

**PROCEEDINGS OF THE  
ATLANTIC STATES MARINE FISHERIES COMMISSION  
SHAD AND RIVER HERRING MANAGEMENT BOARD**

**The Crowne Plaza Hotel Old Town  
Alexandria, Virginia  
August 16, 2007**

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2. **Approval of Proceedings of January 31, 2007, by Consent** (Page 1)
3. **Motion to accept both the stock assessment and the peer review** (Page 19). Motion by Patten White; Second by Pat Augustine; Motion carried. (Page 19).
4. **Motion to proceed immediately with an amendment to do Option 1**, a moratorium on the harvest, possession, and landing of river herring from state waters, coastal and in-river, and no landings of river herring from federal waters permitted (Page 24). Motion by Louis Daniel; Second by Mark Gibson; Motion carried (Page 26).

## ATTENDANCE

### Board Members

|   |   |
|---|---|
| George Lapointe, ME (AA)                        | Roy Miller, DE, proxy for P. Emory (AA)             |
| Patten White, ME (GA)                           | Bernie Pankowski, DE, proxy for Sen. Venables (LA)  |
| Doug Grout, proxy for Nelson (AA)               | Tom O'Connell, MD, proxy for Howard King (AA)       |
| Rep. Dennis Abbott, NH (LA)                     | Russell Dize, MD, proxy for Sen. Colburn (LA)       |
| Paul Diodati (AA), Chair                        | A.C. Carpenter, PRFC                                |
| William Adler, MA (GA)                          | Jack Travelstead, VA, proxy for Steve Bowman (AA)   |
| Vito Calomo, MA, proxy for Rep. Verga (LA)      | Catherine Davenport, VA (GA)                        |
| Mark Gibson, RI (AA)                            | Kelly Place, VA, proxy for Sen. Chichester (LA)     |
| Eric Smith, CT (AA)                             | Louis Daniel, NC (AA)                               |
| Dr. Lance Stewart, CT (GA)                      | Jimmy Johnson, NC, proxy for Rep. Wainwright (LA)   |
| Steve Heins, NY, proxy for Gerald Barnhart (AA) | John Frampton, SC (AA)                              |
| Pat Augustine, NY (GA)                          | Robert Boyles, SC (LA)                              |
| Brian Culhane, NY, proxy for Sen. Johnson (LA)  | Malcolm Rhodes, SC (GA)                             |
| Erling Berg, NJ (GA)                            | Spud Woodward, GA, proxy for Susan Shipman (AA)     |
| Tom McCloy, NJ, proxy for David Chanda (AA)     | Gil McRae, FL (AA)                                  |
| Dick Herb, NJ, proxy for Asm. Fisher            | Frank Montelione, FL, proxy for Rep. Needleman (LA) |
| Frank Cozzo, PA, proxy for Rep. Schroder (LA)   | Steve Meyers, NMFS                                  |
| Eugene Kray, PA (GA)                            | Wilson Laney, USFWS                                 |
| Leroy Young, PA, proxy for Douglas Austen (AA)  |   |

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

### Ex-Officio Members

Michael Hendricks  
Andy Kahnle  
Capt. Sharon Brannock

### Staff

Vince O'Shea  
Robert Beal

Erika Robbins  
Toni Kerns

### Guests

Bob Sadzinski, MD DNR  
Jon Siemien, DC Fish & Wildlife  
Jeff Bridi, PA FBC  
Jim Cummins, Interstate Comm. On Potomac  
John Berry, DE River Shad Fishermen's Assn.  
Ron Marks, DE River Shad Fishermen's Assn.

Dale Weinrick, MD DNR  
Bill McWha, DFL  
Karin Limburg, SUNY ESF  
Marvin Harley  
Bill Sharp, FLWC  
Gordon Leisch

The Shad and River Herring Management Board of the Atlantic States Marine Fisheries Commission convened in the Presidential Ballroom of the Crowne Plaza Hotel Old Town, Alexandria, Virginia, August 16, 2007, and was called to order at 8:00 o'clock a.m. by Chairman Eugene Kray

### **CALL TO ORDER**

CHAIRMAN EUGENE J. KRAY: Good morning. Welcome to the meeting of the Shad and River Herring Management Board. My name is Gene Kray. I am from Pennsylvania. To my immediate right is Erika Robbins, the fishery management plan coordinator. Then we have Andy Kahnle, who is going to be giving us the stock assessment. Next to him is Mike Hendricks, who is chair of our technical committee, my fellow Pennsylvanian. Next to him is Dr. Karin Limburg, who is going to give us the peer review of the stock assessment.

To begin with – he is not here yet – I want to thank Paul Diodati for filling in for me in January when I was out of town. I want to advise you that this is either my last or my next to last meeting as your chair. Paul already know this, but if we have an October meeting – depending on what happens today, if we have an October meeting, I will still chair that meeting. If not, Paul will be taking over in 2008.

### **APPROVAL OF AGENDA**

I will ask for are there any corrections or additions to the agenda. Seeing none, the agenda stands as printed.

### **APPROVAL OF PROCEEDINGS**

Can I hear a motion to accept the proceedings from January 31?

MR. WILLIAM A. ADLER: So move.

CHAIRMAN KRAY: Without objection, I accept that.

### **PUBLIC COMMENT**

How many do we have in the public for public comment? Please raise your hand. All right, John, who is going to kick off, you. Please state your name and the organization you represent, and be brief.

MR. WILLIAM MCWHA: My name is Bill McWha from Suffield, Connecticut. I represent myself. For a number of years, I was a volunteer on the Connecticut River's Atlantic Salmon Restoration Program. It was there I learned about the difficulties

shad passage everywhere on the East Coast. I don't think there is any place on the East Coast where shad can effectively get over a dam.

I passed down a folder. A number of you may have it. It's rough drawings, simple drawings of my ideas for a shad ladder. It's an inflatable dam. The fish can swim into a trough. The dam will inflate behind them. They can school together. It can be as wide as you would want it to be. It could be a hundred feet wide; it could be 40 feet wide; it could be 20 feet wide. It could be a hundred feet long.

It works especially well at a low-head dam. The fish, like I said, can school, and up and over the dam they would go as the trough would fill. I've had two types of bladders. The first one on the first page is a Bridgestone Rubber Bladder. The other one is an Obermeyer Crest Gate. Also, further in the presentation I have two drawings of a vertical slot fish ladder on the Easton Dam – I mean, on the Lehigh River. It's the Easton Dam.

Many of you know that shad will get lost in a vertical slot ladder. They will get into it; they will get into a corner; they will get into a 180 turn; and they will just sit there. My idea is to shorten and make a vertical slot ladder somewhat of a hybrid ladder; shorten the trip through the ladder for the upstream passage; and then allow the vertical slot to do its job for the downstream passage.

Again, I'm using an Obermeyer Hinged Gate to fill the ladder and essentially turn it into a fish lock, something like a St. Stephen's Fish Lock down on the Santee River in South Carolina. The last picture in the presentation – I should have marked it – is the Fairmount Dam in Philadelphia, which the Army Corps of Engineers is going to spend three or four million dollars to fix that fish ladder.

My idea there is to put in some Obermeyer Gates in the upper corner of the dam and pass fish over the dam that way. One Obermeyer Gate is around 12-foot high/16-foot wide Obermeyer Gate. It runs about \$160,000, plus installation, of course. I know everyone would like to have a fish ladder that doesn't move; that doesn't have any moving parts; that doesn't require any maintenance or anyone to run it.

I don't think that ladder exists, so I think you have to do something different for fish passage, and these are my ideas. I am looking for, from this committee, support. I've presented this idea to Alex Haro at the Conte Lab and a number of other people. Alex would like to research the idea except he is having trouble getting agency support. What I'm looking for

from this committee is support from you people in trying to change shad passage on the East Coast. Thank you.

CHAIRMAN KRAY: Thank you, Bill. John.

MR. JOHN BERRY: John Berry from the Delaware River Shad Fishermen's Association. We're presenting and we hope you've all received a copy of our suggested Delaware River Shad Restoration Plan. I'm not going to go into any of the details of the plan. There are 13 individual recommendations that we're making to the Pennsylvania Federation of Sportsmen's Clubs. We're told that probably at their spring meeting they will be approved for the Delaware River.

The reason we're bringing that suggested plan here for your review and examination is because we feel it can be a blueprint for all the natal rivers that are suffering very seriously declining American shad, hickory shad, and river herring stocks. That's why this board has been convened.

We hope that this organization will join us in recommending to the member states of the Fisheries Commission that they implement programs with goals for self-sustaining spawning shad populations, to hold them accountable to programs that will ensure the continuation of these species. We thank you for the opportunity to have this public input.

CHAIRMAN KRAY: Thank you, John. Any other public comment? Okay, we'll move right along to the Shad Stock Assessment. Erika.

### **SHAD STOCK ASSESSMENT**

MS. ERIKA ROBBINS: Before we begin with the stock assessment, there is one copy of the assessment available on the back table in a large folder. We ask that if you'd like to look at it, please leave it at the table so everyone else has access to it. It will be available online. The document is 1,200 pages, so we did not make copies for everyone.

CHAIRMAN KRAY: All right, Andy, now it's your turn.

MR. ANDREW KAHNLE: Good morning, all. I am very happy to finally be here to present this shad assessment. What I am going to do this morning is briefly touch the high points of the assessment and summarize some of our recommendations. Before I start, I should go over a little bit of the issues that we faced and the approach that we took.

Unlike most other ASMFC assessments, we decided to do this one on a stock level. We looked at or had information on over 60 stocks coastwide and ended up assessing 31, I believe, having sufficient data to look at 31 separate stocks. We decided to work on separate stocks because there are dramatic differences in habitat coastwide. Some rivers are dammed; some are not; some are tidal the entire spawning reach; some are not.

The fisheries operate very differently among the stocks. The data that we have available is very different. There is a change in the biology of the animal from north to south. The shad stocks that we worked on were in rivers from Maine to Florida. Shad is a little unique, similar to river herring, as you'll see in a couple of years. These animals spend most of their time in the ocean, but they migrate very far inland to spawn.

So, data are collected by a whole host of government agencies, universities, power company folks, folks that commonly don't work well together, many of whom have not worked with ASMFC in the past. So, we spent a tremendous amount of time, as you know, trying to get the data together. We regionalized this assessment; we held data workshops, where we worked with all of the data producers, trying to understand what the data should be used for and making sure that our assessments did not go beyond what the data allowed.

We spent almost all of our time through data workshops trying to get the information together and computerized. We then held regional assessment workshops in which we included the data producers to make sure that we weren't straying from the data. When we produced reports, we made sure that the data producers were comfortable with what we said. So the whole process has been very open and very transparent.

There were some difficulties. As with most species, there are aging controversies. Ages are mostly done with scales or otoliths. Scaling aging has been verified in one stock, and a recent workshop suggested that another stock was very difficult to age. There were data gaps. There were very few stocks that had sufficient information to use the standard assessment models that we're used to using in coastal situations.

Finally, there are a host of mortality factors that affect American shad, and at this point we don't know how to partition those into various parts. So, we took a very simple approach in this assessment. We used landings to provide a historical perspective,

indices, fish passage numbers, age-length data. We calculated total mortality or  $Z$  from catch-curve analyses, and we used very simple models to set benchmark mortality values to compare with current values of  $Z$ .

A quick look at landings for a perspective. This is broken down into regions. All of them show the pattern that you see with many anadromous stocks, huge harvests in the late 1800s and early 1900s, stock harvest perhaps rebounding slightly never achieving those high values at the turn of the century. There are some differences here, regional differences.

New York/Connecticut in the upper right and Maryland/North Carolina, lower left, spiked early and never really recovered. Harvest has been very low compared to the historical harvest at the turn of the century. All of these, if you look, in the mid-eighties there's a small bump in harvest. It looks like there was some production of shad coastwide. We all took advantage of it. Stocks and harvest declined after that.

We just closed the ocean fishery in 2005. This slide gives you just a relative picture of natal harvest versus the ocean harvest. North Carolina to Florida, the natal harvest predominated and continued to predominate through the present. Virginia to Maine, the natal harvest just dropped off, and the ocean harvest took over. This is another way of looking at it. The yellow line is the ocean or mixed stock harvest, and that just continued to climb for a while, and it eventually dropped off as regulations came into place and the stocks declined.

We set some target or benchmark mortality rates, total mortality rates. Looking at this table, we did it by region first, because there were differences in biology and data inputs among the regions. We only worked from North Carolina north to set these benchmark values. Stocks from North Carolina north spawn more than once, and we were able to develop these estimates. Stocks to the south spawn only once, and we couldn't use the simple modeling approach that we took on the southern stock to set benchmarks.

