Atlantic States Marine Fisheries Commission

American Eel Management Board

August 7, 2014
8:00 a.m. – 12:00 p.m.
Alexandria, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order (*T. O'Connell)* 8:00 a.m.

2. Board Consent 8:00 a.m.
   - Approval of Agenda
   - Approval of Proceedings from May 2014

3. Public Comment 8:10 a.m.

4. Elect Vice-Chair **Action** 8:15 a.m.

5. Draft Addendum IV for Final Approval **Final Action** 8:20 a.m.
   - Review of Draft Addendum IV *(K. Taylor)*
   - Review of Public Comment *(K. Taylor)*
   - Advisory Panel Report *(M. Bouw)*
   - Technical Committee Report *(S. Eyler)*
   - Law Enforcement Report *(J. Fessenden)*
   - Consider Final Approval of Addendum IV

6. Other Business/Adjourn 12:00 p.m.

The meeting will be held at the Crowne Plaza Hotel 901 North Fairfax Street, Alexandria, Virginia (703) 683 – 6000

Atlantic States Marine Fisheries Commission

MEETING OVERVIEW

American Eel Management Board Meeting
August 7, 2014
8:00 a.m. – 12:00 p.m.
Alexandria, Virginia

Chair: Tom O'Connell Assumed Chairmanship: 5/14	Technical Committee Chair: Sheila Eyler (USFWS)	Law Enforcement Committee Representative: Fessenden
Vice Chair: Vacant	Advisory Panel Chair: Martie Bouw	Previous Board Meeting: May 12, 2014

Voting Members: **ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, VA, NC, SC, GA, FL, D.C., PRFC, USFWS, NMFS (19 votes)**

2. Board Consent:

- Approval of Agenda
- Approval of Proceedings from May 2014 Board Meeting

3. Public Comment:

At the beginning of the meeting, public comment will be taken on items not on the Agenda. Individuals that wish to speak at this time must sign-up at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Board Chair will not allow additional public comment. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Elect Vice-Chair Action

5. Draft Addendum IV for Final Action (8:20 a.m. – 12:00 p.m.) FINAL ACTION

Background

- The Board initiated the development of Draft Addendum III in August 2012 in response to the 2012 Benchmark American Eel Stock Assessment, which found the American eel population in U.S. waters is depleted. Draft Addendum III for Public Comment included a range of options for the commercial glass, yellow, and silver eel fisheries, as well as the recreational fishery.
- In August 2013, the Board approved some of the measures from Draft Addendum III (predominately the commercial yellow eel and recreational fishery management measures) and split out the remainder of the management measures for further development in Draft Addendum IV.

- The Board directed the PDT to develop Draft Addendum IV to include, but not limited to, a coastwide glass eel quota, adequate monitoring requirements, adequate enforcement measures and penalties, transferability, timely reporting, silver eel measures (for NY DE River only), and a criteria to issue a state scientific permit for all life stages**.**
- In May the Board approved Draft Addendum IV for Public Comment **(Briefing Material)**. The public comment period ran from May 30 – June 17 (Supplemental Material). Public hearings were held all states with the exception of Pennsylvania, D.C., Georgia and Florida **(Supplemental Material)**.

Presentation

- Review of Draft Addendum IV by K. Taylor
- Review of Public Comment by Kate Taylor
- Advisory Panel Report by AP Chair
- Technical Committee Report by TC Chair
- Law Enforcement Report by LEC Representative

Board Actions for Consideration

- Approve Addendum IV

6. Other Business/ Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

AMERICAN EEL MANAGEMENT BOARD

Crowne Plaza - Old Town
Alexandria, Virginia
May 12, 2014

These minutes are draft and subject to approval by the American Eel Management Board.
The Board will review the minutes during its next meeting.

TABLE OF CONTENTS

INDEX OF MOTIONS

ATTENDANCE

Board Members

Pat Keliher, ME (AA)
Terry Stockwell, ME, Administrative proxy
Steve Train, MD (GA)
Rep. Walter Kumiega, ME (LA)
Doug Grout, NH (AA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
G. Ritchie White, NH (GA)
Dan McKiernan, MA, proxy for P. Diodati (AA)
William Adler, MA (GA)
Rep. Sarah Peake, MA (LA)
Robert Ballou, RI (AA)
Rick Bellavance, RI, proxy for Sen. Sosnowski (LA)
David Borden, RI, proxy for B. McElroy (GA)
Rep. Craig Miner, CT (LA)
David Simpson, CT (AA)
Lance Stewart, CT (GA)
James Gilmore, NY (AA)
Emerson Hasbrouck, NY (GA)
Pat Augustine, NY proxy for Sen. Boyle (LA)
Russ Allen, NJ, proxy for D. Chanda (AA)
Chris Zeman, NJ, proxy for T. Fote (GA)
Leroy Young, PA, proxy for J. Arway (AA)
Mitchell Feigenbaum, PA, proxy for Rep.Vereb (LA)
Roy Miller, DE (GA)
David Saveikis, DE (AA)
John Clark, DE, Administrative proxy
Bernie Pankowski, DE, proxy for Sen. Venables (LA)
Russell Dize, MD, proxy for Sen. R. Colburn (LA)
Thomas O'Connell, MD (AA)
Bill Goldsborough, MD (GA)
John Bull, VA (AA)
Rob O'Reilly, VA, Administrative proxy
Kyle Schick, VA, proxy for Sen. Stuart (LA)
Catherine Davenport, VA (GA)
Louis Daniel, NC (AA)
Ross Self, SC, proxy for R. Boyles, Jr. (AA)
Patrick Geer, GA, proxy for Rep. Burns (LA)
Jim Estes, FL, proxy for J. McCawley (AA)
Derek Orner, NMFS
Sherry White, USFWS
Martin Gary, PRFC
Bryan King, DC

