessarily by state as a positive move forward. However, since most of the mortality is very much river specific, and certainly runs in better stability by experiencing harvest, as our harvest is at the specific river or run.

We recognize that the unit, the river is still the stock unit that is most important. From a recommendation standpoint, we recommended that there be further data collection from populations and fisheries for apportionment of discard mortality at sea, but also just to try to continue to better understand the spatial aspects of river herring during their complex life history.

I'll also say at this point that the lack of data along some parts of the coast, in terms of the genetics, led to there being sort of not quite enough information to really nail down perfect stock unit. I think there is just an overall more work to be done in both genetic analyses, as well as collecting information for future analyses of genetics in those discards.

Again, we were very happy with the amount of data that was collected on river herring from both fisheries dependent and independent sources. I think it is important to acknowledge that there are significant limitations, data limitations that remain a significant issue for these stocks, particularly with the lack of standardized methods for aging, and for developing abundance indices.

I'm actually going to do the second recommendation first, because it feels like it leads from the second comment better, and that is that one of the things that I think it comes out really nicely, and what Dr. Conroy just presented, was the fact that many rivers only had one index or one life history index, or a run count or a juvenile index, or an adult survey of some kind.

One of the problems is that it was, as again noted by Dr. Conroy, that it is difficult to assign mortality or understand where there are issues, when you have such disparate data. We really think that one of the things that might be helpful is to continue to develop the surveys and standardized methods, but focus on a few rivers across the region that allow there to be these sort of sentinel populations that allow a better understanding of what is occurring within that river, sort of like what we saw in the Monument River.

Then of course there is just an overall missing data across the board from supplementing other surveys that are currently collecting parts of the information that are useful, so either a run count, but not really collecting enough information for some other

aspect, but also just in general the discard monitoring is an area that is certainly needed.

TOR 3 was to evaluate the assessment methods and models. As I noted this has remained a data-poor assessment. The majority of river systems there was only just this one type of monitoring data that would exist that could be used as some kind of index, whether it be abundance, run count or so forth, and that is certainly a limitation.

The catch-curve estimation of total mortality (Z) compared to the reference points developed by the spawner stock recruitment biomass to recruit model seemed appropriate. I have a feeling I called Z F later, and I apologize ahead of time, unless someone fixed it. Certainly, we feel like this was a big step in the right direction for the assessment of these populations, although there are certainly some issues that were identified, I think a little bit in the weeds, but certainly worth continued exploration around how to best estimate mortality and make comparisons to the biological reference points.

The trend analysis of Mann-Kendall and ARIMA on the survey and other data sources provided a little additional information, but I think you got the general sense that trends have been generally flat since the last assessment, and so there really hasn't been a lot of either improvement within this, or enough power to detect those trends, which frankly is our problem across a lot of surveyed anyway.

Then of course the statistical catch-at-age models were updated for three rivers and suggested high at-sea mortality, although only one of those models was really, I think at the level that was capable of making that kind of inference. For the conclusions of the assessment methods. We believe that there needs to be a continued development of these bycatch caps.

Based on the abundance we thought that that was certainly a step forward from the more historical sort of what has been caught. However, there were a number of issues identified, particularly interannual variability in cap estimates. We just think that there needs to be a little bit of additional thought on this process.

But it seems like a very, in general, a positive way forward. We were as a group and individually, we were concerned about the use of a fully spatial bycatch avoidance approach, because it wouldn't inherently track the magnitude of bycatch or just things as part of that. We really felt that there would have to be some kind of cap implemented currently with spatial management, to avoid the potentially negative outcomes that could follow through from that.

Of course there are ways around that, which leads to one of the comments, which is that we think in developing these ideas, especially for the time/area closures, you really need some clear management objectives that are going to be complicated by the fact that they're going to be multi-species driven, and that these clear management objectives need to be defined a priori, and there is a reference provided in the document to help tease that out more.

In TOR 4 we were asked to identify the best estimates of stock abundance, total mortality, and exploitation for management use. Some of this is going to be a little bit redundant. The first one is just a reemphasis that the idea that for a majority of river systems there was only one type of monitoring data that was able to be used, and this really limits interpretation, and I think Dr. Conroy gave some good examples.

The trend analysis on survey CPUE and run size as mean length and mean length at age data, really gave mixed results, and in general had a low power. There were some, I would say weak positive outcomes from that. But in general, I think that the group took it as a whole that the trends were generally pretty flat and unchanged. There is the F40 in the next slide. There was I think across the

board higher mortality. I think there was high mortality across all of the runs, or across many runs, and there seemed to be high mortality occurring within the runs up in the north. One point I am just going to make here that I think is worth everybody being aware of, and that is that the use of Age 5 and further, you know an older fish in terms of developing the mortality estimates, certainly is a bit of a limiting factor, in terms of understanding the full dynamics of what is going on over the life history. Obviously, a positive way forward, but just to recognize that there is bycatch mortality occurring as well as in-river mortality during the return after for spawning.