Looking at this table, the  $Z_{30}$  is our target or benchmark value. It's the one that we developed in the assessment, and it's defined as that level of mortality, total mortality, that produces a biomass of spawning stock; that is, 30 percent of that you would get from a stock that was not fished. At the peer review there were some changes suggested in our calculations, and so that led to the right two columns, T-1 and T-2.

They are a Type I fishery and a Type II fishery. A Type I fishery is where harvest occurs and natural mortality occur at different times of the year. Type II is when they both occur throughout the year. Shad really fit in between, and so we developed two estimates for benchmark values to bracket what were probably realistic. The revised values are much higher.

Let's take a look at some regional highlights. New England rivers, most of these rivers are dammed, high gradient. Dams, especially in the northern rivers, are very close to the mouth. Very little spawning occurs below the dams, and so passage is an issue. Almost all of these stocks have very limited recreational harvest, and they are considered to be under restoration; that is, many of them are maintained with stocking of larvae and stocking of adults.

This slide shows available passage information we have for some of the New England rivers. Passage is not always an indication of stock abundance because you never know or we do not yet know what proportion of fish that reach the dam actually go up over the dam. We think the Saco comes the closest to reflecting what abundance of fish that get to the dam, but none of them can be dependent, and so they're just a general picture of what is going on.

The interesting thing on this slide is that all of them show an increase and then a decrease, and a recent decrease, so throughout New England there has been a decline in passage. Also, the total mortality estimates were at target for the New England stocks. The one exception was the Connecticut River stock. Clearly, there is a problem here. Mortality has been about – oh, there is a horizontal line on this graph. There is a dotted one in red and a green one.

The dotted one was the benchmark value we produced in our assessment. The green is the revised value. The fluctuating line above it is the total mortality values. Clearly, the Connecticut stock has been above the target value for a while and mortality is increasing. This has led to changes in size, reductions in repeat spawning, and perhaps in abundance.

I think it's pretty clear, based on historical records and the timing of dam construction, that all New England stocks are very well below potential, based on historical context. All of them have had recent passage declines. All of them have fish passage problems, both upriver and downriver. We focused on the upriver because we need to have fish present at dams in order to justify passage facilities, and

ignored downriver to some degree to the present, but downriver is just as important as upriver passage for adults.

Most of the northern stocks are designed and have evolved to spawn more than once. They spawn several times over their life. If you put them up over a dam and don't let them get back down alive, suddenly they become a stock that spawns once instead of several times, and that is an issue for most of the dams.

No obvious problems with juvenile production. The one high point is that Kennebec juveniles increased starting in '99. That's the year that the Edwards Dam was taken out, increasing spawning habitat some 70 kilometers in that river. Well, at the same time, there was an increase in fry stocking, so it's not clear which caused the increase in juvenile production, probably both. And, finally, excessive and increasing Connecticut River mortality.

Hudson/Delaware, we have some pretty good spawning stock indices for both of these stocks. Both stocks are declining in abundance; the Hudson earlier than the Delaware, but they're both on their way down and have been for at least the last ten years. The Hudson stock decline started about the time that Hudson mortality went up. It's currently well above the target values. Clearly, both stocks are well below their potential abundance.

Adult abundance is declining. For the Hudson, certainly, high mortality rates; decreasing size and age structure; and over the last several years, there has been a decline in juvenile production. The last four are the lowest we've had the time series since 1984. In the Delaware, it looks like there is an expansion of spawning downriver from the historical spawning as water quality improved around Philadelphia. There appears to be stable juvenile production.

The Chesapeake Bay, I'll provide just a highlight of some of the spawning stock indices that we have. The Susquehanna River, we have both lift data – and these are lifts per day – and a catch-per-unit-effort in the fishery below the dam; a decline in the last few years. That seems to be occurring in both hatchery-produced and wild fish. The Susquehanna has a huge stocking program that's been in place for probably 30 years and is a major factor in adult production.

The Potomac River is one highlight. All the indices we have are going up. The white graph down in the lower right, we have three bits of information. On the left, that bouncy line on the left is information

from earlier studies in the fifties when we were able to create catch effort in the pound net based on reported catch and reported effort. That produced an average that we call a benchmark.

Then, the next batch, right in the middle, just above the 1980, is catch effort values from reported information. Then the right is catch effort values from more recent reported information from the pound net. It looks like the Potomac is definitely increasing, but it is nowhere near the level it was during the 1950s. This assessment ended in '85 or the data ended in '85. If we extended that top graph a couple of more years, it would be going down.

The same sort of information for the York, James and Rappahannock, these are all gillnet catch effort. On the York River we have log data for the fifties, information from logs in the eighties, and current information from fishermen who are hired to sample for the state. The York River has gone up in abundance since the eighties. It is nowhere near where it was in the sixties. In the last few years abundance has been declining.

The James River stayed about the same, but the James River is almost entirely maintained by stocking. The Rappahannock River has increased since the eighties. We do not have information from the fifties for comparison here. The total mortality for most of these stocks is high and above target, especially in the Virginia stocks.

Juvenile abundance, Maryland values are going up, the Potomac is going up, Upper Bay, and Nanticoke are all increasing in the last few years. They're highly variable, but they are increasing. Virginia, fluctuations at low levels and no trend. I think, again, we can say stocks are well below potential. The Maryland rivers, we've had an increase and a decrease in the Susquehanna. The smaller stocks are at very low levels, and many of them are being maintained by stocking. JI's are increasing, high total mortality.

The Potomac River is a success story. Both the JI's and the adults are increasing, and the total mortality is declining. Virginia rivers, the adults are increasing except for the York where they are declining a bit. All of them are below the fifties level; that should be the fifties and not the seventies. JI's are low; Z's are high, but declining. We feel that recovery is being affected by continued removals and discards.

The southern rivers, most of the southern rivers have some sort of commercial harvest continuing. I put this up only to point out that in a couple of the rivers,



like the Neuse and the Cape Fear, you see this fluctuation of harvest; and it turns out that if you look at the catch effort indices that we have, just before each of these spikes in harvest, there is a spike in catch effort or abundance. Effort then goes up; harvest goes up; and then it's followed by a decline.

So it looks like fishermen are focusing on the stock; and when the stock goes up, they hone in on it, knock it back down, and then reduce their effort. We only have one good set of indices for North Carolina. The Albemarle indices are increasing. The rest of the rivers, no increase, no change, anyway. Total mortality estimates for the southern rivers are at target or bouncing around the benchmark value.

Conclusions: Albemarle Sound is the only system in North Carolina that we have good, historical information, and the current harvest is very low compared to historical harvest, suggesting that stocks are low. There has been a recent increase in abundance and the mortality levels are at target. The other rivers, we have very little information about historical harvest, and so we don't know where they sit relative to what they could have been.

No trends in any of the adults, and the mortality levels are bouncing around the target value. One river of interest here, again, is the Neuse where catch effort spikes followed by effort and harvest and then a decline.

The South Carolina rivers, harvest continues and the y-axis is correct. These are in thousands of kilograms. If you look at the upper right, the Combahee and Edisto rivers, the harvest is miniscule in these rivers, and it has been very low in the last few years. The only river where there has been an increase has been in the Santee-Cooper Complex, mostly the Santee, following the re-diversion.

Re-diversion doesn't mean anything to most of you. The Santee and the Cooper River, at one time, water was diverted from the Santee to the Cooper; and back in the early eighties, water was re-diverted back to the Santee so it finally had a good flow; and since then, stocks have rebounded. The only positive sign we see in the South Carolina stocks has been the Winyah Bay Complex.

Both the Complex and the major tributaries, there has been a slight increase. We know nothing about the rest of the tributaries in that Complex. The Santee has been increasing since the re-diversion. There is a fish-passage facility on the re-diversion canal, and passage has been going up until '99, and then it began going down, and that decline has continued,

very similar to the declines in the New England stocks and the Susquehanna.

We have some concern about the Edisto and Combahee rivers. The harvest is very low. Landings in the Edisto are especially low in the last few years. The Combahee has been apparently depressed for at least the last 25 years. Continued harvest on these stocks is very likely delaying any recovery and may cause further declines. The Savannah River remains low but stable.

The Georgia rivers, the Altamaha is the one we have the best data for. Catch-effort values increased for a while, until the nineties, and has since declined. We're pretty confident, based on harvest information, that the stocks are much depressed compared to where they were in the sixties and earlier. Ogeechee, Satilla and St. Mary's, we have very little information. Ogeechee has very low landings. We need information on stock status on all three systems.

Finally, Florida. In Florida the St. Johns River is the only one we looked at. Effort in the recreational fishery has been declining. Average size is going down; it's clearly at depressed levels; and it's staying low and depressed.

We're going to look very quickly at some hypotheses. We have documented now that most of the stocks are at low level or are declining, and so then the question is why? We looked at a couple of issues. One, we looked at the ocean harvest, the mixed stock harvest; could we find any evidence that was causing the problem; and, two, predation.

To look at the mixed stock harvest, we used tag recapture studies and some DNA studies to partition the coastal harvest into stocks. You can see here that the stocks that took the big hit were the Hudson, the Delaware, and those stocks in South Carolina. Once we had that information, we looked at some relative exploitation rates over time for a couple of stocks, Connecticut, Hudson and the Delaware.

Relative exploitation is a meaningless index that gives us some idea of changes in exploitation rate over time. It's total catch divided by the stock index. What we wanted to do was to see if relative exploitation went up as the ocean harvest went up; or it went up as the in-river harvest fluctuated.

In the Connecticut, relative exploitation went down regardless of what the in-river or the total harvest was doing, suggesting that neither in-river nor ocean harvest had much of an impact on the Connecticut stock. In the Hudson, the in-river relative exploitation was stable, but when we added in the

ocean harvest, the relative exploitation increased substantially. It looks like the ocean harvest was having an impact on the Hudson; the in-river harvest was not. And, finally, on the Delaware, the same picture, in-river was stable, but when we added in the ocean harvest, we got a spike in relative exploitation, which suggested that ocean harvest was a factor.

Predation is one of the more interesting and controversial hypotheses, and we looked at a couple of studies, first a couple of river-specific studies. We get mixed signals here as, of course, everywhere. In the Connecticut they looked at survival from juvenile to maturing adults and found that the survival went down as bass abundance went up. They did a diet study to see what adult bass were eating that were coming in the river in the spring, and they found that adult bass did, in fact, eat the smallest mature American shad.

Then they did some modeling that suggested that striped bass predation on mature American shad was a significant part of mortality. Now, on the Hudson we did a diet study. We have 16 years of diet information and maybe a couple thousand stomachs that we've looked at from the spawning striped bass. They clearly did not eat American shad. They enjoyed herring but not American shad.

We found two striped bass out of those thousands that had eaten an American shad. So, two rivers next to each other have very pictures, and we think one possibility may be that in the Connecticut striped bass are a new fish in the river, basically, and in the Hudson striped bass and American shad have evolved since the glacier, and so it's possible that there is a difference in how the American shad are responding to the predators in these two rivers.

Also, in the Connecticut apparently striped bass can corner the shad up against the first dam, and that doesn't occur in the Hudson. A different way of looking at predation was to just compare abundance of adult shad and adult striped bass in rivers over the last 20 to 25 years to see whether there was any change that might suggest bass were affecting shad..

So, we were looking for a series of years when bass abundance went up and shad abundance went down or vice versa. We found no such time periods in any river. In fact, we did find long time periods when both shad and bass increased or decreased, which suggests perhaps some environmental factors were at play. So from these abundance data, there was no evidence that bass abundance influenced shad abundance in the coastal rivers that we looked at, the

Connecticut, Hudson, Delaware, Susquehanna, Potomac and Albemarle Sound.

You've heard all of this before. We think that abundance is at historical lows, and there are a few signs of recovery in coastal stocks. The ocean mixed stock harvest was dominant from Virginia north for the last 25 years. That has now ended. It's too soon to see the impact of that ocean closure. The total mortality rates have been around the benchmark value or in some cases above it; and in those stocks where they have been high, the stocks show signs of that high mortality, and there is a coastwide decline in fish passage in the last few years.

We only had two management recommendations. We don't feel that an increase in harvest is warranted in any stock. We suggest that fisheries should be restricted in those stocks where mortality is increasing and abundance is decreasing. The stock assessment committee and the technical committee have worked together to put together these monitoring recommendations, and most of them are obvious, and I think you've heard most of them.

We need more information on bycatch. We suggest the use of observers to find out information on bycatch. We need information on the Canadian harvest and bycatch. We know nothing about what happens in Canadian waters, and we know shad and herring, as well, go into the Bay of Fundy, at least, and are harvested.