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

Ex-Officio Members

Joe Fessenden, Law Enforcement Committee Rep.
Sheila Eyler, Technical Committee Chair
Marty Bouw, Advisory Panel Chair

Staff

Robert Beal
Toni Kerns
Kate Taylor
Marin Hawk

Guests

Wilson Laney, USFWS
Steve Meyers, NOAA
Patrick Moran, MA Environmental Police
Jack Travelstead, CCA
Tom Baum, NJ DFW
Kelly Denit, NMFS
David Pierce, MA DMF
Leo Maher, CCCFA
Hunter Maher, CCCFA
Janice Plante, Commercial Fisheries News
Daniel Hightower, E&D Eel Co
Arnold Leo, E. Hampton Baymens Assn
Greg Wells, Pew Trusts
Joseph Gordon, Pew Trusts
Aaron Kornbluth, Pew Trusts
Purcie Bennett-Nicherson, Pew Trusts
John Pedrick, Bensalem, PA
Paul Jacobson, Elec Power Research Intl.
Jeffrey Pierce, Maine Elver Fishermen Assn.

The American Eel Management Board of the Atlantic States Marine Fisheries Commission convened in the Presidential Ballroom of the Crown Plaza Hotel Old Town, Alexandria, Virginia, Monday morning, May 12, 2014, and was called to order at 11:35 o'clock a.m. by Chairman Thomas O'Connell.

CALL TO ORDER

CHAIRMAN THOMAS O'CONNELL: Good morning, everybody. I would like to welcome to the American Eel Management Board Meeting today. My name is Tom O'Connell. For those of you that don't know me, I'm from Maryland. This is my first meeting that I will be chairing the American Eel. Thanks to Terry for the last couple of years for his work. Before we get started, I am going to hand it over to Bob Beal, our executive director, to just introduce a few new commissioners today.

EXECUTIVE DIRECTOR ROBERT E. BEAL: This is our first coast-wide board of the week, obviously, and I just want to introduce a few new faces that are around the table and around the room just so folks can introduce themselves and get to know each other and know who is sitting at the table representing which states.

As Terry Stockwell mentioned earlier, Emerson Hasbrouck from New York is here. He is the new governor's appointee from New York. As you noticed, Pat Augustine, who is not a new commissioner but is still here; and Pat is serving as the proxy for Senator Boyle, the legislative commissioner from New York.

Another relatively new face is Chris Zeman from New Jersey. Chris Zeman is serving as Tom Fote's proxy for this meeting. Tom Baum was also at the board this morning. Tom has been in the commission process for a long time but relatively new to the boards. John Bull is the new commissioner of the Virginia Marine Resources Commission. John is in the back. As he likes to say, he is trying to fill the shoes of Jack Travelstead. The last introduction is Sherry White from the U.S. Fish and Wildlife Service. Sherry is the new Region 5 Assistant Regional Director. That's it, Tom, thank you.

APPROVAL OF AGENDA

MR. O'CONNELL: Thank you and welcome everybody that is new here today. Everybody should have an agenda in front of you. As you'll see, we have a few updates, but the primary focus of today's meeting is to review Draft Addendum IV for public comment, to go out for public hearing this summer.

The first two items on the agenda, the agenda and the last meeting's proceedings, are there any comments or questions regarding the agenda for today? Seeing none; the agenda will stand approved.

APPROVAL OF PROCEEDINGS

CHAIRMAN O'CONNELL: In regards to the proceedings from our February 2014 meeting; are there any questions or comment regarding those proceedings? I have one person from the public. Is it in regards to the February 2014 Proceedings, sir? Come up to the microphone, please.

MR. DANIEL HIGHTOWER: My name is Daniel Hightower. I'm a South Carolina eel fisherman. I'd just like to address a few of the implications of Addendum III.

CHAIRMAN O'CONNELL: Hold on one second; we're not yet at the public comment period. We're almost there; just hang on for a second. Back to the February 2014 Proceedings; are there any comments and concerns on those? Seeing none; those proceedings will stand approved.

PUBLIC COMMENT

CHAIRMAN O'CONNELL: Now we're at the public comment period. We do have two members from the public that signed up. Daniel Hightower; would you come up and state your name for the record again. These are for items that are not on the agenda.

MR. HIGHTOWER: My name is Daniel Hightower. I'm a South Carolina eel fisherman and I'd like to address some of the issues of Addendum III and the implications to the South Carolina fishermen. This year as a fisherman, I

can speak on the numbers that I've caught and what I did. This year I caught a little over $300,000 worth of eels at market price; and out of that I was able to keep less than 2 percent because of the eighth inch mesh regulations.