I think that while initially I was surprised that those mortality rates were high, I think that there are some potentially confounding factors in there a little bit as well. The statistical catch-at-age modeling suggested high at-sea mortality and the habitat model suggested continuing need for improvement of habitat access or said another way that we're still very much below the baseline of undammed systems based on the habitat model.

We just suggested the continued development of data limited methods for developing a bycatch cap, based on trends in abundance, and really felt that that type of method moving forward was likely to balance the need for some flexibility in the approach, but also recognizing that it's not just the historical catch that drives the potential for bycatch.

There are some recommendations, and some of these are redundant, but to have these sentinel sites that are tracking more data on more indices to allow for better interpretation of results. Move the statistical catch-at-age model to more of a population viability analysis, which is really just a tweak, and hoping that more of those sentinel sites will bend themselves to becoming statistical catch-at-age models in the future, so we really have a better tracking of the process of what is going on coastwide.

Continue the development, we really encourage the continued development of that habitat modeling approach. We really think there is a lot of promise in that. Then of course the work with the New England Fisheries Management Council's Plan Development Teams in both the herring and mackerel, to work on approaches to limiting bycatch, and also to continue to better monitor those fisheries.

We overall, we agree with the assessment that the river herring stocks remain depleted. Although there is a low power to detect trends, there is an increased monitoring need and a better standardization of techniques, and hopefully movement toward some of these sentinel sites, a little help, I think, to understand better how our populations are trending.

Mortality exceeded the biological reference points in many rivers, and at-sea mortality appears to be high. While the river herring stocks remain data poor, and status determinations were impossible, we do find that the lack of recovery, given the last decade of restoration and effort is troubling. A quick note here though that many areas are still improving access and improving.

Many of those populations may not have entered into the assessment. We hope that in the future these sorts of improving areas might get more call-out. But we do believe that the lack of discard mortality monitoring remains a really important missing element for the assessment, and leaves us in a little bit of a difficult position, in terms of assigning or apportioning where the issues are, in terms of what is limiting the recovery of these populations. This is really on the research recommendations. The Panel really recognized the importance of an improved estimation of bycatch and discard mortality, and so this is essentially really working on comparing the current analytical techniques in a sensitivity analysis to understand and assess their relative predictability in estimating total bycatch.

This is particularly important, because river herring are a schooling fish, and those numbers, they are

just not a typical fish population in many ways, and I think they need a little bit of work on the analytical side, and it was really a strong recommendation by the Peer Review Panel. Certainly, continuing explore these, iSlope was probably the preferred version between the two, but to continue to explore these.

Since incidental catch seems to comprise the largest source of ongoing fishing mortality, and it remains high for many populations. The focus on bycatch at this point is fairly urgent. Continued improvement of the habitat model, they are incorporating major sources of mortality, and then to use observed data to ground truth the outputs.

We're really excited about some of the advances in that habitat model, and actually the assessment overall. These are still high priority for us, but we recognize that some high priority things you can pick up at the computer and do. Those were the things we just sort of just discussed. These things involve a little bit more on-the-ground work, and sort of more collaboration beyond the Atlantic States Marine Fisheries Commission.

Equal priority, although with implementation over a longer time period and improved monitoring via port sampling or dockside monitoring, to collect more information about a species in bycatch. Because most of these species are full retention, or many of them are, we really don't have to require observer coverage.

We really hope that this can be a step forward over the next numbers of years towards the next assessment. The Panel also saw a high priority and continued improvement of enumeration techniques, including hydroacoustic, eDNA, other run counts, sort of video imaging processing with machine learning, all these ideas to increase the amount of information that we have, increased its reliability.

Then hopefully do so in such a way that dovetails with those other types of data being collected about the life history, so that we can continue to have more sites that we have better interpretation of the overall data. Then for a medium priority, we had sort of a need to implement sampling programs. This is actually sort of going back to what I just said, which is sort of having these sentinel sites, where we sort of would be collecting more information about the overall life history of the species in a single river.

This was something that Dr. Bowlby brought up a number of times, and I think is actually something that would be well worth some effort, would be a detailed river history and inventory that captures current population numbers, details about restoration, and documents data that is collected, and what those methods are. In order to really help interpret current status, but also to allow people to use as a resource moving forward. I know there is a little bit of work out of Maine that sort of trying to get up at, so something to think about in the future. River herring specific surveys would be of great benefit to the assessment. Some of the best surveys, in terms of how they provided, in terms of how the operated with the power to detect trends, were actually surveys developed for river herring. I guess there is not surprise there. But the dependence on a lot of surveys that were not either timed or developed to collect information on river herring, no doubt increases the amount of variability in those surveys, and then makes them less powerful to detect the trends.