We need stock ID information, and we just suggested that microchemistry might be a good way to do it. The Delaware Bay was picked out as a location where we needed more information on where the next stock harvest was occurring since the ocean is closed and mixed stock harvest only occurs in some of the larger bays, such Winyah Bah and Delaware Bay, at this time.

We need information on recreational catch. In many cases states or data collectors would tell us that there was a recreational harvest, and it was growing, but they knew nothing about its size or what fish were being taken. In many cases states and investigators used tagging to estimate either population size and/or exploitation rates, and we did not use those estimates in this assessment because of the many problems with assumptions.

So, we suggested that future studies using tagging should try to verify those assumptions. There are some Brownie-type tagging studies that are going on similar to the ones used on striped bass survival, Delaware Bay and the Hudson River, and we

suggested they continue. There is no juvenile monitoring in southern stocks and in some of the northern stocks, as well, and we suggested that we need that information.

Aging continues to be an issue for shad, and so we need some way to verify shad age. Currently the many stocking programs that are going on provide us a means to do that if the fry that are going in the rivers can be marked so that we can tell the age or the year class. We need to understand passage efficiency. If we knew what proportion of fish were going up over the dams, we could use passage as an indication of stock size. That would be an inexpensive approach to stock abundance.

This third recommendation here, I think, is very important. After spending two or three years trying to get shad data together, we have finally got it together. It's on a series of spreadsheets going to ASMFC, currently with ASMFC, and it will make life much easier for everyone in the future if we annually update those datasets, along with the ASMFC annual reports.

Finally, many of the managers and the biologists working on the stocks suggested that we should develop management plans for the stocks. There are some simple habitat recommendations. Fish passage needs to be improved coastwide, upstream and downstream. There are some water quality problems. That's an obvious issue. There are some flow regulations in some rivers that need to be resolved. That's it.

CHAIRMAN KRAY: Thank you, Andy. We're going to go right on to the peer review; and following the peer review, we'll throw it open for questions and discussion. Dr. Limburg, are you ready?

## **PEER REVIEW REPORT FOR AMERICAN SHAD STOCK**

DR. KARIN LIMBURG: Thank you, Mr. Chairman, and good morning, commissioners. This is my first time coming to one of these meetings. It's been very interesting. I want to just take a moment and thank the people that were on the committee with me. I want to thank the ASMFC for inviting me to be part of this review.

I worked on American shad for my PhD, so it's a species I know quite a bit about. I want to say that the peer review committee was stellar. We had people on here who are just amazing experts. I want

to point out that Terry Quinn literally wrote the book on advanced stock assessments, so this was a very good committee to be working with.

I just wanted to list off the terms of reference. They're in our report, also, but this was a large collection to do things that the stock assessment subcommittee had to complete, as you can see here. So, they worked through all of these; we reviewed them all. I am going to give you highlights today, but I wanted to say, just to make it very clear, that the peer review panel gives the report a pass.

Although we have a lot of comments to say about it, in general we felt that the work was done as best as it possibly could be done, given the datasets, given some of the uncertainties. I think, as you heard from Andy just now, they were very, very cautious with how far they could take the data; and when they felt that they were going a little beyond that, they were very careful to couch this as hypotheses.

Now, just to review, this is an unusual stock. Actually, all of the alosanated sub-family of herrings that are the shads all are characterized by having very large geographic ranges, and range of American shad goes all the way up into Canada. They actually historically were up in the Ottawa River, going up the St. Lawrence hundreds of kilometers, and all the way down to the St. Johns River.

They do home to natal rivers. That's evidenced by the genetic work that's been done, and so it makes sense that each natal river is considered a stock; that it's managed river system by river system. I also want to point out that in a review work that I did a few years ago with Andy and Kathy Hattala, we counted up the amount of habitat, in-river habitat and estuarine habitat, that has been lost due to dams and other obstructions, and it's pretty substantial, 4,000 kilometers.

The stock assessment subcommittee provided information on 64 rivers, and the assessment actually was done on 31, as Andy said. We tried to summarize some of those datasets in a few tables, such as this one, in our review. I just point out that even if you can't really see things in there, you can see sort that we have all the rivers over here, and you can it's sort of a patchwork of polka dot matrix here of what data exists and what don't exist.

You guys can look at that and sort of see. It's broken into basic biology, some light history characteristics, then relative abundance indices, and then also we noted where dams appear to be an issue, as well. So, it's a really kind of a mix of what is available.

The status of the stocks, they're certainly highly depressed compared to historic levels, and this just combines the data regionally back to 1880, and you can see that these were high times for shad compared to today. We're going to look at this again a little bit later, but, again, kind of summarizing some of the data, looking at it by jurisdiction and river system.

The next column is benchmark. Sorry these are a little small for you to see, but these are the numbers that Andy was showing before. They are what they called  $Z_{30S}$ , and you compare that to the  $Z$ , the total mortalities that were calculated and look at the status. So, we've got here a column of 2007 status and 1998 from the last stock assessment.

And although it's kind of hard for you to see this in the back because I can barely see it myself, basically where stocks are improving, there are smiley faces like here. Where they are in decline, there are sad faces, like in the Hudson. If it says stable, there were stable; if there's a question mark, we don't know. I think the thing to point out here, though, is that, first of all, there's a lot more assessment that's done in 2007 than in 1998, so that's a good thing, more information is available.

The bad thing is that where we now see more information, we can see also that there are more declines than in the past. So, from our report, we then said that taken in total, American shad stocks do not appear to be recovering. In fact, I think we're almost more adamant about this than the stock assessment. The current restoration actions need to be reviewed and new ones need to be identified and applied.

These include fishing rates, dam passage, survival from that, stocking and habitat restoration. Okay, an issue with stock identification and distribution, as Andy touched on, these are genetically distinct stocks due to the natal homing, by and large. There is some straying also, but they're a lot more like a salmon than an eel. Eels actually are completely mixed in North America. There is just one population, and shad are a lot more like salmon.

The caveat, though, is that there has been some genetic mixing because of restoration stocking. But, the big problem, why people cared about this, is because of this ocean-intercept harvesting. So, estimates were made from trying to parse out – if you collect fish in the ocean harvest, try to parse sort of who belongs to who from that fishery, and so this was something that they struggled with for quite a while.

They were based on a few tagging studies and some of these otolith and genetic studies, but a lot more work needs to be done on that. So, even if this ocean-intercept fishery is closed, the review panel still recommends that the shad people continue to improve stock identification and distribution understanding. I think we feel that's quite important to do.

Management unit river by river, we felt, is also appropriate, and it's supported by the genetic evidence. It's also support now recently with some of this otolith microchemistry as well. But we also feel that given the difficulty in getting all these data, it may be possible to combine some of this data regionally so that you can develop some of these more sophisticated models.

Take advantage of the life history differences. One of the amazing things about American shad is that it has really amazing gradients of life history variations from south to north. It's actually textbook classic how that works. So, if you can capture some of that in your regional management models, that might be helpful.

The landings were well reviewed by the stock assessment subcommittee, and we appreciated that very much. We also appreciated that they made an effort to take us back into historical times, so that we, in fact, then were inspired to do some more analysis, which I'll present at the end. As far as the data and assessment go, the stock assessment subcommittee used a mix of simple indices.

As you heard, they were somewhat constrained by the data that were available. They used catch curve analysis and developed biomass per recruit and egg-per-recruit models. The approach to this biomass-per-recruit modeling was some somewhat nonstandard because typically one looks at  $F$ , this fishing mortality, but values for this total mortality  $Z$  were used instead, as Andy said, because of the uncertainty as to how to parse it all out.

So, instead the  $Z_{30}$  benchmarks were developed and the catch curve  $Z$  values were compared to that. They also performed some sensitivity analyses to look at whether mortality was age in variance or varied with age. When you do that, you have to acknowledge that age determination is a definite problem among some of the stocks, and so that limits the analysis. I think the SASC was very up front about that. We just wanted to make it a point, too.

Limitations of catch curve analysis were also noted by the panel. This was discussed quite a bit, and so

we encourage the SASC to look at alternative means of computing Z in the future. I just wanted to tell you a little bit about how they computed mortality. There is a method that a fellow named John Hoening at VIMS developed back in 1983 where he looked phenomenologically at mortality rate and maximum age of fish and found that there was an inverse correlation.

It's a very powerful process. Many types have very powerful kind of relationships, so it's something that could be – the rationale, then, for choosing it in this assessment was that it is a simple and widely accepted relationship that can be applied across regions. That was the rationale for using it. As I said before, they did this sensitivity analysis, exploring values of M, how things change.

We felt that for the being at least this is an okay method to use, but that we also encouraged the subcommittee to explore other methods of determining M; also, that they consider doing additional field work or encourage the agencies to do additional field work to get better estimates of M. To some of the tagging programs, we made recommendations on how to do that. We also suggested looking at some more age-varying sensitivity analyses; for example, looking at something where mortality rates varies in a U-shaped function of age, and that way you can look at both predation mortality on younger cohorts and spawning mortality assess the older cohorts.

We also suggested using an approach that is now being used in the North Pacific, basically acknowledging that data have limitations. When you have good data, use it; when you don't, don't. So, when you have great data that is sufficient, then that permits you to use more complex models and actually tune your flexibility. It gives you a lot more flexibility in determining your harvest.

If you have moderate data, be more cautious with it. It's sufficient to use for per-recruit analysis. This was done in some cases here. When you have poor data, which is often the case with many of the stocks looked at, you may be able to look at trends, but really we encourage the use of the precautionary approach, use risk-averse policies.

A word on biological reference points. This  $Z_{30}$ , this total mortality, comparable to the unfished virgin stock, was chosen, again because of this uncertainty. It was assessed on the spawners and not on the total population. It was assessed for New England, the Hudson, York River and Albemarle Sound and not for the semelparous stock.

And as Andy said, they calculated the Type I  $Z_{30}$  and a Type II, which would be sort of typical of an ocean-intercept fishery. But they only identified a couple of – don't forget, we did have the person who wrote the book about stock assessments on our committee. They identified two calculation problems and they were corrected. They did tend, as Andy said, to raise the estimate of  $Z_{30}$ .

So, in this table, which is also in your report, it just shows the systems that were assessed this way, and the revised T-I would be the revised estimate of the  $Z_{30}$  for, for example, here in New England by a per-recruit model. So, you've got that information there, and you can compare it to the 1998 – at the bottom we have the 1998 assessment, too. You can see that the numbers are actually lower than in the '98 assessment. Some of the inputs were different.

The panel considered that these current – now that we fixed the calculation problem that wasn't a deal breaker, but having the correct  $Z_{30}$  values, we considered this was valid, but we also recognized that, as Andy pointed out before, these are populations with very different circumstances up and down the coast, subject to different sources of mortality, so, therefore, we recommend moving toward the development of population-specific reference points for these different systems, to alleviate the threats existing for many of them.

So, where the abundance is sufficient to support fisheries, you can use fishery-type reference points, but where the stocks are under restoration, rebuilding them, et cetera, you need to develop reference points that are appropriate for assessing how effective that recovery is. So, we also suggested modeling approaches to derive benchmarks for some of the southern stocks. There are methods to do that, and so hopefully that will happen in the future.

For fishing mortality, again, not to hammer this home too many times, F and M were not split out. Instead, total mortality was calculated. Although there are reasons why catch curve analysis is often not a good idea, in this case it seems to be robust from some of the sensitivity analysis that was done.

We recommend splitting out, in the future, the components of mortality, more effort to go into that, and it's not just F and M. As you heard yesterday in Genny Nessler's workshop, who would think that a couple of letters of the alphabet would give us so much trouble, but they really do. We suggest that there are other letters that to come in, too, not only to fisheries in-river and ocean but dams, the turbine mortality, habitat degradation, in addition to the

natural phenomena of predation and spawning mortality or just plain old age.

So, we made some recommendations on how to go about this in terms of Reference G, such as improving the age estimates, stock discrimination, better tagging programs, and models, including ecosystem-based models. Touching on recruitment, note the shad larvae and the small young of year there.

The panel felt that the SASC did a good job compiling the existing recruitment indices; that the juvenile indices were often missing for a lot of stocks, and that is something Andy also just pointed out. We also encourage that these be developed and pursued to look at some long-term trends.

We also think that more effort can be put into really trying to interpret those in a couple of ways, both as how they reflect the adult abundance for that year, but also, then, looking at those as the year classes go into the future, because that will be important as we try to assess this other big template, the big environmental template, which is climate change and then changes in habitat.