Now, my questions would be the eighth mesh as it pertains; Maine and South Carolina are two completely different fisheries. Maine, the majority having a glass eel catch and a very low pigmented eel catch; South Carolina being the opposite, I catch a thousand pounds of pigmented eels in three months to 10,000 glass eels in the river that we're regulated to at this time.

Now, if an eighth mesh regulation is used for two completely different states; I don't see how that can be effective' and also by reducing our catch by 98 percent, you know, how is that justified by the board. That is one of my first questions. The question is how in Addendum III is the pigmented eel fishery represented as a new and developing fishery when I hold in my hand an October 1974 issue of Trends Magazine where Randall Livingston was catching and raising these pigmented eels in his farm? I've given a couple of copies of these out and I can pass around if need be. Those are a couple of the issues that I would like to address. I don't know if you have any comments or answers for those.

CHAIRMAN O'CONNELL: Thanks, Daniel, I appreciate those comments. As we probably go through the meeting today, if the board members have questions, if you're hanging around, maybe we can bring you back up.

MR. HIGHTOWER: Absolutely; and one more thing. Maybe there could be an amendment to represent the states for that eighth inch mesh because as it pertains to elvers, when you use an eighth inch mesh, you know, we have an elver fyke net permit, that is anything under six inches as defined. The eighth inch mesh regulates those six-inch elvers out of the catch, which inherently as you can see South Carolina is predominantly – that is our catch. That is why I'm here today just to represent the South Carolina fishermen and talk with you fine people.

CHAIRMAN O'CONNELL: Thanks a lot; I appreciate you taking the time. All right Jeffrey Pierce.

MR. JEFFREY PIERCE: I've got a couple of things. Reading the new Draft Addendum IV; there are a few things that are incorrect on the executive summary. The first paragraph you have a combination of historic overfishing – overfishing has not been determined in this fishery. Then on Page 1, in the background, it states overfishing again. Overfishing has not been –

CHAIRMAN O'CONNELL: Excuse me for one second, sir. This public comment is for items that are not on the agenda and Draft Addendum IV is. There will be an opportunity for public input on that. Do you have anything to say that is not on the agenda right at this point in time?

MR. PIERCE: I only have something that should be in this draft addendum, outboard migration and turbine mortality. It says in this addendum there that it cannot be easily corrected; that is not true. Through FERC L3, Article 15 and 16, with cooperation with U.S. Fish and Wildlife, NOAA and NMFS, they could encourage the hydroelectric facilities to do this.

CHAIRMAN O'CONNELL: All right, Kate Taylor is saying that we already have the authority in Addendum II and III to address those concerns. I'll talk to Kate maybe at break to see if we need to bring those up today or not.

MR. PIERCE: Well, it says in the addendum that this cannot be corrected; so it is inconsistent with Addendum III is what I'm trying to point out.

CHAIRMAN O'CONNELL: Okay, thank you. We'll take a closer look at that. Are there any other members from the public that didn't sign up that wanted to say a word? All right, seeing none, we'll move forward with the agenda.

UPDATE ON 2014 MAINE ELVER FISHERY MANAGEMENT MEASURES

CHAIRMAN O'CONNELL: We have an update on the 2014 Maine Elver Fishery Management Measures; Terry Stockwell.

MR. TERRY STOCKWELL: Pat Keliher is going to do it.

MR. PATRICK C. KELIHER: I'm just going to quickly do an update here. I think I've got eight or nine slides for the board. I'm going to talk about the quota system that we put in place – and that was allocated to individuals – the swipe card system, enforcement and monitoring, penalty provisions and the season to date.

We had two pieces of legislation that went through this year and were signed into law by the governor to ensure that we had everything in place for this season that is currently ongoing. LD 1625 authorized the commissioner to establish a rule to create an individual elver fishing quota for the state.

If you recall, we voluntarily put a 35 percent reduction in place that brought our total target down to 11,749 pounds for this season. It also allocates quota to the non-tribal license holders using a formula that takes into account prior years landing. The formula that we used towards taking the last three years, we averaged the best two years of the landings from an individual.

By doing that little bit of a math problem, you ended up with more or a higher number, if you will, for the individual based on what they would have had or would what would have shown for the 11,000. If we totaled them all up, it would have been greater than 11,000. At the end of that calculation with the two-year average, throwing out their worse year, we then had to take an additional 41.8 percent from each individual.

Then a specific percentage of the overall quota is then allocated to each of the four federally recognized tribes. Out of that 11,000, approximately 2,581 were allocated to the tribes or 21.9 percent of the fishery. Just quickly, this just shows the quota that we have in place for the Passamaquoddy, Penobscots, Maliseets, and Micmacs; and at the bottom the non-tribal.

The first column shows the total quota for each of the jurisdictions. We subtracted a 5 percent buffer from that. Then the far right column shows the allocated pounds; again totaling up the poundage that would be allocated to each jurisdiction. The one component that is new for this fishery, which is new to the state, is the swipe card system.