Either tweaks or changes or new surveys to increase variability to understand what is going on with the population would be of great value. The Panel considered most of the other medium and high priority research objectives that were identified in the SAS to be a little bit less important, only because they had a lower likelihood of actually leading to information that would directly inform the management in the next assessment.

That is not to say that they are not important, but this just feels like these, the ones I just presented were the critical issues where we really need

additional work to move the assessment and management of river herring forward over the next decade. TOR 7 was, recommend the timing of future stock assessments.

We simply agreed with the SAS that the update in five years and a benchmark assessment in ten years would be appropriate, given sort of the life history of the species, sort of talking about a couple of generations that would go through by the next benchmark. Hopefully, we've seen some improvement, and things have continued to gather steam, both in terms of restoration, but also in terms of our overall data collection to inform how things are moving, and in which direction.

I just wanted to, as a closing comment. You know one of the things that I had talked about in my fisheries class are the time lags between when things occur and when decisions get made. In the meantime, since we did the review, I've also sat at NE-SSC, and there were just pretty significant cuts to the Atlantic herring fishery that occurred, and I also know that the Atlantic mackerel fishery is facing some challenges.

It's sort of an interesting moment here, in terms of what's going to happen with bycatch. I don't rejoice in any of these things, I think that they are all complicated and challenging. But certainly, working with the relevant PDTs seems like we're right at this moment where these bycatch caps of spatial management could be really rethought, hopefully as we see a return in Atlantic herring in the future.

Then just to point out sort of a concern of mine, and that is that we don't have a lot of forage fish in the Gulf of Maine area, and one of the things that my research, one of my graduate students working on an ecosystem model pointed out, was that sometimes the consumption can actually be a really big source of mortality, and can sort of overwhelm any fisheries-based changes in management.

Just as a concern here that with herring lower, river herring are going to be a more important forage items to many predators. I think we have some challenges coming up over the next decade, and I look forward as a researcher to be involved in those, and hopefully I can be involved in this type of a process moving forward as well. I think that might be it, but next slide. Yes, and I'll pass it back to you. Thank you.

CHAIR FEGLEY: Thank you very much for that presentation. It's a tough one, it's a big one to wrangle, and you guys have done an excellent job. At this point what I'll do is turn to the Board for questions on either the Assessment or the Peer Review, so if you have a question. All right, we'll start with Bill Hyatt.

MR. WILLIAM HYATT: Thank you for a very, very excellent presentation. My question has to do with a statement that was made in what I believe is the Peer Review Report. I might be wrong on that, but I believe it was. It was a statement that the calculated mortality rates don't include all sources of mortality, and that was actually an underestimate.

You know I believe the statement was made because the mortality estimate was based upon assuming Age 5 plus spawners. I would just like you to mention that if you would, go over it a little bit, and if you could, speculate on how big of a potential underestimate that might be, based on what knowledge or information you have. I'm kind of asking this question from the perspective of having some information for southern New England stocks that only about 19 percent of the spawning stock is made up of 5 plus individuals.

DR. CONROY: I'm going to start and then you can jump in. The reason that we looked at only the 5 plus, in terms of calculating mortality is that was the data that we had, because most of our data is from spawning runs. I don't now exactly how we would get the data to include younger years. Go ahead, Katie.

DR. KATIE DREW: Yes, I think the challenge obviously with the catch curve approach is that you need all of your ages to be fully selected when you are sort of trying to figure out how they are disappearing over time. If you have a lot of river herring start maturing at Age 3, Age 4, but the ones that come out back to the river, that is only part of the Age 3s that are actually out there. And only part of the Age 4s that are actually out there.

We can't really include them in the catch curve approach, which is a limitation of this approach, and it's a limitation of our data that we don't have information on those fish when they are out at sea, either as immature or mature fish. It is difficult to track them back to their river systems, but even looking at them, the data sources that we have on the ocean, such as the bycatch and the fishery independent surveys don't age those fish.

We just have length information on them. In addition, you know there is definitely going to be a selectivity effect on that as well. I think that is a limitation on the available data that we have. Moving towards more of a model-based approach that can pull in additional information the way we do with all of our other species, to get an estimate of total mortality would be great.