Concluding these various components assessing the spawning stock biomass, it was not presented. There is no spawning stock biomass calculations, as far as I know, but the historic data suggests that the spawning stock biomass is greatly depleted, compared to the past, assuming that the landings, more or less, correlate with spawning stock biomass.

As Andy said, bycatch was not assessed. They just plain old ran out of time. You saw that they had a 1,200-page report, anyway. But, it certainly is considered both by them and by us as a priority for future work. The other comment that we had was that there were no or very few estimates of uncertainty associated with this report, and that would certainly help – if you can look at uncertainty, that helps you prioritize your research needs and also tells you where your management steps are going to be better or worse in terms of your understanding of what is going to happen.

I think that is important. I know that was also a recommendation from the '98 assessment review, and we hope that they'll move forward with that. Now, I am going just going to take a few moments to give your our perspectives. We recognize that long-term data, such as you have here, can provide you with some perspectives that you don't always have a chance to look at.

There is a phenomenon here that I talk about called the “shifting baseline”. I don't know how many of you are familiar with that, but this is the idea that there is inter-generational sort of memory loss, if you will, about the status quo in the past. This term was coined by Daniel Pauly at the University of British Columbia, and I think it's a very useful term to think about.

Unfortunately, for all of us, what the shifting baseline tends to reflect is a general long-term degradation of the environment and fisheries, in general, whittling away of stocks. So, what we did was we saw that there were many long-term datasets in the stock assessment report. We tried to pull them together and look at them. We had information on the historic distances that fish could go from the ocean upstream because of records that were kept in the 1800s and 1900s.

There have been changes in most of these river systems as to how far fish can swim from the ocean up to spawning grounds and use nursery habitat, so you can basically divide the catches by those distances over time and get sort of a way put all these landings on equal footing, if you will. So, we looked at that.

We also looked at some information from historic times. It's very good that a lot of old information is now becoming available online. The New York Times, for example, for some reason, I don't know, New York City, they liked shad, they've had a lot of information on shad going all the way back to the 1850s.

Anyway, putting together those datasets all on the same timeline here, you can see that most of the datasets start in the 1880s. I have just put World War I and World War II on this graph to guide your eye. The Potomac actually had data going all the way back to 1814, which is pretty remarkable, and I commend them for dredging that data out.

If you look there, you notice that all of these are on different scales. We'll look at them all on the same scale in a moment, but basically we can see that, as I said before, the high times were really in the 1800s, the late 1800s or the 1800s. The late 1800s it declines. In some of these systems there was a fishing-up again and then generally fishing down. In some of these systems, there have been increases, and those apparently were largely due to the ocean-intercept fishery.

If we put all these on the same axis, another rather startling picture emerges that, in fact, those high

times in the late 1800s are actually dredged of higher times in the early 1800s. Now, when I saw this Potomac data, at first I couldn't believe them, but as I looked at them more, I actually now think that they're fairly reasonable. What I think this is telling us is that even in the late 1800s we were looking at residual populations, and today it's even more residual.

If we put all these on the same axis again, but transform the data so that we can see the trends better, there is definitely just a long-term decline. Even if you remove these data, the slope of that trend line is identical, statistically and distinguishable. So, it says that the shifting baseline phenomena I think is actually demonstrated for American shad.

So, they were once the most sought-after fish with salmon and cod. You know, I think some of you are aware how important they were, but today it's a forgotten and marginalized species. If you go back and look at the records from the 1800's, it is remarkable how cherished and important a species it was.

Charles Minor Blackford, who was a historian and an active member of the American Fisheries Society, wrote this article: "There are probably no fish on earth that surpasses the shad in all the qualities that go to make up an ideal food fish", including the bones, I guess, but it's a very good fish, actually, if you know how to bone it.

But, the reports were incredible, the amount of effort that went into restoration. The American Fisheries Society, which was founded at the American Fish Culturist Society, was founded largely to develop means to encourage the propagation of shad; salmon, secondarily, maybe. The first technical article in the American Fish Culturist, which was the first issue of the Transactions of the American Fisheries Society, was about shad culture. That's how important it was.

We also know from some of these past records that these ecosystem linkages that link shad and river herring to marine ecosystems to retain continence and the marine ecosystems were very, very strong. So, if we read through a quote from the past, "The relationship between the different species of fish in the economy of nature" – that's what they used to call "ecology" – "is not well understood, but sufficient is known to indicate that the valuable shore fisheries on the New England coast are intimately associated with the run of shad and similar species up the rivers of that section."

"Seventy years ago the run of fish up the rivers of the New England states was very much greater than at

present; and after the parent fish had disappeared, the waters swarmed with the young, which later in the year descended to the sea in enormous schools, attracting the cod, haddock and other offshore species, which were caught in great abundance within a short distance of the coast, rendering unnecessary the expense of hazardous trips to distant banks."

"So, with the depletion of shad, alewives, salmon and kindred species came a corresponding diminution in the number of cod, haddock, et cetera, near the coast, and it appears that any measures tending to restore the anadromous fishes to their former abundance will also improve the coast fisheries," so those linkages, I think, are things that we'd like to see happen again.

So, who said that and when did they say it? Charles Stevenson said that in 1899, so here we are today with a similar situation, only even more so, I would say. That's pretty much my report to you all. I just wanted to give you those parting words as a perspective to think about as you move forward with restoration of shad. I actually think that species like shad and river herring can be more than just fished stocks. I think that they can be indicators for you guys of the health of your river and estuary systems, too, so think about that as well. Thanks.

CHAIRMAN KRAY: Thank you, Karin, and thank you again, Andy, for a very thorough analysis. I am particularly intrigued by the historical perspectives that both of you put into your reports. We will now open it for questions and discussion. A.C.

MR. A.C. CARPENTER: Mr. Chairman, thank you very much. First, I want to commend you of getting this done on your watch as chairman. I was unable to do it when I was there.

CHAIRMAN KRAY: I had nothing to do with it.

MR. CARPENTER: Secondly, I would like to publicly acknowledge and thank all of the people up and down the coast, Andy Kahnle, the people from Maryland, the people from Virginia and from every state up and down the coast that put so much effort into this monumental task that we have just completed.

The news may not be good for every place, but the fact that we have all of this information in one place now truly was a monumental task, and they deserve our gratitude and our thanks; because, without the effort that they all put forward, we'd never get here today. With that said, I'd also like to particularly say that I worked on a lot of the data for our river system, and I know how much effort went into this. It was a

difficult task, and I really just want to say how much we appreciate all the effort.

CHAIRMAN KRAY: Thank you, A.C. Other questions? Karen.

MS. KAREN CHYTALO: I, too, want to thank Andy and his staff and the whole committee who did do all the extraordinary work. We know that you've put an incredible level of time into it. And, yes, you can have a few days of sun and get away from your computer, but then we hope you get back to other stuff, too, because we know you have so many great projects that you're working on.

I just have one question, also. One of the recommendations you had was about development of the management plans in the individual areas as river-by-river systems. Do you have any formal recommendation as should there be an overarching plan for the whole system and then for the individual rivers or what are your thoughts on that?

MR. KAHNLE: When you say "overarching", do you mean a coastwide plan versus river-specific?

MS. CHYTALO: Both.

MR. KAHNLE: Okay, the coastwide plan is "plans", plural, have been developed by ASMFC and amendments, and so we do have coastwide plans and amendments in place now that may be amended as we go forward, based on what was learned in this assessment. We're not suggesting that we do more than amend the existing coastwide plans, but we are suggesting that we need river-wide, river-specific plans, both to help with the management and also to help with restoration activities. In many cases these plans help local biologists and managers argue for fish passage and other restoration activities.

MS. CHYTALO: A follow-up question, too. I was just also intrigued that you saw an improvement in the Potomac River. Out of all the river systems, that was not the one I would have expected. Could you give any rationale as to why you see those levels of improvements? I think it's great.

MR. KAHNLE: There was more than Potomac. Most of the Maryland Chesapeake System, with the exception of the Susquehanna, the recent Susquehanna, also are showing signs of improvement, so Potomac and the Northern Chesapeake – and those stocks have been under a moratorium for a long time, over 25 years now – well, almost 30 years, actually, some of them, in the Maryland part.

That's a factor that we can't escape. The Potomac River also has a large stocking program, mostly stocking of fry, but at this point we saw very little evidence that the stocking was actually influencing abundance, because a very small percentage of – all the fry are marked so that we can tell fish in the future, if they were stocked or not. A very small percentage of the mature fish actually came from the stocking program. It looks like moratorium made a difference.

DR. WILSON LANEY: Thank you, Mr. Chairman, a couple of comments and then a question for Andy. I'll echo A.C. and other folks' comments about how much of a job this was and how much commendation you all deserve for getting it done. I think not only did you do the job and do it well, but you paved the way for the next group that has to do it, to do it with a whole lot less time and energy, and you're to be commended for that, also.

The other comment is regard to basin-wide planning. A lot of the states are already working in concert with the two federal agencies, often in the context of FERC re-licensing of hydropower dams, to develop those basin-wide restoration plans, not just for American shad, but for the entire suite of diadromous species.

If your state hasn't already begun that, I would encourage jurisdictions to consider doing that. We've done quite a bit of it in the southeast, and most of those plans have been filed with the FERC, and they're available online at the FERC website, if people want to take a look at those.

Then the question, Andy, is with regard to coastwide recommendations, under management you had indicated that the stock assessment subcommittee is recommending not increasing directed fisheries on American shad. In those cases where the Z was over the target level, would you also recommend consideration of decreasing existing fisheries?

MR. KAHNLE: Well, the second management recommendation we made was when mortality was increasing and stocks were declining, that we definitely restrict fisheries. The group worked by consensus, and we could not achieve a consensus on a stronger recommendation for those stocks with high mortality alone or just declining abundance alone.

MR. CARPENTER: To answer one of the hypotheses that we have put forward as to why the Potomac is rebounding I think has to do with the fact that this river system only has about 10 or 12 miles of



riverine spawning area that were traditionally available to any of the anadromous fish.

Great Falls, which is about 10 or 12 miles above Little Falls – Little Falls is the head of tide; Great Falls is another 10 or 12 miles upriver – was a natural barrier that these fish never ascended and there's no evidence that they ever ascended, so they were always predominantly a riverine/estuarine spawner, and we think that may have some play in this.

The other thing, the stocking effort that was started in the late eighties or middle eighties was, I think, important. I think the third major change was the reappearance of submerged aquatic vegetation in the Upper Potomac, the nursery area. I think the three things put together, plus the moratorium that had been in place for 20-some years, I think all – the gods shined on us all at the same time, and that's the benefit that we are seeing there today.

But, I think the major part is the fact that we didn't lose hundreds of miles of traditional spawning areas as a result of dams initially. It's a hypothesis; it's not been tested, but we think it's got something to do with it.

CHAIRMAN KRAY: Thank you, A.C.. Other questions? Yes, sir.

MR. JIM CUMMINS: I'm Jim Cummins. I with the Interstate Commission of the Potomac River Basin. I'm a biologist for them. I wanted to comment. I wanted to echo many of the sentiments. This is a great effort, and I don't want to diminish the amount of work that in there, but I do have a major concern with this in that the interface with the Canadians, I didn't hear much on that.

There was just that there was no information available, but I wondered how that was pursued. You know, what opportunity, if not now, to be communicating with the Canadians about this important fish. You know, when almost perhaps all of our stocks are in Canada at one part of their life, and maybe most of their life, at least one part of the year for each year of their life.

By not including information about Canada, we are missing a major component of this assessment. That's just a disappointment, but, again, I think the overall effort was great. I think the bycatch effort, you know, we have to look at river bycatch, but the ocean bycatch, other kinds of bycatch fisheries, as well as ocean predation, you all talked about river predation but not ocean predation.

And, fourth, on the shifting baseline, I loved those comments. We had a part in the Potomac Section that included those 1814 things. In the final chapter, that was eliminated, and I hope that you put that back in because that's an important perspective. Some people call it "baseline"; I've called it "environmental memory". We tend to have a very short-term environmental memory.

I hope that is included in the final – I guess that will be part of this final report. I felt that was something that should be in there. They have to have that perspective on what it really was. Spencer Baird, who started the U.S. Fish Commission, which the Fish Commission was created primarily because of the concern for the shad stocks, he said that the demise of cod, which was the second reason it was created – first and primary reason was shad but also cod – he said the demise of cod was related to the damming of the rivers and the loss of the herring and shad. So, it's not just the American Fisheries Society, it's everybody at the table that really started with American shad concerns.

DR. LIMBURG: Just to answer you, Charles Stevenson worked for the commission. He may have been a member of AFS, too, but his report was an assessment of shad for the commission.