We were, I would call it, cautiously optimistic going into this season that this would work as well as we had hoped; and it far exceeded our expectations. The way we implemented this system is we had all license holders, tribal and non-tribal – that is 949 individuals – were required to appear in person to pick up their transaction cards.

A marine patrol officer went over all of the laws associated with that transaction card and their individual quotas. Then everyone who received that card was then required to sign off. That signature was witnessed by a marine patrol officer. So if somebody came up to us, which we've had a few people say that they didn't know that was the law, we'd have them on record with a signature stating that they in fact signed off on this and were aware of the laws.

All license holders were given a summary of the law and the regulations pertaining to the elver fishery; and then the license holders were given a sheet that explained the use of their transaction card. The transaction card looks like a simple credit card or the hotel cards that you would have here. We were concerned that just abuse coming in and out of the wallet or however they were going to hold them; that they would potentially start to fail, but to date we've only had one card fail and only one swipe card reader failed.

But that swipe card reader we think there may have been some thinking to try to get around how they were going to move forward; but it

was not finally determined. We replaced the mechanics or the reader and everything now is moving forward smoothly. The other piece of legislation was LD 1723. This was more focused on enforcement and monitoring.

With harvesters, we established the requirements for the use of the swipe card when selling elvers. It requires the harvester to have in their possession, when they're fishing, their license, the transaction card and a photo ID. If they're missing one of those three, then they cannot move forward with the transaction.

The transaction card is deactivated by us when the quota is reached. I think as of today we've I think shut off around 60 cards for reaching their quota. We did reinstitute the 48-hour closed periods from noon Friday to noon Sunday. We also, at the request of the Passamaquoddies, put in a dipnet-only restriction for the St. Croix River, which is the border river between Maine and Canada.

The season was delayed until April 6th. It normally starts on March 22nd. The reason it was delayed is that the legislature took a little additional time. There was some back and forth right at the end, which meant that we could not get it finalized and then to the governor for signature in time. As far as the dealers with enforcement and monitoring, we created requirements for dealers to use the DMR-issued reporting equipment, which is the swipe card reader. DMR then provided the reporting software. Again, it has been working flawlessly. The dealers must sync with the DMR Licensing System once every 24 hours in order to ensure that they don't buy from harvesters whose cards have been deactivated. The dealer must upload landings every 24 hours, as I said, by 2:00 p.m.; and then by 7:30 or 8:00 o'clock the following morning we will have a full report sent out to both Colonel Fessenden and myself and others within the landings' program and within the patrol.

The dealers may immediately be suspended for failure to report; and swipe card readers may be seized by a patrol. If we have an issue before – all of these swipe readers are state-owned; so if we have abuse of the system, we can put them out of business right then and there on the spot by just taking their equipment.

The supplemental buyers must keep a running tally of purchases. If elvers are in possession and don't match the records, the entire bulk pile may be seized. If we have a patrol officer who stops a truck and they say they've got 20 pounds on board and the officer looks and he thinks they have 25 pounds on board or 30 pounds on board, he can require them to immediately drive back to their fixed place of doing business and weigh the eels.

If it is a minor violation and they're only a few pounds over, then we will seize just that small amount of the poundage; but if it is a violation of ten pounds or more, we will seize the entire bulk pile and we will hold on to the money. We will go through the court proceedings; and then if we're deemed to be wrong, then they would receive part of those funds back.

All purchases must be made by check; so we went back to the no-cash sales. Elvers must be returned to the permanent facility for at least 60 minutes before shipping out of state; so all of those supplemental buyers who buy for the dealer with a fixed facility must come back to that location.

The one area that it looked we made a mistake on was the fact that if a dealer did not buy, they didn't have to sync. What was happening is we were turning off cards and somebody would still fish. Then they would go to a dealer that hadn't synced up for two or three days and they were able to then go ahead and sell those eels. In some cases they were going over their quota.

To rectify that situation, I signed an emergency rule and put that in place last week; and so even if they have not purchased any eels, they have to sync at zero pounds. The penalty provisions, as I reported to this board in the past, all of our penalties for the elver fishery are felonies now. They are a Class D crime with a $2,000 fine.

The first offense is a mandatory one-year suspension of license. The second offense is

your license is permanently revoked. Those two issues, the second offense, the two strikes and you're out has brought us into a very high level of compliance with licensed fishermen. The harvester who sells more than their quota must pay restitution to the state equal to the value of their overages.

Joe, which do we have, four people I think now who have gone over to date, four or five that have gone over for a total of about 15 pounds? We deal with that through an administrative process. One, they are notified by a marine patrol officer that they've gone over their quota. They have summoned; they know they will lose their license for the following year; and then we take them through an administrative process.

We know what they paid before or sold the eels for. They are then made aware of the fact that they have to refund that money to the state of Maine; and that money would go directly into our Eel and Elver Management Fund. I think there was one piece left unless I covered it. The last bullet, collective overage by non-tribal license holders or by any of the four federally recognized tribes is deducted from the following year's allocation. That was the point that I brought up at the last board meeting.