I don't think we have a way of knowing what the affect of that additional mortality on the stock is, because from river to river it's going to be different. I think the bycatch is not happening equally across all rivers. The stress of returning to that river to spawn, or the predation level in the river, or the environmental affect, or the passage efficiency is different from river to river, and so it is really difficult to say how much additional mortality they are experiencing as young fish compared to kind of what we're measuring on these oldest fish. I think the reference points take into account some mortality on those younger fish, so we don't completely disregard that in the reference points. When we compare these total estimates, we are comparing it to a reference point that assumes some mortality has happened on those younger fish. But that is just a real black box in our understanding of this population,

MR. HYATT: Safe to say there is confidence that it is an underestimate, but no idea whether it is a small underestimate or a large underestimate.

DR. DREW: Right, yes. Again, this is like mortality on those older fish from year to year was, what are the younger fish experiencing? We have no measure of that at all. Are they experiencing, probably they are experiencing more mortality than the older fish, but even just the stress of returning to spawn is probably also a significant source of mortality for the older ones as well, so yes.

CHAIR FEGLEY: I see you, Justin Davis, but I'm going to go to Emerson Hasbrouck online first.

MR. EMERSON C. HASBROUCK: Thank you, Dr, Conroy, and Dr. Jordaan for your presentations, very informative. I have a question, and I'm not sure whether you can answer it, but I'm going to ask it anyhow and see where it goes. How long would it take for a river population of either alewife or blueback, or just combining river herring, to fully respond to habitat improvement, especially dam removal. Maybe the period that it takes the population to respond is just longer than what our recent data is showing.

DR. DREW: I think the issue is that I don't think we know. I mean we could tell you; you know that is what the habitat model would get at if we had like this perfect scenario where there is no fishing mortality, there is no other sources of mortality, you take out a dam, habitat spawning increases, you know recruitment, blah, blah, blah.

You could run those projections and see. But I think we don't understand sort of how much of what is limiting each stock is fishing mortality or bycatch mortality or other factors, predation, climate change, poor recruitment versus how much of it is a lack of access to the habitat? If the majority of

what is holding the stock back is lack of access to spawning habitat.

Then they are going to respond faster than a population that is also being held back by bycatch mortality or some other factor. I think the short answer is, it's going to vary from system to system, depending on how much habitat is available to them now, and all of the other factors that are influencing their current abundance.

DR. CONROY: It is also the influence of change in predation when those dams are taken out.

DR. JORDAAN: Can I add one thing?

CHAIR FEGLEY: Go ahead.

DR. JORDAAN: One thing I just want to comment on, because it came up both during the Peer Review and it just comes up a little bit every now and then is, it's this idea that there is an immediate response by river herring to dam removals, for example. One of the things that I think everyone needs to realize is that very frequently there is not great monitoring of that change.

There is sometimes good monitoring of a passage improvement, but not always. Sometimes there is monitoring of a dam removal in some way. But it's very difficult to get at that question that was just asked in, I think a really quantitative way. I think there is some work that is going to come out over the next few years that will help answer those kinds of timeline responses.

But I think that Dr. Drew's answer was almost spot on that it is going to depend, but that this expectation that it is immediate, that to me is all to suggest that there were river herring that were below the dam that couldn't use the habitat before that are now being granted access. I worry sometimes that those numbers that get sort of given, in terms of the numbers improved of fish that came back immediately after a dam are actually composed a lot of fish that were just never counted before. That is my perspective on that.

CHAIR FEGLEY: Thank you for that. Justin Davis.

DR. JUSTIN DAVIS: This is a question that might drift in the comment territory, but I'll try to keep it as a question. This has to do with the analysis of the habitat model and dams. I think the takeaway there is that on a timescale of centuries, dams are persuasive explanation for why we have lower river herring productivity now than we did, say 300 years ago, before we built all the dams.

But not that over the timescale of say the last 40 years that dams are a persuasive explanation for why we've seen the dramatic declines in river herring runs from say, the 1980s or '90s until now, because we haven't been building new dams. We've been out of the dam building business for a long time. In fact, you know I had my staff pull this information together before the meeting.

Just in Connecticut alone in the last 30 years we've built 66 fish ways and removed 30 dams, so that is just in one state. We've sort of been going the other way, with taking dams out of the picture. I just wanted to clarify that that analysis is taking like a big picture look at what the productivity of our rivers could be, in terms of river herring, but it is not suggesting that dams are really a factor in what we've seen over the last four years with these declines.

DR. CONROY: One thing is that some of the newer information on fishways is showing that the downward travel is very, very important, and if we improve the upward travel then that whole area just becomes a sync. It is possible that some of the older fishways, like before that was well known, may have actually been exacerbating the problems of the dams. But yes, I agree with most of what you said.

CHAIR FEGLEY: Dan McKiernan.

DR. JORDAAN: Can I just jump in really quickly in response to Justin's comment?