MR. CUMMINS: That's right, but it was Spencer Baird who made the comments about the demise of shad. Thank you, that's all I wanted to say.

CHAIRMAN KRAY: Andy, do you want to comment on that all?

MR. KAHNLE: I definitely would like to support the comments about interactions with the Canadians. We pursued it only through our contacts with Canadian biologists. We did not formally pursue it. They explained that in many cases their data were very poor. I think this group, ASMFC, is the proper format to move forward and talk with the Canadians about obtaining and sharing some of that information.

CHAIRMAN KRAY: Thank you, Andy. Captain O'Shea.

EXECUTIVE DIRECTOR JOHN V. O'SHEA: Thank you, Mr. Chairman. Both for Andy and Dr. Limburg, thanks very much this morning, great work and great report. Andy, I know how much trouble and work went into assembling this data, and I heard you make the comment that now we have the database together, the recommendation to maintain that on an annual basis. Do you have a sense of what the support within the member states is to do that,

and did you guys have any discussion about things the commission might be able to do to help make that happen?

MR. KAHNLE: Those biologists who are part of the ASMFC process support this because they don't want to go through the effort that we had to go through to get the information together. Those biologists who are not part of the ASMFC process are not familiar with this reporting requirement; and while they are not opposed, they're not thinking about annual updates of information, and so bringing them into the fold will take some effort.

As far as what you folks can do, we would like to see the technical committee and perhaps the board and the plan review team perhaps bring in or add to the sorts of data that they're asking for from the states to expand it to the non-ASMFC participants, and that might help remind folks, as well. It takes years to adjust the sorts of data that we routinely accumulate for each species. For striped bass, we think it's routine, but it hasn't been routine in the past, and it took a lot of effort to make it routine. We'll have to do the same shad and other species.

CHAIRMAN KRAY: Any other questions? Mark.

DR. MARK GIBSON: First, I very much appreciated the historical perspective. In fact, I have been sitting here contemplating that, and it's almost like we need a moment of silence for what has happened. I don't know that any of us can fully – I think Karin referred to it as connectivity – can fully appreciate the ecological significance of the connection between the Atlantic coast rivers and the Atlantic coastal fisheries themselves and the enormous sources of biomass of marine origin nutrients into freshwater and enormous quantities of juveniles of shad and river herring pouring out into the ocean and becoming forage for marine fishes.

That connectivity has likely been lost to the demise or the diminution of these fishes, and I don't know that any of us can contemplate the implications of that at this time, but it's certainly something we should aspire to reconnecting. The question I have is I thought there was a fairly important point that the peer review panel had made – it's at the top of Page 8 – when they were talking about the  $Z_{30}$  benchmark.

They say that they weren't able to find any rationale for the percentile. It seems to me that's an important point and something that the technical committee or the assessment group needs to think about as to whether this  $Z_{30}$  value is sufficiently conservative. The point I would make, there are several places in

time and space where shad populations have exhibited explosive growth.

I think A.C. even opened up the discussion a bit on that when the Potomac River, I guess, accessed some new habitat; that places like the Susquehanna, when Conowingo Dam, the lift started lifting significant quantities, there was explosive growth of that population; the Pawcatuck River in Rhode Island, on a smaller scale, when we transplanted fish from the Connecticut; the Santee River where the water diversion stopped; and I think even in the Connecticut River when the Holyoke Impoundment was accessed by migrating shad.

Those periods of explosive growth on a generational time tell you something about the intrinsic capability of the stock to grow and may set some bounds on what sustainable and critical exploitation rates would be to offset that. I am wondering if there is going to be some work done on this  $Z_{30}$  calculation so we can have a feel – right now we have comparisons of  $Z_{30}$  to existing levels of  $Z$ , but we have a comment from the peer review panel that they're unsure there is any rationale for the choice of this value, which I think is an important point. That's a long-winded question, Andy, but I think you know where I'm coming from.

MR. KAHNLE: We agree. There was some rationale behind selecting  $Z_{30}$ , but not a formal one. We just looked at what other assessments had done with other similar life species to see what sort of benchmarks they selected, as well as the 1998 assessment. We did not have the data actually for any but a few stocks to come up with a rational, formal justification for the  $Z_{30}$  selection. We certainly would like to pursue that.

MR. DOUGLAS GROUT: Andy, I had a question. There was a lot of information that went through that, and I tried to get through at least some parts of this assessment. The one thing that sort of intrigued me in your presentation was that there seemed to have been a region-wide decline since the late nineties in shad abundance.

Could you refresh my memory from your presentation as to any hypothesis behind the causes of that? I know you did some analysis on natural mortality that didn't seem to show any significant effects but mortality outside of the Connecticut River. Is it the ocean-intercept fishery? I'm particularly interested in this because in New Hampshire we've been trying to restore shad for 25 years; and just when we seemed like we were making some headway, all of a sudden in the late nineties and

into this century, things just seemed to have gone bad.

MR. KAHNLE: We really didn't have the data; and by the time we got all the data that we did have the time to spend a lot of effort evaluating potential causes for this decline, the two that we did look at were predation by striped bass and the ocean harvest. The tentative conclusions that we reached were predation seems to be a mixed bag where in the Connecticut it looks like predation may be having an impact; in the Hudson, definitely not; and in other coastal stocks, apparently not.

For the ocean harvest, it looked like it was not influencing the Connecticut stock but it was influencing the Hudson and the Delaware. So, it may be that a lot of different things have impinged on these stocks at about the same time, as the ecosystem has changed. That decline that you're seeing in New Hampshire is definitely coastwide in passage, and we don't have a good explanation. We never came up with a consensus.

MR. PAUL DIODATI: I guess Mark's comments about a moment of silence is certainly a gut reaction when you look at changes to the habitat and what we sense are changes to our fisheries and our coastal fisheries. But, I think what we don't contemplate is that we're getting ready for a new shift in baseline and development at least in the northeast of our coastal oceans relative to mining LNGs, desalination, windmills.

So, we're preparing now to take everything we've learned for the past hundred years and continue on down this path. I expect someone a hundred years from now will be having a similar gut reaction in a similar meeting like this. But, I guess my question is that 1,200-page report is a little overbearing, and I'm wondering if there are plans to put that on a disk and to create an executive summary, and is the peer review available?

MS. ROBBINS: The peer review and the stock assessment report will be available on the website, and we will be publishing what we'll call Volume I of the stock assessment and make the full stock assessment available to all the states and people who would like it. But, Volume I will contain coastwide summaries and summaries of each region, which follows the SARC format that they publish for each stock assessment.

This gives a description of the biology, the fishery, the indices, the assessment of those stocks, and the recommendations and conclusions. Those, for each

system, are between two and ten pages long. They're in Section 1.3 of the stock assessment.

MR. LEROY YOUNG: Andy, you mentioned the predation issue in the Hudson, that you didn't think it was an issue. I assume that is from studies, if I understand this correctly, of predation in the Hudson River, but what about predation in the ocean? Has anyone looked at that, or is this primarily just predation studies in the rivers?

MR. KAHNLE: Well, predators could affect shad at all life stages. There are 50 or 60 striped bass diet studies available. It looks like that in estuaries and especially in the southern estuaries striped bass are enjoying the young American shad, but we didn't see much of that in the ocean diet studies. It looks like menhaden was the favored – menhaden and crustaceans were more favored diet items for striped bass in the ocean, but we can't discount that. I don't know how, at this point, we would explore that issue further with the data that we have.

MR. ERIC SMITH: My compliments, as well, to both the assessment and the peer review. I have a couple of questions, and then I also have a couple of tentative recommendations. I think they're almost simplistic, but I want to transition from the reports to what we do about them, so if I could tie them all together.

I was intrigued, Andy, and I agree with your answer to Doug on different factors superimposed on each other, both historically and recently, confounds putting your finger on one cause. When I look at what is likely to be the cause for a coastwide change, I look for a coastwide factor. When I look for what happened in a local area, I look for a local factor, which is why, when Doug says coastwide everything seemed to decline at once from '99 onward, I look at things that were effective coastwide.

To me, that is the end of the ocean fishery and the rise of striped bass abundance once we restored them in the mid-nineties, and now they're going to larger size. You know, a four-year-old male shad on his way back to his natal river is just prime food. My question, then, is – I take your point that in many of the areas you couldn't really make the linkage to predation as a source of a decline, but I wonder is that as much due to date limitations as – well, is that potentially due to data limitations rather than a conclusive result that we looked at this area even in the spawning river and there was no evidence? You had a slide up there, but I didn't quite capture the meaning of it.

MR. KAHNLE: That's a good question. Clearly, data limits the interpretations we can make. You need some corresponding change between shad and striped bass to at least identify that there is a link, and then you need diet studies to verify that the link was, indeed, predation for any life stage of shad. We only had diet studies from adult striped bass in the estuaries, from the Hudson and the Connecticut, to work with.

In the Connecticut striped bass did eat young, mature American shad; in the Hudson they did not. The abundance data we had for the Connecticut, the Hudson, the Delaware, the Upper Bay, the Potomac and Albemarle Sound, and in none of those cases was there any apparent relationship between shad and striped bass. But, that's as far as we could go with the data that was available, so we need further diet data, clearly, for potential predators.

MR. SMITH: I hadn't caught that point before, so there were three other systems where you did have the data, but there was no discernable affect, the Potomac and the two others?

MR. KAHNLE: Four other systems, actually.

MR. SMITH: Four, yes, okay.

MR. KAHNLE: Delaware, Potomac – well, actually, all of the systems, Connecticut, Hudson, Delaware, Potomac, Upper Bay and the Albemarle Sound. In none of those could we detect any relationship between shad and striped bass, but that's only correlations in change of abundance. That's not a verification that there was not some impact.

MR. SMITH: Okay. Then, Mr. Chairman, my two recommendations – and I stress these. These won't be earthshaking, but I'm trying to tie the two public comments that we've got in the public part of the discussion to the consequences and the results of the assessment. I guess the question for Bob Beal, do we still have an active Fish Passage Committee? We had one in the past, I'm pretty sure, and I just don't know if it's been dormant or it's still active.

MR. ROBERT BEAL: The formal committee is not active at this point. It's a dormant committee; that if we want to revitalize it, we'd probably have to look at membership. Some of those folks have probably retired or moved on to other jobs. The one thing we currently planning is a Fish Passage Workshop. It will probably take place in early 2008. January is the kind of timeframe we're looking at.

That's going to deal with fish passage, upriver and downriver, essentially get everyone on the same playing field. The ultimate goal of that workshop is to put together a template or a protocol that the states can use when they're dealing with fish passage issues. It's also going to explore some of the regulatory FERC relicensing and opportunities for the states to be involved in that process. So, all those things are being rolled into this workshop.

We have a steering committee that's developing that workshop right now, so we've kind of got a skeleton of what that workshop looks like. We don't have the speakers and the facilitators, if necessary, and those sorts of things. We're moving in that direction.

MR. SMITH: Okay, thank you. In light of that, I hope that the gentleman that has the idea for the different type of fish passage, I hope that will be referred to be considered in this workshop, because in those areas where passage is believed to be a factor affecting rebuilding and maintenance of healthy shad stocks, that's the kind of thing that ought to get explored.

My second point is to the other comment that was made. I mean, I take the advice of the stock assessment that there may be some reason to have coastwide initiatives for these species, but it's really more important that we have river-specific assessment and river-specific management because the problems and the conditions vary. So, the Delaware River Proposals clearly need to get in front of the agencies, the two state agencies, New Jersey, Delaware, geographically – yes, Pennsylvania, as well, thank you. That is the chairman's home state. Thank you for the time, Mr. Chairman.

CHAIRMAN KRAY: Yes, and I would encourage both Bill and John, who presented this morning, to get on to our mailing list so they're aware they can get the information about the workshop sent directly to them by the ASMFC. Vito, you had your hand up.

MR. VITO CALOMO: Thank you, Mr. Chairman. I enjoyed the presentation by all of you. It was very interesting. I was out of the room for a few minutes, so if I duplicate a question, I question. I heard about the predation of striped bass on these pelagics, and I totally agree on that. Up our way in Massachusetts, we have stripers that look like tuna fish.

They're very big and they definitely in towards the rivers and stuff eating plenty of feed. Have you taken in account the abundance of dogfish that is off the New England coast and what they're doing to the alewives, the blueback, the shad? It seems like, you

know, they're easy prey, hanging around the rivers trying to go up. The fish ladders have gone.

The ways to return back have been filled in a lot of places for golf courses, so on and so forth or whatever the case may be. The runoffs of pollution that have taken place in the last hundred years, let's say – it looks like, I mean, we need to start back at the rivers again and the inlets to see if whatever is alive can get back into these passages.