Just a quick update on the season; despite the delayed start and the incredibly brutal winter – it was even brutal for me and I like winter – we've caught greater than 50 percent of the quota. If you broke it out, the non-tribal license holders have caught 57 percent of their quota to date. As I said, the swipe card is performing excellent.

Enforcement actions to date, before the season even started we implemented actions against 14 harvesters for reporting violations for the last three years for improper reporting. The in-state poaching has been very limited and compliance is very, very high by license holders. There is very little illegal activity.

Usually we see a lot of cases of poaching at fishways and other places; and that has been very minimal this year. We have 65 individuals who have reached their individual fishing quota and their cards have been deactivated. Four individuals have gone over their quota for 16 pounds. The real big case that we had in Maine is the fact that our Maine Revenue Service is looking at harvesters for not paying taxes.

The first one who went through; he underreported his income by $700,000. He is now in the process of paying that money back in full and will be spending nine months in jail. The IRS hasn't taken care of him yet either; so that is just his first stop in the court system. There are many more individuals who will be going through that process.

I think we've also had three, Joe, or four cases of illegal eels that we know they have been brought in from out of state. They tried to sell to dealers and the marine patrol was able to make some really good cases. I think 50 or 60 pounds were confiscated and then liabled through those cases. Very, very little activity compared to last year on eels coming in from out of state; but I think that is a direct result of the individual fishing quota and the swipe cards that we've put in place. With that, Mr. Chairman, I will end my remarks.

CHAIRMAN O'CONNELL: Great overview; thanks, Pat. Are there any questions for Pat? Dan.

MR. DAN McKIERNAN: Thank you, Pat; that was a great report. I have a few questions, but I'll start with the first one. Can you describe for us the typical transactions of eels relative to primary buyers and secondary buyers and tertiary buyers? To maybe get to the point; are your primary buyers also the folks who are shipping out of the airports or do you have multiple persons who take possession?

MR. KELIHER: We have a primary dealer or buyer who has a fixed facility. Then under that dealer license, he may have supplemental licenses. Those would be the people that he hires with trucks to go out buy on the rivers. Those individuals are buying; they also buy directly at their fixed facility, but all the eels have to come back to that fixed facility.

The shipping of eels out of state, some of our dealers, what they'll do is just turn around and sell their eels that they buy directly to another dealer for a profit and not deal with the export side of the business. I would look to the colonel to remind me that we probably have six to ten dealers who probably do export. It may be a little bit more, Dan, but that is what is ringing a bell right now.

REPRESENTATIVE SARAH K. PEAKE: A question on the enforcement; and thank you for your efforts to address cutting back on poachers in other states coming to Maine to sell their eels. I'm just curious if as the system has worked, if the swipe card is more to get at quota and if there is traceability as to the source and origin of those eels.

Interestingly, as I was reading the Cape Cod Times, our daily paper, in Barnstable County and for the Cape and Islands, in today's paper there was a poaching effort that was thwarted, saving, according to the press, about 35 pounds of young and valuable eels. They had condensed them in a fishway; and it was just because a passerby asked these two guys what are you doing and they ran off. Here was 35 pounds of elvers; what are we doing to stop that from traveling north and over the border and finding its way to a dealer and being shipped out?

MR. KELIHER: I think that is a great question; and I think that's one of the biggest benefits of the individual fishing quota that we have in place now. An individual may have as low as three pounds or as high as a hundred pounds, depending on how good they have been within the fishery and the fishery that they have in the fishery.

An individual, whether he has three pounds or a hundred pounds, is very unlikely to want to take on illegally caught eels to sell them for half the money, especially because the value of eels – the price per pound has been fluctuating between $500 and $800 versus the $2,000 a pound last year. That becomes a very good deterrent just in itself because the individuals don't want to lose the money.

It was easy last year to say, yes, I'll take your eels and mix them with mine, because they have to worry about reaching their quota too early; but now they have to worry about reaching their quota. As soon as we instituted that quota, the fishermen were instantly saying, okay, I get 20 pounds, this is what the value is. They were calculating in their mind very quickly what they could make that year. Anything that takes money away from them is something they don't really look very highly at.

MR. DOUGLAS E. GROUT: As a neighboring state, last year we put in a tremendous amount of effort in law enforcement. I think we ended up with 22 cases in our little thirteen miles of coastline. I also had an assaulted officer. Compare that to this year, we've had nothing.

Even though we've had just as much effort out there, two or three, sometimes four officers out every night checking, so obviously I'm sure some of this action that has been taken by Maine has helped us out; maybe the price, too, because the price isn't quite as high as it was last year.

It is less than half of what it was last year. I still would like to comment the state of Maine for taking these efforts, but also say that we're still putting a lot of effort on enforcement here for a very small amount of species.

MR. G. RITCHIE WHITE: A question for Pat just to follow up on what Sarah was getting into; is there tracking beyond the first dealer into the export system. What I'm thinking is could someone sell to the secondary dealer that you're talking about that is the exporter and bypass your recordkeeping system?