CHAIR FEGLEY: One hundred percent.

DR. JORDAAN: I think one of the advantages to the habitat model is not telling us something that we already knew, which I think you just nailed really well. But in fact, the idea that it can be a tool to understand how things are progressing. I think Dr. Conroy just pointed out one of those issues, which would be the downstream passage.

But also, as information that that is able to be brought in, for example that provides for different water quality, accessed for different habitat qualities, and then allows you to really build a model that is actually much more like the system. Then you get to a place where you start out being able to ask questions about what will provide positive outcome. Is it downstream passage? Is it reduced at-sea mortality? I think it's a tool that has a lot of validity moving forward, notwithstanding I think your comment was spot on.

CHAIR FEGLEY: Okay, to Dan McKiernan

MR. DANIEL McKIERNAN: I am curious to know if the elevated total mortality, the Z scores, have gotten worse in recent years, and whether that could be related to predation, and not necessarily attributable to commercial fisheries bycatch. That is an interesting question I think we all would like to know. But given what we are all expecting over the next five years or so, which is s vastly diminished sea herring and mackerel fishery, I guess I don't know where we go.

I mean some of the recommendations about extra sea sampling. I'm not sure the fleet is going to be there. As I was listening to the presentation, I heard there was a lot of implications of commercial fisheries bycatch, and then Adrian, the last thing you said was, there are not many forage species left. I guess what I'm hearing is you are sort of implying that this could elevate total mortality on river herring at sea. Can you comment on that?

DR. JORDAAN: In some ways I think I should have not included that last slide, but I thought it was important for context, because here we are. I think you've identified exactly what is going to happen, the future, in the next couple of years here with, I think both mackerel and Atlantic herring. I think those are going to be much diminished fisheries, especially Atlantic herring.

Our work on this, and this is the ideas of this paper on the contrasting fisheries, reduction and habitat improvement. I probably did not quite get in the title properly, but it essentially showed that if you do fisheries regulations that reduce fish catch, you actually also reduce the catch of some of the predators, and the result is that essentially you don't see any change in the river herring population. Now, it's a model. It's an ecosystem model with huge assumptions around consumption and productivity.

But I think that that paper pointed out the fact that habitat improvement is the sole way, or increasing the amount of habitat is the sole way to really improve these runs of herring, when compared to these sorts of fisheries management of passageway because of this predation pressure. I feel like it is an important thing to bring up now, so we don't get five years down the road, and everybody is wondering why bycatch reductions haven't reduced at-sea morality. I would worry much more about the overall populations of these species that we have currently available, and worry about there not going to be sufficient moving forward to be partitioned around everyone who needs them. I always called them the hot dogs of the sea. I know a lot of people don't like hot dogs, but I mean they just are eaten by almost everything, and I think that is one of the challenges, it's their role, and I think it's a big challenge for their management. I don't envy making management decisions around a stock that also remains fairly data poor.

DR. CONROY: Just one addition. We did show the estimates by river in the assessment if you want to look it up. If they varied a lot, like whether the mortality is getting worse or better, it varies a lot by

river. If there is a particular river that you want to see, you can look that up.

CHAIR FEGLEY: Okay, Jeff Kaelin.

MR. JEFF KAELIN: Thanks for the presentations, I've kind of been bouncing back and forth between the slides that were shown earlier by Dr. Conroy and some of the language in the Peer Review Report. In the Peer Review Report, on Page 4, and also repeated in the Terms of Reference 6 slide that we just saw.

It says probably the most important aspect of incidental catch is that it has become the highest individual source of fishing mortality on river herring. But if we look at the Figure 1, the total removals in your slides, which is on Page 10 of the written document, it doesn't look that way, and in fact I think you had another slide that blew up the scale, so you could really see the comparison between bycatch and mortality of river herring that followed, which we don't have in the written document.

My question, so I don't think it's accurate to say that most of the mortality is bycatch mortality, because my understanding is that there are several rivers that are under sustainable fisheries plan, certainly in Maine that's the case. I think Maine's directed mortality is a couple million pounds of fish coming out of sustainable. Yes, there you go. Out of sustainable runs.

You know what is missing, I think, in the way this data is being displayed is, we don't have any idea. We can't identify, I can't identify anyway, which river systems are under management through the sustainable fisheries plan approach that we've taken at the Commission, the other approach being the black box approach, and New Jersey is guilty of that.

We don't have any rivers that we're looking at. But I think it would be really important to try, so this shows me right here that in fact incidental catch is not the majority of the mortality of river herring, that directed landings are greater. What I can't determine is how much of those directed landings are coming from river systems that are under sustainable fishery's plans? We don't know that and I hope it's a big number, so that is my first question.