It seems like the predators around this idea of rebuilding all stocks to the highest level of all time I think is creating more of a problem than we think we're curing because the predators are tremendous off of the New England area. We're starting to even see white sharks now. I am a third generation fisherman, and I owned a spotter plan for about 15-20 years, somewhere in there.

In my time as a spotter pilot up to around 1990, I'd say, I've never seen a white shark. I've seen sharks but now we're seeing white sharks up at Cape Cod. More and more, we're starting to see a lot more predators. So, I'm just wondering that I think there's a lot more to this mystery; and to see it, you know, recede in more areas at one time is a puzzle to my thinking, and it's got to be a lot to do with pollution and probably the cutoffs of these areas where they return, not being able to go up and spawn. But, I think as they come out, the predators are knee deep. Thank you.

MR. ROY MILLER: Thank you, Mr. Chairman. I'd like to just briefly delve into my perspective on these issues. I was a charter member of the original Shad and River Herring Technical Committee and have been on the Shad Board since the middle of 1990s, so I think that perspective gives me some appreciation for the magnitude of the task taken on by the stock assessment committee.

Frankly, I am in awe of the effort and the job that the TC and the stock assessment committee accomplished. Having said that, I'd like to note a few trends, which they noted as well, and maybe emphasize a few, particularly in relation to the Delaware System since the Delaware System, I think, is emblematic of what has happened to our shad stocks with tremendous initial abundance before the turn of the century, followed by drastic crashes and then gradual improvements and then finally declines again most recently.

Now, when we were working on the original stock assessments and originally setting out to manage shad, we became buoyed by apparent increased

abundance that ran up through the middle of the 1990s. So, the more recent trends of declining abundance I find most discouraging because they've occurred in spite of significant improvements in water quality in many systems; notably the Delaware and the Hudson and the Potomac; significant inroads in providing fish passage over many dams; and more recently, with dam removal; and then more recently, the closure of the ocean-intercept fisheries.

So, I keep wondering is there a smoking gun that we're not examining in terms of explaining the more recent declines coastwide of our shad stocks. I just want to find out how Andy or Mike feels about a hypothesis that we posed early in the 1990s; namely, is there a possibility of ocean exploitation of juvenile shad stocks in fisheries directed at other species like Atlantic herring, and has that been discounted as a source of mortality for juvenile shad or immature shad, I should say?

Are there any potential smoking guns out there that we have left unexamined to explain the seemingly inexplicable, you know, how water quality can be improving, how fish passage can be improving, how our institutional controls on fishing are enhanced, and yet our stocks are declining? Thank you.

MR. KAHNLE: The hypothesis that there's a loss of juvenile shad in some ocean fisheries remains on the table. We know it occurs; we've seen it. We don't know the size of losses to these fisheries, and that's one reason why all of us that worked on it emphasized the need to delve into and summarize the available bycatch data, and also to begin to use observers to increase our knowledge of bycatch of this species in ocean fisheries.

It's on the table. We did not have the time to look at the bycatch data that's available. We need more. It's something that we think is a very high priority as we move forward. The decline started in – actually, the decline started in some stocks in the mid-eighties, and most recently coastwide in the mid to late nineties.

From Virginia north the ocean harvest began to build in the mid-eighties concurrent with some of these declines, and it appears that in some stocks the two are coincidence. Time will tell. The experiments now in place – the ocean fishery is closed, and we will see in a few years if that closure makes a difference. All we can say is that the information we have now suggests that the ocean harvest did have an impact and may be part of the reason for this decline, and we need to look at the existing bycatch.

CHAIRMAN KRAY: Thank you, Andy. Before we go to Karen, Roy mentioned dam removal, and, Leroy, would you want to comment? Does Pennsylvania still lead the nation in dam removal?

MR. YOUNG: As far as I know, we do, but, of course, you know, with shad on the Susquehanna, the primary issue is the four major hydrodams and passing fish over those. But, there is a lot of work going on up-basin as well, as well as in the Delaware System.

MS. CHYTALO: I just wanted to bring us back again to the habitat concerns that were being raised, too. Yesterday we had the presentation by Jessie on the Atlantic Coastal Fish Partnership. I think that a lot of the priorities that are going to be generated on there are the fish passage, are on the things like the submerged aquatic vegetation, like A.C. brought up about in the Potomac and that that might have helped the diversion issues and stuff.

I think that this report is extremely helpful to help supply the basis and the prioritization needs for doing that whole restoration on a coastwide basis, as well as in the regional areas. I think each one of the other reports, too, whatever information will be gleaned out of the different fishery management plans I think is really going to help us to highlight what the priority should be.

I think this report nails it, too, for us in a lot of ways and names the rivers, do it here, do things here, here, there, and that needs to be explored. I think it's a good marriage between the management effort and the habitat restoration effort, and I think this will be really good. We look forward to be able to use this report for that purpose. Thank you.

CHAIRMAN KRAY: Other questions? Lance.

DR. LANCE STEWART: I would like to expand on what A.C. said and looking for a smoking gun. I think a lot of what may be missing in many of our demises in river systems is due to olfactory and chemical changes of our effluence. There is a lot of attention now to endocrine disruptors, but it would be interesting to see what the change in STP volumes are for any river.

And especially as we gauge water quality, I think we will use some of the wrong parameters in E-coli bacterial content as an index, and other things like DO, our standard water-quality benchmarks have been improving, but this is at the expense of high water treatment and chlorine additions, chloramines,

the changing characteristics of the societal discharges.

It affects all the species that we really seem to not have control on when we're looking at abundance and spawning stock biomass, the eels, the river herring, so all these diadromous effects, I strongly believe, are chemical in nature, and we should be taking river systems that have strong tendencies and comparing them.

One of the things I don't see coming out from many of the states – and I have asked in our areas – is just to plot over the last decade or two the amount of treated water discharge. The different tendencies to go from gaseous chlorine to massive doses of liquid chlorine, they affect, in large part, what many of our olfactory homing species use to return to rivers.

We can remove dams all we want, but if the biochemistry of the water is greatly different, I think it has a major effect. Again, you know, we talk about the physical aspects, things we can see as humans, but we need to pay a lot more attention to the chemistry of the water.

A first start, again, to reiterate, would be a mass balance equation for your rivers; how much treated effluence are you now entertaining into the river systems; and the location of those treatments; you know, the discharge areas. Anyway, that is my strong feeling about the physiology of the animal and declining trends over many improvements.

CHAIRMAN KRAY: Thank you, Lance. Any other discussion or questions? Kelly.

MR. KELLY PLACE: Yes, I couldn't agree with Lance and Roy more on the chemistry of the water and in general the smoking guns and the synergistic effect that is obviously taking place from all the various guns were identifying. One thing, though, that hasn't been brought up too much, and this is a result of unpublished data from Virginia's Game Department pursuant to their years of shad restoration efforts.

Their in-stream flow guy has found that in many of Virginia's rivers, that the successful recruitment of shad in many respects has been based on summertime water flows. We all know the various effects that lack of returning adults or bycatch and any number of other smoking guns have been identified.

But, they found, interestingly, that regardless of the number in many rivers of returning adults, that the summertime water flows have affected whether the

recruitment was good or bad on an area of 20 percent exceedance, 20 percent over average, even in a situation with low numbers of returning adults of very good year classes.

And some years when they have a large number of returning adults, but low water flows – and I guess it's an expansion of a habitat thing, as well as changes in the biochemistry in the water – seem to have been the determining factor in many respects as to whether they had good recruitment.

So, with the board's permission, I might ask John Kaufman at the Game Department to put together a final draft of his work on in-stream flows in the summertime and their relation to shad recruitment and send it to the board. I mean, there's no shortage of smoking guns here, and they all have a synergistic effect that we obviously can't assess right now adequately, but it's just another one that I think – because it is unpublished, but it is relevant, I think I'll ask him to send that to the board so you can add it to your list.

CHAIRMAN KRAY: Kelly, that would be sent to our technical committee and have them take a look at it. That would be great. Andy.

MR. KAHNLE: I would want to comment here that this job involved over 40 biologists producing information, and it could not have been done without the constant and positive help from these folks. Also, we could not have got these 40 folks together without the support of ASMFC; and in particular, Erika Robbins, Patrick Kilduff, and Meagan Caldwell were very supportive in this effort. We thank you all.

CHAIRMAN KRAY: Thank you, Andy. Yes, Wilson.

DR. LANEY: Thank you, Mr. Chairman, just one little item here. Do you think it would be appropriate for the board to refer the two items that were presented to us by the public to the technical committee for a look-see, also, with regard to whether or not they would think a board endorsement of these proposed actions is appropriate?

CHAIRMAN KRAY: Yes, I think that would be appropriate; so following the meeting, if John and Bill could talk with Mike Hendricks, our chairman of our technical committee. You all know him, I'm sure. Since the discussion seems to have ended, I would ask for a motion to accept both the stock assessment and the peer review. Moved by Pat White and Pat Augustine seconds. Discussion on the motion? Is there any objection to the motion? The

stock assessment and the peer review are accepted. Moving on, discussion on the River Herring Assessment, Erika.

## RIVER HERRING ASSESSMENT

MS. ROBBINS: Thank you, Dr. Kray. Because of the length of time that was necessary to complete the American Shad Stock Assessment, the Assessment Science Committee recommended that the River Herring Assessment be postponed. It was slated to begin in 2008. There are several steps that need to be taken before we begin the assessment.

First, we need the desire from the board to say we need to move ahead, if you'd like to move ahead now or if you feel that some pause is necessary. If you choose to move forward at this time, the first step would be to go home, look at your staffs' workloads, identify people who might be available to work on the stock assessment, and send those names to myself so we can put together a list of potential stock assessment subcommittee membership for the River Herring Stock Assessment. Thank you.

CHAIRMAN KRAY: If I understand what you're saying, we probably would not be able to start the River Herring Stock Assessment in 2008; and, when would you propose we do that?

MS. ROBBINS: It's up to the board when they would like to begin it. We could begin in 2008, but I need to know if we'd like to start the process now or if we'd like to continue the delay that has been recommended by the Assessment Science Committee.

MR. SMITH: Thank you, Mr. Chairman. I have a view on this, and I need to back up a little and look at what we did to our staffs on the Shad Assessment, recognizing that the anadromous biologists who have the skills to do an assessment for river herring are probably going to be very much the same people who did the Shad assessment.

And if you think about the history, A.C. implored us several times, "Would you please go back home and get your staff to devote the time to do this", and it was like pushing a string. That's not because people were reluctant; it's because people were busy. Finally, somehow the initiative developed legs and it started running, and then they did a great job, but it took a while to get it to happen, and that's because of workload.

My view is we need to get on with the River Herring Assessment right away; and if that means in early

2008, that's fine, but what we should not do – because, there were two phases of shad. There was no action, and then there was frenzied action. Frenzied action is never good. It could run the risk of giving an impaired advice, which fortunately it didn't in this case, but it also creates stress and workload crimps and things like that that we should try and avoid.

I would rather take a more measured approach and not set a deadline that is so ambitious that we drive our staffs batty, but that we don't let the track grow cold. These folks are tuned into anadromous fish stock assessments now, and the sooner we continue with the effort and move to river herring, the better, but it ought to be a more measured approach. They may need some time to take a deep breath and catch up on work that didn't get done at home, and I think we ought to acknowledge that.

But, I would hate to wait until 2009 to start this, because river herring is an important issue, and we may have more data-poor situations with that one than we did with shad. I don't think they're going to find Potomac River historical landings from 1814, quite frankly, but there will be some data and there will be data-poor situations that we can deal with.

The fact is I want to get on with it; I want it to be measured, so that we do it in kind of a stress-free way and not set – I don't think we should set deadlines yet. I think we should carefully have the stock assessment committee and the technical committee step back and take a deep breath and gauge how long it's going to take to assimilate the data, to get things together, how long is it going to take to actually do the assessment. Don't prematurely set a peer review deadline. I know we would never do that now, but even – we need to give ourselves time to slide a little if we have to, but we should start now in the process of getting that assessment underway.

CHAIRMAN KRAY: I think it's an excellent idea, Eric, and I will ask Mike Hendricks and Erika to get together and maybe come up with a timetable. Erika suggested that we start to have the states start sending in the people who would comprise this committee. That may not be a bad idea, but I think it would be better if we had framework of time to look at when in 2008 could we start it, a broad, broad expanse of how long do you think it might take; hopefully, not as long as it took the shad. That, of course, was an enormous thing; this will be an enormous thing, as well.