MR. KELIHER: No; because they have to keep a running tally on the truck and because that running tally must be maintained with the dealers themselves when they get to their fixed facility, I think the chain of custody and Maine monitoring those landings from harvester to supplemental to dealer is very, very strong.
Now, once they leave the state, then it falls over to the U.S. Fish and Wildlife Service for their monitoring of what is being exported. I know the colonel has had many conversations with the

U.S. Fish and Wildlife Service and dealing with that side of the monitoring. There may be loopholes, but I think we've tied it up in our end as best we can.

MR. ROBERT BALLOU: Thank you, Pat, for your excellent report. A question to you, Pat – actually I have two. The first is how have you covered what must be enormous administrative costs associated with developing and implementing this program?

MR. KELIHER: We established some funds over the past two years, which were very beneficial for elver eel management and enforcement. We were actually able to cover all the costs associated with the swipe card system in particular. The swipe card system itself; the overall budget was not astronomical.

I think with all of the equipment we purchased, the swipe cards and some staff training, totaled around $75,000. Now that we have that in place, we're already getting ready to transfer that technology over to our Urchin Fishery and our Scallop Fishery; and if that works and the governor is reelected and I have a job next year, my goal is to transfer it to all other fisheries.

MR. BALLOU: I have a second question. Do you collect information on the locations of the harvest; is that part of the system?

MR. KELIHER: The swipe card; even though the harvester maintains the swipe card itself, it is really for the dealer reporting. We still require the monthly harvester reporting where we get the information as far as harvest location. It is fairly rough information right now. The one thing that we have invested heavily in and has been very expensive is the new business management system for enforcement, for licensing and for harvester reporting and dealer reporting.

We're hoping that within the next two years we're going to have a system that will tie together with the swipe cards, and we will be able to do both harvester and dealer reporting at the time of sale so we can easily add that type of information into it. This is where, Bob, we have invested heavily and it has been very expensive. I think we have invested around $400,000 to date in that system and we still have a couple of years of work to do.

MR. MITCHELL FEIGENBAUM: Mr. Chairman, I was going to address the questions asked by the Massachusetts delegates about traceable beyond the first dealer. Pat has addressed most of those points. First of all, I want to commend Pat and the state of Maine and everyone at DMR for all the great work they've done. I think that Pat is being a little bit modest about just how successful this program has been. I think it has been well received by dealers. It has been accepted by the fishermen.

It has clearly changed the entire characteristic of the fishery as we move from one that has operated as a cash business with a lot of non-reporting to one that is much more professionalized and enforceable. I just want to point out in relation to that very question about the traceability; obviously our federal partners in the Fish and Wildlife Service are playing a critical role in helping to improve the fishery.

It was interesting to read through the law enforcement comments from prior to Addendum IV where it was suggested that the magnitude of the problem was such that perhaps the federal resources were not sufficient or state resources were not sufficient to keep up with the poaching efforts, but I think this year has demonstrated that a dedicated effort by jurisdictions working together really is capable of putting a fishery under control that was perceived to be out of control in the past.

I want to just conclude by saying I really hope that the Fish and Wildlife Service will continue to focus on this particular question of the export process. Basically, Maine has authority to regulate what a dealer does in the state buying those fish; but as we have now heard, that dealer can turn around to another dealer the very next day, someone who is not licensed, someone who is not even from Maine and can sell those eels to anyone they one.

Presumably those individuals would be subject to the same Fish and Wildlife Service reporting requirements, which includes 48 hours advanced notice of all shipments. It requires that the shipments go out of a particular airport. If a dealer is not, quote-unquote, on the radar screen, working in a state other than Maine where the local Fish and Wildlife officers might not even know there is a glass eel trade going on and that they're taking the eels to an airport other than the major airports where Fish and Wildlife has a consistent presence to check exports, a dealer can presumably go another airport where there is just no one even present that is aware of these issues.

It has been a really great amount of progress in one year; but in terms of the issue of shore-to-plane traceability, we still have some work to do; and I look forward to sharing thoughts further with the state as well as with the Fish and Wildlife Service so that we can continue to tighten up and improve the fishery. Thank you.

CHAIRMAN O'CONNELL: Joe would like to provide a response to some of that input.

COLONEL JOSEPH FESSENDEN: The commissioner did a great job summarizing our effort up there. Truly, the officers and the whole department is a joint effort in pulling this off; and it has been very effective. I'm very pleased in how it went. One of the things – and Pat mentioned this kind of quickly, but I want to bring attention to it because a lot of peers in law enforcement have confidentiality issues with landing reports.

Maine up until last year, we weren't able to look at our landing records unless we had a good reason, probable cause or violation had been committed. The commissioner, working with the legislature, got authority for our patrol to look at landing records. It was absolutely incredible. I have been around for almost 40 years doing this, and last year was the first time I had the opportunity to look at landing records and compared dealer records with harvester records.

The discrepancies that were there within the elver fishery were significant, which allowed us moving forward with suspensions of 14 harvesters. They had a minimum of 25 pounds difference in elvers reported, minimum. Some of them were a hundred pound differences between the harvester and dealer landings. You may go back to your respective states and just consider giving some of that information up to law enforcement. It is confidential to us.

We don't use that information unless we can make a case and obviously to go to court. That information is made public during the trial, but certainly it really enhanced our enforceability of these laws. It is a heck of a resource for law enforcement, especially when you go from not having that information and then all of a sudden having this treasure load of information.