DR. DREW: Yes, all the directed landings, so what's in yellow on these pages are coming from states that have sustainable fishery management plans. A lot of this data we can't actually show river by river, especially from Maine, because it is confidential. But I would say, I think maybe the issue, and I don't want to speak for the Review Panel, but speaking for the Stock Assessment. I think the issue is more that in some rivers the bycatch is maybe more than. We have rivers that are closed, but we know that those rivers are still vulnerable to bycatch from some of the snapshots of genetic data that we have. Meanwhile, we have other rivers that continue to have a fishery, and are contributing, are influenced less by the bycatch, again, based on the genetic snapshots that we have. We could go through maybe and show, in the giant table of results we could maybe try to compare rivers that are flagged, which rivers are under sustainable fishery management plans and which are not.

How does that relate to the trends that we're seeing? But it's difficult to then, we can't parse bycatch back to specific rivers, we have some snapshots in time of where the majority of the bycatch was coming from at kind of a regional level. While we can definitely partition the commercial directed data back to specific states and rivers, that is more difficult to show because of confidentiality.

MR. KAELIN: There you go. It looks like the sustainable fishery plan program is working then, and it should be maybe an incentive for other states to go down that road, if we really want to bring some of these stocks back. On the forage concern issue, yes, we just saw yesterday, 86 percent caught in the herring quota in one year, but 2500 metric tons of herring available to the entire U.S. fleet to take, so no, there is no herring fishing and mackerel is rebuilding.

But according to our projections on Atlantic menhaden, there are 4.5 million metric tons of Atlantic menhaden out there. I don't know if river herring eats menhaden, they probably eat menhaden possibly when they're inshore, so I just wanted to point out that there is certainly a lot of menhaden out there, there is a lot of butterfish out there.

Again, I don't know what is in the river herring diet, but it's an interesting concept to say that because herring and mackerel are going to go down, we can expect greater mortality on river herring. It's an interesting concept. These legacy rivers that with the research recommendations suggest that we identify.

Wouldn't those be the rivers that are under the Sustainable Fisheries Plans? Couldn't we identify them more specifically that we're able to? You mentioned the issue of confidentiality, I'm looking at the table that shows, it's the one that has the little box with Maine, with all the red confidentiality. I don't know which one of these documents that's in.

My question about that is, there are a lot of fish that are being managed up there. What is it about those river systems that just show a little box with a whole lot of red in it, which doesn't allow us to really unpack the value of these SSP rivers that are under management. What is it, Katie that requires confidentiality? I mean a lot of them are managed by towns. Some of them are owned by individuals because that is really unfortunate. If we can't really see what the value of the legacy river is, if the data coming out of there is confidential.

That's my last question, I'm going to stop there. But there are a lot of pieces that don't really fit here. To incentivize states to develop those plans and put the resources in them, it would be nice to be able to see how well they are working, you know, get some kind of feedback. But apparently the confidentiality requirements will never allow that to happen, possibly. I'll stop there, that is my question, thank you.

DR. DREW: For Maine, I'll defer to Maine. I think in a lot of these cases the issue is that there is only one harvester on these rivers, and so if we go down to the river levels, then those landings and the biological information associated with those landings is considered confidential, and so we can't display that publicly.

MR. KAELIN: Yes, I get that. I was looking for my last point. You know a lot more about this, Pat, than I do. But why couldn't we have NDAs developed, so that those harvesters could agree to allow that information to be made publicly available, because it demonstrates the value of setting aside those rivers and managing them? This was Jeff Pierce's comment in his letter to us. Otherwise, we're just stuck in this situation. Maybe NDAs could be used, we're using them in the squid fishery and so forth, so just a suggestion. That might be one way to get around it.

DR. DREW: I mean obviously, ASMFC defers to the states. We follow the states rules about confidentiality in that respect. You know, if Maine wanted to pursue that we would certainly be wiling to be bound by whatever you would like on that front. But that is really a state issue.

MR. KAELIN: Kind of suggestion to Pat, I don't know if that is reasonable or not.

CHAIR FEGLEY: Okay, so Pat, do you want to follow up on that, and then Doug, I'll go over to you.

MR. PATRICK C. KELIHER: Just very quickly, Madam Chair. I think it's important to point out that while the information may not be public, right, we're still utilizing that information. We understand what the Zs are within all of these systems, and the benefit of the runs, how they're growing. I just want to correct one thing. They are not owned by any individual. These are municipal fisheries that still fall under the state of Maine's management prerogative.

They still have to have their harvest plans approved by DMR before they can proceed with fishing. As you know, Jeff, we've got very strict, well we all

have the same, basically with confidentiality laws the rule of three applies. Whether we've got an NDA, a Non-Disclosure Agreement or allow them to disclose it. We couldn't force them to do that. I think at the end of the day, and I was going to say this earlier, Madam Chair, as far as these.