MR. AUGUSTINE: Thank you, Mr. Chairman. It would seem that maybe our annual meeting might be

an appropriate time – we're talking about now August to October – maybe for them to come forward with a timeframe that might be presented to the board for consideration, so we can move forward with it. I'm not sure whether that's practicable or not. I think Bob would probably have to figure that out in the schedule, but I think that might be the next target that we should look at doing something with this whole process in river herring.

CHAIRMAN KRAY: I would not want to lock it into getting it at our annual meeting. If we can do it, that's fine. We're deciding now and we still haven't decided whether we're going to have a meeting in October of this board. Maybe we should possibly target the January meeting as opposed to the annual meeting. Doug.

MR. GROUT: Thank you, Mr. Chairman. The ASMFC has a document for benchmark peer review processes, and for species like this, where they've never been peer reviewed before, I think the timeframe for a full-fledged peer review is at least two years. So, if you were to start in 2008 with a data collection workshop, then go through the actual assessment workshop, et cetera, you're looking at least at 2010. So, if we use that as a guideline and if we start in 2008, that might be something reasonable to deal with.

CHAIRMAN KRAY: Again, I think if Erika and Mike Hendricks can get together and work out a potential timetable, with all of these factors taken in, that would give us that measured approach that Eric was talking about. We're up now to the review and discussion of the Creel Survey Requirement. Erika.

### **CREEL SURVEY REQUIREMENT**

MS. ROBBINS: Thank you, again. At the January meeting of this board, the board elected to postpone the states from having to comply with the requirement to monitor their recreational fisheries. At that time, the board was made aware of the fact that ASMFC was going to hire a contract group to prepare and develop a Pilot Creel Survey, which could be used as a template to apply coastwide to obtain important information or the necessary information to provide to scientists on in-river recreational fisheries.

At the May meeting, the executive committee decided to not fund that creel survey template, and that money is being redistributed to other programs that were losing funds. So, there is not an anticipated creel survey template that will be completed that states can use to fulfill this requirement, but at the



same time that requirement is still postponed for all the states, and I think the board might want to take this time to consider how they would like to move forward with this requirement.

It is under Section 3.3.3 in Amendment 1 and has been revised in Addendum I, and all states are required to monitor recreational landings, catch and effort every five years for at least one river system within their state.

CHAIRMAN KRAY: Okay, before we get to the North Carolina Proposal, Erika, you wanted to comment?

MR. AUGUSTINE: Mr. Chairman, I think we have a decision to make as to whether the board wants to –

CHAIRMAN KRAY: I'm sorry, I was distracted

MR. AUGUSTINE: – whether the board wants to take any further action at this time, as Erika indicated, now that we do not have an outside contractor who is going to develop a template for us, and she did refer to the amendment – what was it, 3.3 point whatever.

MS. ROBBINS: 3.3.3.

MR. AUGUSTINE: Yes, like that, 3.3.3 indicates that the states are supposed to take some action on this, and it is during a five-year timeframe. I guess the question I have is where are we in that five-year cycle? Does it have to be somewhere in that five-year cycle, and how far are we along in that?

MS. ROBBINS: Each state is under their own five-year cycle, depending on when they first sampled their recreational fishery. The state of Pennsylvania and – or I should say the Delaware River states were scheduled to complete a creel survey review assessment this year, but were given an exemption. Every state is at a different point.

MR. AUGUSTINE: Okay, well, then, unless there is anything critical that we've got to do, it seems as though we just let it ride and let the states do what they have to do for this particular period of time and come back and address it again next year.

DR. LANEY: Thanks, Mr. Chairman. I guess I would address this to Vince. Is there any chance that – the funding that was proposed to be used for the development of a creel template came from the supplemental funding; is there any chance that we're going to get more supplemental funding and that we

could allocate some of that to go ahead and do that study?

EXECUTIVE DIRECTOR O'SHEA: Well, Mr. Chairman, it was the decision of the executive committee to shift a portion of the ACFCMA Plus-Up money and give that money directly to the states, so you're really asking sort of a two-part question; one, are we going to get an ACFCMA Plus-Up, and then the second part of the question would be would there be a change of heart in the strategy of sending that money to projects as opposed to going to the states?

I think that's a controversial issue around the table, and my sense is that the states would rather have the money directly and choose within their own priorities to do that. I think the short answer is no.

MR. YOUNG: Erika, you stated something to the effect that the states were to conduct a survey on a river system in their state? I mean, it doesn't have to be the same one?;

MS. ROBBINS: It varies by state. For the southern states, South Carolina and Georgia, they're allowed to have a rotating creel survey. They don't have to monitor the same river every year. South Carolina may monitor the Santee River one year; the Savannah River another year. It's up to the state to decide. They have multiple rivers.

Northern rivers, the Hudson River, the Delaware River, for example, are supposed to be monitored every five years, so some states may have two rivers to monitor; other states may only have one.

MR. YOUNG: So the Susquehanna is not in that mix?

MS. ROBBINS: If you give me one second, please. There is not a specific river for – well, Pennsylvania has to monitor the Delaware. Maryland does not have a specific river that they have to monitor. The Susquehanna would be included in Maryland's monitoring their choice of river on a five-year basis.

CHAIRMAN KRAY: Okay, Leroy, you have the Delaware, whether you like it or not.

MR. YOUNG: I mean, just to leave it up to the states, I don't know where we're going to get the money to do the Delaware. We didn't do it this year. We have lots of other rivers that need creel survey studies. We're talking \$300,000 per study on these large rivers, and we just have to take that into account. It's very difficult for us to do that.

MR. THOMAS SNYDER: Thank you, Mr. Chairman. Judging from the discussion that's taking place, it sounds like the three jurisdictions, at least, or maybe four are supposed to be doing a creel survey of the Delaware this coming year since it was supposed to be done in 2007. Leroy just mentioned about his financial constraints, and, of course, this area is not under our marine jurisdiction in New Jersey.

It's under the freshwater jurisdiction. I seriously doubt they have allocated any money to complete the survey or contribute to this survey in this coming year. I would be interested to see where Delaware stands and maybe New York. I see this as being a major difficulty financially.

MR. LAPOINTE: Mr. Chairman, I think I'm with other board members, and I have that kind of a rabbit-in-the-headlight look about this, which is like a deer in the headlight, but weaker. It strikes me that we could do one of two things. We could just say let's hold this in abeyance for a while, but I don't really have enough information to even do that at this point.

So, it strikes me that it would be good for our staff to bring back the requirement for us with a little more detail, say where the various states are with it, and then give us some options – do we need an addendum to shift the requirement – and just to give us some options so that, in fact, we can get some traction and move forward one way or the other.

CHAIRMAN KRAY: I think that might be a solution, George, thank you. Vince.

EXECUTIVE DIRECTOR O'SHEA: Thanks, Mr. Chairman. I think along those same lines what has happened is the board has now got the very comprehensive stock assessment, and I think the creel survey is one issue of the question of a response to that stock assessment, so what you're really looking at, quite frankly, is an amendment or addendum to respond.

This is, I think, going to be one element; so building on that, I think you might want us to take a look at some other issues that this board might want. There's data collection issues, there's all sorts of other things that were mentioned in the stock assessment, as well as the peer review.

MR. YOUNG: Thank you, Mr. Chairman. I think, also, we need to take into consideration the scale of the impacts. I mean, we do have estimates on the Delaware now at least from one year of the amount of harvest. I think we really need to look at that in

relation to all these other sources of impact to see if it's worth the kind of money that it costs to do one of these surveys. I mentioned this before.

I mean, double the potential impact and save the money and use it as an estimate, I mean, as a conservative estimate. I mean, I think we need more Delaware data, but to require that every five years is problematic unless we have some greatly scaled-down approach, which I had mentioned earlier we do that in some other places in our state where we have some index sites that we then extrapolate up to the previous full-scale study.

That's much less costly, going to some of the more popular, heavily used access areas and just looking at those areas. So, there's other options and ways to do this than a full-scale study that I think we really need to really look at.

MR. GROUT: Thank you, Mr. Chairman. If we are going down the suggested path that George was making of having staff put together where we are in the creel survey requirements and other things that we need to deal with to respond to the stock assessment, one of the things that I would like to suggest is that we look at discards in some of the ocean fisheries. Something similar to the sturgeon workshop that occurred just recently might be helpful here in getting at this information.

CHAIRMAN KRAY: Thank you. Erika, are you comfortable with that, as to where we're going to go with this?

MS. ROBBINS: I guess my question for the board would be are you interested in having your staff look at it and report to you directly, or would you like the technical committee to look at the creel survey requirement and report back to the board at the next board meeting?

CHAIRMAN KRAY: Yes, the latter. Erika, you wanted to say something before we do North Carolina.

## **NORTH CAROLINA PROPOSAL ON RIVER HERRING**

MS. ROBBINS: North Carolina is going to bring forward a proposal for river herring. I have been trying to get that proposal out to everyone prior to this meeting. If you do not have a copy of the proposal, please raise your hand and staff will bring you one.

CHAIRMAN KRAY: Okay, while that's happening, Dr. Daniel, the floor is yours.

DR. LOUIS B. DANIEL: Thank you, Dr. Kray. I, too, wanted to compliment the technical committee, the stock assessment folks and the peer reviewers on the shad work. I think a lot of what was discussed during the shad discussions are appropriate for river herring, as well, particularly how they are a barometer of what is going on in the inland and coastal regions.

The fact that we don't have the recruitment that we need in order to determine what the impacts are of the various things like water quality, habitat loss, SAV loss, those types of things creates a real problem for us. So, if we're concerned about the timing of the next assessment for river herring, which will likely be much more wrought with data lacks than the shad assessment was, it may be appropriate for this board and the commission to take a little more significant action in relation to river herring while we wait for 2010.

North Carolina has done, I think, a significant amount of work on river herring. We have put a lot money, time and effort into restoration of river herring, identifying strategic habitat areas, trying to determine whether or not historical runs can even exist in some of the areas where they used to be because of the degradation in habitat or water quality.

In 1999 we implemented our first river herring fishery management plan whereby we implemented a harvest cap of 300,000 pounds down from the historical 25 to 27 million that used to occur on the Chowan River and the Albemarle Sound. We were unable to attain that 300,000 pound catch level; and through proclamation authority of the director reduced that quota down to 150,000 pounds, which we still had difficulty catching.

In 2006, based on a 35-year time series of repeat spawner data, we finally had the dubious distinction of having our first year with zero percent repeat spawners in blueback herring and our first zero alewife abundance index from our juvenile surveys. So, we throw the word "collapsed" around a lot. Most of the time it's probably an inappropriate use of the term, but I feel pretty comfortable saying that the river herring population in North Carolina has collapsed.

I look coastwide and I see the same trends. I see the rivers in the Potomac; I see other areas where the populations have declined to such an extraordinary low level to where I said in front of my Marine

Fisheries Commission, my first meeting as the director, that every female spawning river herring in North Carolina is probably important. I would go further to say that's probably true coastwide just because of the sheer absence of those fish on a coastwide basis.

So, I asked for this board to take this into consideration at the last policy meeting, and Erika has done a beautiful job putting together this document with some input from me, but it goes through and it provides a brief introduction, which you've probably all seen or read, and I think Table 1 is pretty consistent with what I've just said in terms of the problems that we're facing.

The North Carolina landings in 2007 were a thousand pounds. I had a 7,500-pound research set aside that I had control over. I opened the fishery for two days to collect some information, and the permittees were able to catch a thousand pounds during that time period. I had mentioned emergency action. I understand there is a lot of concerns and hesitancy to move into emergency action, and that's fine.

But, I do think that we're in an emergency situation here with river herring, and I think that it's important that we take action now and get this assessment done in a timely manner, as timely as we can, for the 2010. Then if we come back and find out that we're mistaken, then we might be able to take some minor actions to restore some of the fishery, but at the present I don't see it coming from anywhere I've been able to see.

I know with the work we're doing in North Carolina – you know, we had the Shad Intercept Fishery closed in 2005 and 2006 was our lowest juvenile abundance on record for shad. So, what we're doing isn't working on these anadromous fisheries, and I think we should have done more on the shad, but I was going to wait until I had the opportunity to talk about river herring and maybe we can do something about both.

I think it's critical that we do something now for the next meeting. I think it's also critical – if you look at those options at the end, there's a recommendation based on some of the comments that were made in the audience. I think it's critical that we ask our partners in the federal system to look into this problem.

The councils know the Atlantic Herring Fishery, the squid, mackerel, butterfish fishery, many of the fisheries that likely have a bycatch of river herring and shad. It's important for us to work with them

and request the Secretary to identify those fisheries where herring is a bycatch and a problem. I think it's also critical, as one member of the audience said, that we ask the state department to work with the Canadian government to identify those fisheries where there is a problem.