We actually hired an investigator last year at the beginning of the season. We're on year two with him right now. He was able to look at records and spent a lot of time bringing to my attention and the whole leadership's attention the records that were incomplete or inaccurate. It made a huge difference. Actually I think at the end of the day, I think our fisheries' data from Maine, harvested data will be improved across fisheries; not just elver fishing but all fisheries as a result of law enforcement having access to landing data. Thank you.

MR. JAMES GILMORE: Mr. Chairman, just to echo Mitch's comment, I think, Pat, you and the state of Maine should be commended. I think it is a great program. The question I really have is looking at the future, because this obviously has applicability to other fisheries, we're in the process of modernizing our permitting system and tracking, because we've had a lot of interesting things going on in New York.

You already answered one question is you have invested $400,000 in this. The immediate question is, is that just the infrastructure; is that all staffing, whatever, and at some point – you probably don't have the numbers now; but if you could come up with what this program is costing you to implement and then what you think the operational costs would be; it would be a help

for us as we're going into similar type things and modernizing our tracking. Thanks.

MR. KELIHER: Jim, I don't want to confuse – the $400,000 that I'm talking about is our major program within the agency to modernize and implement a system across the three major areas for enforcement, licensing and landings. We call it the Maine Lead System. Associated with that is the swipe card system. That was a separate budget of $75,000, but we're hoping that we're going to be able to merge these two. I will be happy to share that information.

MR. McKIERNAN: Pat, how frequently are fishermen observed in the field either in the act of harvest or just possessing them before dealers? My follow-up question is did you consider creating a logbook like a VTR so that the harvester writes something down that is somewhat permanent and is observed by an officer; and then if some of those eels disappear, you will be able to know where to go to investigate.

MR. KELIHER: We did consider a few different types of tracking requirements. Well, let me back up first. We've got 52 marine patrol officers in the state of Maine. You take off the top command staff and we've got about 30 individuals who are very active in enforcing the fishery on the ground before eels are brought to the dealers. That has always been the primary focus for marine patrol officers.

In the last year the colonel has shifted some of that priority, not all of it but some of it, back on to the supplemental dealers, because last year we were having a lot of problems with the supplemental dealers. We are spending more time actually going to the supplemental dealers weighing up their product to ensure that we have consistency and accuracy for what they're bringing into the field. To date, there has only been I believe two warnings, Colonel, written to supplemental buyers.

We have recently suspended one dealer, but that was for a reporting violation and not an accuracy violation. That has been the focus of the marine patrol. The work on the water, we have talked about having some sort of a record, some sort of a logbook. In fact, Mitch brought it up through his business about almost like the VTR would be a good example or even almost like what a truck driver would have.

We didn't implement that. There were some challenges in doing that, but it is something that we're continuing to look at to try to make sure that we've got a better record of what the harvesters are catching. Now, all of that said, though, when that harvester leaves that dealer, they have a receipt printed out.

That dealer has a receipt printed out, so we can go back to a dealer. If they have discrepancy in their landings and they come to us and say, well, that is not correct, we can go back to those dealers and we can look at what they purchased right from the lad in Boothbay and print out those receipts from our office now to be able to track it.

It gives some accountability to the harvester to say, "I need to follow and I need to look at what I'm landing and to make sure I'm tracking it." As I said, if they don't track it, they lose their license and now they're paying back. There is more work to do there, but I think we've a lot of strides forward.

CHAIRMAN O'CONNELL: I have got two more people; Rick and Dennis. I just want to point out that we started a few minutes early and we're right up to where we should be, starting early. Obviously, this effort by Maine is of interest to a lot of us as we struggle with these reporting issues back home. I'm sure that Maine would be happy to share and discuss with us after the meeting as well; so let's see if we can try to wrap these couple of comments up so we can move forward.

MR. RICK BELLAVANCE: Mr. Chairman, I'll be brief. I'm going to turn my hat a little from a commission hat to an ACCSP hat and just remind the commissioners that the ACCSP is funding a swipe card program starting in October this year. If anyone is interested, it might be worth a question for the Coordinating Council on Thursday.

MR. DENNIS ABBOTT: Mr. Chairman, like others I compliment the state of Maine for what they've done. I think they've done an admirable job; and I don't say that to the state of Maine a whole lot in the past.

MR. KELIHER: Somebody write that down.

MR. ABBOTT: You've done a wonderful job, Pat. Do you foresee any problems in the future with dealing with latency and will there be any latency and will you be renewing permits for people who don't have a catch or have you considered where you would go in that area?
MR. KELIHER: Just quickly, I think with the price what it is so the latency probably won't exist; but what was taken off the books was the lottery system. If somebody does not renew their license, that license goes away. If they miss one year; they're done. If an individual is suspended and their privileges have been permanently revoked, they're also done. We don't have anything in place at this time to allow people to come back and reenter the fishery. It is a question that was discussed, but there was no movement at the legislature.