We're seeing very different responses up and down the coast. Look at Dr. Davis's comment earlier about how much work is happening in Connecticut and what you're seeing for responses versus what we're seeing for responses in northern New England and Maine. We've got high Zs, we had 7 million fish in Benton.

Right and to Mike Brown's comment to me as we were preparing for this meeting goes, Z that, baby, right, 7 million fish. It's made up of, it's a young run. Anyway, I'll stop there, but I think I'm comfortable with the approach that we're taking, only because the information is going into the assessments. Yes, it is protected by confidentiality, but it is a key bit of information that is used to assess the runs.

CHAIR FEGLEY: Great, thank you. Doug Grout.

DR. JORDAAN: Can I follow up with one small comment?

CHAIR FEGLEY: Sure, quickly.

DR. JORDAAN: Thank you, Madam Chair. This is really about the comment about the majority of bycatch or majority of mortality coming from bycatch of that its fishing mortality, and that is because the orange bars currently are really only from Maine, and so it's really a geographic outlook, and not as specific in terms of actual numbers.

Acknowledging however, that those bycatch numbers that are being offered there are certain to be underestimates. I think that we recognize that Maine is a bit of its own story here, living with a high Z and very productive, whereas other places don't have that directed harvest that are still subject to the discard mortality.

CHAIR FEGLEY: Okay, Doug Grout.

MR. DOUGLAS E. GROUT: Just a question. When did the NEFOP program begin? Was it the late eighties early nineties? Really, we just have no idea prior to that what any bycatch was. I know we had a lot more small mesh fisheries back then, so it potentially could have been even higher back in some of the earlier years. Is that correct?

DR. DREW: Yes. The NEFOP Program, the estimates start in 1989 for the gillnets and the otter trawls, but the small mesh midwater trawls are not really considered reliable until 2005, where they make the changes to how they do high volume fishery samples. Yes, the coverage was much lower, and the CDs under the estimates are much higher, and did not exist prior to really 1989, so for sure.

CHAIR FEGLEY: I hate to do it, but I had one question, and maybe it's a spot question for later, or maybe if it is worthwhile we can hear about it at our next meeting. But I am intrigued by the idea of the Sentinel River, and I'm trying to understand if you could help us understand, how to best pick those rivers. What do they do? Which ones would be worth throwing our research into. If you could answer it really quickly that's great. Otherwise, maybe we can table that until later.

DR. DREW: I think that was specifically a Peer Review Panel recommendation, so the TC and SAS have not really fully thought about it. We were just like, increase monitoring everywhere. But they had the more targeted idea, so maybe I would defer to Adrian on that question.

DR. JORDAAN: That is such a good question, Madam Chair. You know I would probably defer to the states who have the best knowledge. I mean I could pick my like five favorite runs from the northern part of the range. But I think that it would be really much more probably effective to work

through the state agencies responsible for managing those populations.

I think that going back to some comments earlier, it would be really nice if some of those were also harvested runs with whatever agreements needed to be put in place, and then really geographic spread. I think that is one of the things if you look at the maps earlier on, are really lacking some of that, especially in the southern part of the range. It would be nice to have, I mean I don't know what the magic number is, two per state, three per state, that had a little bit of dedicated effort. I would really want the states, I think, to weigh in on which ones of their runs are most likely to be able to be worked in that kind of way. It's not every system and it is certainly not every location. I think it would need some local knowledge.

CHAIR FEGLEY: Okay, Justin.

DR. DAVIS: I appreciate the second bite at the apple, given the late hour. I just wanted to put the idea out there that from my perspective, I'm a little concerned with the idea that I think has sort of been floated around in various discussions around this, that because of what is happening in the Atlantic herring and mackerel fisheries, for the unfortunate reality there that bycatch is sort of something we don't have to worry about anymore, and those fisheries are generally for river herring.

Certainly, there is going to be less directed effort in those fisheries, but those are not the only fisheries that river herring bycatch occurs in. For instance, I think there is a fair amount of bycatch in the small mesh bottom trawl fishery. Even if in recent years levels of bycatch in aggregate have been something like 750,000 fish annually, I think was the number I saw.

There is good reason to believe from genetic evidence for just how the fishery is performing that that bycatch is disproportionately concentrated in space and time in such a way that it is impacting southern New England runs. Our runs in Connecticut, most of them now are not even measured in the thousands of fish, it's hundreds of fish.