It's going to be very difficult for any of us to restore shad and river herring populations on a coastwide basis if the work that we do in our individual states is compromised by the actions in the ocean or further north. To get the ball rolling, I'd like to make a motion, Mr. Chairman, if I may.

I would move that the Shad and River Herring Board proceed immediately with an amendment to do Option 1, a moratorium on the harvest, possession, and landing of river herring from state waters, coastal and in-river, and no landings of river herring from federal waters permitted.

CHAIRMAN KRAY: Is there a second to the motion? Seconded by Mark Gibson. George.

MR. LAPOINTE: I'm not opposed at all to an amendment, but an amendment with one option I am opposed to. I think we need to reword this a little bit. The situation in Maine, and I think a couple of other jurisdictions, isn't as dire as other places. I think there are things we need to work on, but just shooting from the hip, I don't support a coastwide moratorium.

I think we just need to be cautious about putting some options in there on how to work on the problems, help those states that do have moratoria, to help those states that are considering moratoria, to help those states that are interested in conservation and don't support a moratoria on the broader issues.

Louis had mentioned, and other people have, the issue of bycatch in the Atlantic Herring Fishery. You know, if you turn the clock back 20 years when we were promoting joint ventures with foreign fishing vessels, we required they monitor for river herring and shad bycatch, because we wanted to make sure they were clean fisheries. When those fisheries were Americanized, we haven't continued that requirement, and so I think that's a critical issue. If we move forward, we need to be broader than just one option.

CHAIRMAN KRAY: Are you suggesting that a substitute motion may in place?

MR. LAPOINTE: Well, I just think the appropriate way to do this – and we can talk our way through it – is to prepare an amendment to deal with conditions in

the fisheries, and in our normal amendment process we allow options to be developed as it goes along, rather than just having one.

CHAIRMAN KRAY: Additional discussion? Dr. Daniel.

DR. DANIEL: I agree, and I think whoever was wordsmithing up there had it in a way that would satisfy me, and that would be to move to proceed immediately with an amendment for river herring containing an Option 1. I think that satisfies your concerns, George.

MR. ROBERT H. BOYLES, JR.: Thank you, Mr. Chairman. I agree; I've got a lot more comfort with this perfected amendment. I have talked to Dr. Daniel about this. In South Carolina there are some different things going on. We have got a fishery that is prosecuted mainly behind impoundments.

The way this is written – and basically what I've got is I've got declining effort; the data that is available to me in my state, declining effort in terms of number of nets fished, but a trend that is generally trending upward in terms of catch. So it would be very, very difficult for me to go back to my legislature and say that there is a problem in North Carolina, which we acknowledge, and I acknowledge, but we've got to do something here in South Carolina with these fish. I think a more fully developed amendment would be certainly in order.

MR. DIODATI: Just a question about process and what Louis is really asking for, because the motion is actually different than in your letter. I believe it is. You're asking, in your letter, that ASMFC take emergency action to close the remaining river herring fisheries, but what we're asking for in this motion is the regular process of moving into amendment development; right?

DR. DANIEL: That's correct, and that is based on discussions with board members and staff that had some issues with taking emergency action. I was making the motion specifically to remove the emergency part of that suggestion.

MR. GROUT: I agree with George, and I'm glad this motion has been amended. We're not in quite as bad a shape as some of our other states. In fact, we have one river which has the fifth highest return in river herring just this year. We do have some rivers where fishing was a problem, and two years ago we took regulatory steps to curtail that fishery, but still allow a small amount. Something that is a complete

moratorium would be, I think, beyond what we really need from our state of New Hampshire as this point.

MR. PATTEN WHITE: I wholeheartedly support Dr. Daniel's intent with this. I have some concerns that I would just like to see the PDT address as far as a moratorium on the harvest and landings involved in other fisheries. I think it has got to be reviewed, what the options would be available with that so it doesn't close down other fisheries.

DR. GIBSON: I seconded the motion, and I would have seconded it even if it had been an emergency action, because I think it warranted – while we can discuss around the table the nuance differences in the river herring populations currently, I think a thorough review of the historical information, similar to what was done for shad, will reveal that on an order of magnitude, even in the runs that have some performance – the great Damariscotta runs in Maine are a shadow of their former selves. But I think that is what we're going to find. So this is fine with me, but I would have supported even stronger action.

MR. SMITH: I think George is on the right track. I think the revised motion is an improvement. In my view, it doesn't – and I don't have comment on what we finally do afterwards, because the whole point of the amendment development process is to figure that out. I'd prefer a motion that said containing, at a minimum, options such as those identified in this position paper.

That still reads very much like we're going to do an amendment, and it's going to have an option that does a moratorium, and that's what all five or six of these do, but they do them in different areas. There is in-river, there is coastal, there is all state waters. During the amendment development process, we may find there is a different way that makes people more comfortable on how to deal with this issue.

As long as we know we're not limiting ourselves to one approach, and a plan development team is going to flush out other ideas, then I don't have real problems with this. This is still fairly limiting, and we usually try to not start out telegraphing what we're going to do before we've actually started to develop the amendment.

CHAIRMAN KRAY: Yes, I, too, am uncomfortable with the wording. If someone could wordsmith that to give us a little bit more flexibility – I don't know, your reference to the options that were in the paper are certainly – I would feel more comfortable with that than just having that one. As you say, it sort of

jumps out at you. Eric, do you want to take a shot at it?

MR. SMITH: Yes, just off the top of my head, "includes options among which are a moratorium on fishing and other means to control mortality".

CHAIRMAN KRAY: Is the maker of the motion happy with that? Mark, are you happy with that?

DR. GIBSON: Fine.

MR. DIODATI: As long as we're wordsmithing, it would seem – given that this is an interstate plan, I don't know if it's appropriate to include that language at the end "and no landing of river herring from federal waters". Maybe should read "moratorium on the harvest, possession, and landing of river herring", period, so you get rid of "from state waters and no landing of river herring from federal waters".

CHAIRMAN KRAY: I would agree with that.

MR. LAPOINTE: Mr. Chairman, thank you. I'm not a wordsmith, and so I don't think it's worth getting into it that much. Incumbent in the motion is using the normal PDT process, and those states that are concerned about the options, whether they be a moratorium or whether they be, in Maine's case, conservation measures that include a moratoria in those states that need it, those are all things that we have to make sure that the PDT hears from us our concerns and gives us a suite of options to go out to public hearing that include that. So, my wordsmithing will come at a later time.

DR. DANIEL: I agree with Paul's comment about perfecting the end of the motion, with the intent being that there would be – and you don't have to add this to the motion – but my intent would be that the recommendations to the Secretaries be included in the amendment, which is what we talked about and what is in the options paper.

So, I think if the PDT works with this options paper and fleshes it out and maybe adds additional options is fine with me. My main intent here is the four words, which is to move to proceed immediately. However it comes out at the end, I appreciate the help in getting this to where everybody is comfortable.

MR. BOYLES: Thank you, Mr. Chairman. I agree with this. I must say on record – I mean, our sense of things south of North Carolina is there is something different about life history or biology or least the prosecution of this fishery. One of the things that

concerns me with my fishery in South Carolina is this land locked or impounded harvest, some of which is prosecuted several hundred miles from the coast.

I feel a lot more comfortable with going through the plan development team. I agree with Dr. Daniel, we do need to move immediately, but there are these nuances that if I have to go to my legislature and talk about the hammer of a moratorium, I just get concerned about the perception that we're shooting from the hip. I support the motion as amended.

CHAIRMAN KRAY: Any additional discussion the motion? Kelly.

MR. PLACE: To support Dr. Daniel's immediacy, I would like to point out that during our three-year independent survey with sturgeon we caught one alewife in the spring of '05 and zero alewives in '06 and '07. We weren't exactly fishing this right size mesh during our sturgeon survey, but the watermen that I touched based with in all the river systems that are fishing the right mesh see a similar thing.

We still got some but very few blueback herring. The alewives, from what I can tell, are practically extirpated to the point that even old-time watermen don't even differentiate between the two species. They're hard to tell apart, really, for a lot of people. I'm reluctant to use the hammer of a moratorium, too, but the facts speak for themselves.

MR. DIODATI: Given the discussion we had earlier about the new MSA requirement for a federal recreational registry that will include fishermen fishing for anadromous fish, this may be a moot point to do this, because I suspect that new law will put the authority for managing anadromous fish, all the way up into the rivers, under the federal regime.

So it might make ASMFC a moot point in developing this kind of a state plan. So, that would follow what has happened with other groundfish species, for instance, and other species that are currently managed by MSA where registry requirements were put in place to track fishermen, but now those registries are used very effectively to control fishing throughout state waters and were all federally managed fish. So, very clearly, I think this needs some kind of legal review relatively soon.

CHAIRMAN KRAY: Thank you. Call the question? All right, Louis, would you read the motion, please.

DR. DANIEL: Yes, sir. Move to proceed immediately with an amendment for river herring that

includes options which are a moratorium on fishing and other means to control mortality.

CHAIRMAN KRAY: Okay, motion on the floor. Any need for caucus? Seeing no need for caucus, all those in favor, raise your hand; opposed; abstentions; null votes. 19 in favor; 0 abstentions; 0 null; 0 no votes. Another issue, Mr. Chairman.

MR. LAPOINTE: The issue of the bycatch is something I don't think we should wait for an amendment to do, the bycatch in the herring and the mackerel fishery, from my perspective, and other fisheries, and so I would hope we could have an engagement with the National Marine Fisheries Service on trying to address that issue sooner, you know, because we know it's the right thing to do.

And for those states that do monitoring of the herring fishery – and Maine is one – we've already got our staff looking at the level of bycatch so that, in fact, we can get to the issues sooner than an amendment would provide. I don't know if we want to write a letter from the commission to the service asking for some attention to this, but I think that's something we should do sooner than – you know, we don't need a full amendment to take action.

CHAIRMAN KRAY: Okay, I neglected to say that the motion passes 19 to nothing. Thank you, Erika. Bob Beal, you wanted to comment?

MR. BEAL: Yes, not to George's point but just back on this motion. I just want to make sure that staff is interpreting this motion the same as the folks around the table. My interpretation is that the – since this is an amendment, we will go through the two-step process of a public information document, then a draft amendment, public hearings and all that.

So, prior to the October annual meeting we will develop a draft public information document for consideration by this board in October. I just want to make sure everybody is on the same timeline and page here.

## OTHER BUSINESS

CHAIRMAN KRAY: Okay, is there any other business to be brought before the board? Wilson.

DR. LANEY: Mr. Chairman, just a clarification, I guess, back to American shad for a moment. I heard Vince say that based on the stock assessment and the peer review, which we have now accepted, that the appropriate process or the appropriate next step would be to develop an addendum or amendment to

hopefully implement some of the recommendations from those two documents. We didn't really discuss a timeline for that. Is there any consideration to what the timeline should be for that addendum or amendment?

CHAIRMAN KRAY: I would turn to staff for that.

MR. BEAL: Thank you, Mr. Chairman. My interpretation with that one is that staff would go back, look at the requirements in the plan to determine where the states are with respect to their monitoring requirement and kind of develop a list of other recommendations that are included in benchmark stock assessment and the peer review report, bring all those back in October.

Then the board can decide if they want to take that list and initiate an addendum based on that. At that point we will have decide whether you want a concurrent addendum/amendment or you're going to roll it all into one or whatever, but I think we need – if we get the list in front of the management board members, it will be a lot easier to decide.

CHAIRMAN KRAY: Okay, with that, at the beginning of the meeting I indicated that we may or may not have an October meeting, and now it looks like we're going to have an October meeting of this board and particularly look at both issues, the possible addendum to the shad and how soon we're going to roll it into an amendment with river herring and shad or how that's all going to work. We will have a meeting in October and get the recommendations on that.

EXECUTIVE DIRECTOR O'SHEA: Thanks, Mr. Chairman. You're moving pretty fast here and we keep pulling you back a little bit. I'm unclear as to what the board's direction is relative to the suggestion made by Commissioner LaPointe on a letter to the feds on bycatch.

CHAIRMAN KRAY: I think we should probably send something to them that indicates to that effect. Does anyone on the board disagree with that direction?

MR. YOUNG: I don't disagree, but would that letter address not only river herring but also shad?

CHAIRMAN KRAY: Yes. Are you clear now, Vince on that?

EXECUTIVE DIRECTOR O'SHEA: Yes.

## ADJOURN

CHAIRMAN KRAY: Thank you. Seeing nothing else before this board, we're adjourned.

(Whereupon, the meeting was adjourned at 10:55 o'clock a.m., August 16, 2007.)

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