Even a couple hundred thousand fish being removed that are from Connecticut origin runs is not an insignificant impact. I think we just need to continue to pay attention to the bycatch issue. I appreciated the sort of mentions throughout the stock assessment in the presentation today about the importance of needing to continue to work on that issue.

CHAIR FEGLEY: Eric Reid.

MR. ERIC REID: There was a lot of discussion about at-sea mortality and a lack of monitoring. Do any of you know why there is a lack of monitoring?

DR. DREW: Part of it is COVID, part of it is budget restrictions, part of it is, these are fisheries that there is not a lot of effort directed towards them anymore, and so the total amount of effort, of trips available to be sampled is lower in the herring and mackerel fleet going forward.

MR. REID: Okay, I agree with that. But the other part of that is, the way some of these bycatch caps are measured is from X amount of trips over X amount of time. The fleet itself that prosecutes the directed fishery wants observer coverage. Nobody is trying to avoid observer coverage, because in some cases we are working on X amount of trips, I think it's 5. Is it 5 or it's 3? I think it's 5, some odd number. They go back in time more than a year because we can't get observers to observe current trips, to analyze what is happening now as opposed to what has happened. You know that effect will linger, even though now. There has been really no directed fishery in southern New England for herring in a few years. We're still working on very old data, and if we went out and never caught a herring, we would still be under the rule of 5 trips over X amount of time to calculate what that is. That is a real concern to us, because we want to carry observers. There are certain areas in the directed herring fishery, I can't remember if it's

Area 3 or 1B, that you cannot go fishing unless you have an observer onboard, and those areas are pretty lightly fished, because they won't give us observers.

I just want to be very clear that the industry itself that is in this fishery really wants to have observer coverage to do the right thing, do the right calculations. But we can't get them, so don't think we're avoiding observers in any way, shape or form. I agree with your answer, but the other answer is, I don't know why we can't get them. That's another question I can't answer. My 50 percent probability of having a question I can't answer. Anyway, thank you.

CHAIR FEGLEY: Thank you for that, Eric Reid, and Jeff Kaelin, can you make it quick?

MR. KAELIN: Yes, just quickly. I appreciate Eric bringing this up, because we've actually asked the Science Center to allocate the small number of days in the midwater trawl fleet, for example, and it's a small number of days, because there is not a lot of discards, right that's what drives it. But the flexibility has been removed from the SPRM program by the Oceana law suit, and we're being told by the Science Center, well, they don't have the flexibility to put the days where we need them, basically, you know the spring time for example.

That is a problem we just haven't been able to resolve. Cheri knows, as the Chair of the Herring Committee that we brought this up. We talked to the Science Center, but there just doesn't seem to be a lot of flexibility left to allocate those days in that way, which is really a conundrum. Because if we had those observed days, we would be able to observe clean trips.

There are clean trips, and balance out the factors that lead to closures, and there have been closures in herring and mackerel as a result. We have trouble allocating the days for time and areas where they should be on the boats. As Eric said, we haven't caught any herring in southern New England for a long time.

CHAIR FEGLEY: Thank you, Jeff, I really appreciate that conversation. Okay, so I know we have one member of the public online, and I think what I would like to ask Ms. Evans, and it's because of the late hour, if you wouldn't mind reaching out to staff with your question on e-mail. I think that would really help us. We still have a couple things we need to take care of here, and it's getting late.

CONSIDER THE ACCEPTANCE OF THE BENCHMARK STOCK ASSESSMENT AND PEER REVIEW REPORT FOR MANAGEMENT USE

CHAIR FEGLEY: Moving on, our next agenda item is to Consider the Acceptance of the Benchmark Stock Assessment and Peer Review Report for Management Use. For this I would need a motion. I think John Clark.

MR. JOHN CLARK: I would be glad to make a motion, Madam Chair, oh there we go. **Move to accept the 2024 River Herring Benchmark Stock Assessment and Peer Review Report for management use.**

CHAIR FEGLEY: I have a second from Cheri Patterson. Is there any discussion on the motion? All right, any public comment on the motion? **Is there any objection to the motion? Excellent, so thank you all very much for your great work that has been accepted**, and we'll move on to the last bullet, which is to Consider Management Response if Necessary. I will defer that to the Board, I am not under the impression that there is a desire to take management action based on this, but if somebody wants to say otherwise, please do.

Okay, we have a new stock assessment, we are not currently taking management, and a lot to think about, I will say.

OTHER BUSINESS

CHAIR FEGLEY: Okay, finally, we are at Other Business. Any other business to come before the Board?

ADJOURNMENT

CHAIR FEGLEY: I'm going to have to beg for this one, a motion to adjourn. All right, meeting adjourned, thank you, everyone.

(Whereupon the meeting adjourned at 5:53 p.m. on Wednesday, August 7, 2024)