REPRESENTATIVE WALTER KUMIEGA: Obviously, reentry into a limited fishery I think is something we all struggle with; that is something we have to figure out is what to do – if somebody gives up their license or if they're revoked, what to do with that quota. Right now it would just go back into the pool and just be redistributed amongst all fishermen. We're going to have to figure out a way to allow for some entry at some point, because a good number of elver fishermen are older than I am.

MR. KELIHER: I'll be very quick. There has been a lot of talk about what Maine did and Maine DMR has done; but I'd be remiss if I didn't make a statement that this was a work of cooperation between the executive branch, my department and the legislative branch, which is Representative Kumiega's, which he is the House Chair of. If it was not for Representative Kumiega, we would not be here today. I want to just give kudos where kudos are due to Representative Kumiega.

CHAIRMAN O'CONNELL: It was a great job, definitely. Lance.

DR. LANCE STEWART: Just a comment that it is amazing to see it done so rapidly and so thoroughly. As far as the qualification and distribution; I was wondering if the technical committee within Maine, you're giving any mapping or distributional attention to what could be scientifically important to certain streams along the coast; timing as well headwaters, that sort of migrational information.

MR. KELIHER: I can't say whether my staff has shared it with the technical committee. I know there has been information brought forward. I think, Lance, that one of the areas that we need better focus on is a little bit better detail from our harvester reporting. We've got a really good idea regionally where the eels are coming from; but I think – and you and I have had these conversations before – really get down to the river-specific location; because as we know some river systems have a much higher value than others. I think that is some of conversation I'm having with staff about how to pinpoint that.

CHAIRMAN O'CONNELL: Okay, that has got through that agenda item and a really good discussion and great work on Maine's part and others that helped with that.

TECHNICAL COMMITTEE REPORT

CHAIRMAN O'CONNELL: We're going to move on to Agenda Item 5, which is a technical report from Sheila Eyler. At the October meeting, the board directed the technical committee and stock assessment subcommittee to update some of the key indices from the last assessment as well as an update on landings' data through 2013.

MS. SHEILA EYLER: Hopefully, I can keep this short. The technical committee was tasked to update some indices that included for us the harvest data and the young-of-the-year survey. Those data were updated through 2013. We were not able to update any other indices that

were used in the stock assessment besides those two. We also developed a lifecycle survey or at least a framework for a lifecycle survey; and I can give some of the details for that. It is still in a draft form.

The technical committee has not released that yet, but we do have do some information we can pass along to the board. Also we discussed the idea of scientific collection permits and kind of the threshold that should be considered for board action versus the amount of collection permits that could be handled at a state level.

This is the last meeting. Sorry, one second. All right, the presentation was from the February meeting; but I will update you with the harvest data for 2013; the harvest data that we received from all states through 2013. What we saw was an increase – well, the stock assessment period ended in 2010; and so we looked at 2011 through 2013 harvest data.

2011 showed the highest harvest landings since the stock assessment period began in 1998. Harvest levels dropped somewhat in 2012 and the levels again dropped in 2013; but the 2013 data – and we're missing North Carolina's reporting out for 2013, so that number might go up; but the 2013 level right now is in line with the average data from the stock assessment years.

With the young-of-the-year survey, we completed the data through 2013; and you should have received some information in your briefing materials about the young-of-the-year survey updates that we had done. What we found was that there was no significant trends in any of the young-of-the-year indices except for Goose Creek in South Carolina, which showed a decline in the indices.

We just want to point out that the young-of-the-year surveys are highly variable; so some states did see increases in young-of-the-year numbers in the last couple of years. Some states saw a decline and a lot of the states saw the average number. Either regional or short-term changes in the young-of-the-year indices does not indicate that there is an increasing trend or increasing population for American eels. We just want you to take that into consideration.

Because we only looked at the young-of-the-year survey and the harvest data, we did not do a comprehensive review of all the indices for the stock assessment. The technical committee does not recommend any changes to the status of the stock, which remains depleted from the results from the 2012 assessment.

At this time the technical committee continues to recommend that harvest be reduced at all life stages. Moving on to the lifecycle survey, we were tasked to develop a survey to look at the potential for transferability between life stages; and we thought that having a lifecycle survey may be a way to address that.

The technical committee developed a framework for sampling and methodology to conduct lifecycle surveys. Those surveys consider both geographic region and watershed size. There was some interest in looking at smaller watersheds versus larger watersheds and how mortality might be different between those different size watersheds.

At this time the technical committee does not have enough information to determine natural mortality rates or transferability between life stages; which was a request by the board. If we could determine if there is a transfer from yellow eel to glass eel; we just aren't able to do that at this time, but the lifecycle survey should help us get closer to that answer.

And just a few more details about this survey; it is broken into four regions along the coast. What we'd like to see is that three watershed sizes per region get samples. Those would be a total of 12 lifecycle surveys along the coast. The lifecycle survey would include glass eel sampling, yellow eel sampling and silver eel sampling. We have provided a memorandum. In the memorandum from the technical committee there is some information on the lifecycle surveys and the costs associated with those.

Some states would be required to do a full lifecycle survey. There are more states than surveys would be required; so the states that aren't implementing a full lifecycle survey, we would recommend that they at least do a partial survey; so looking at glass eel to yellow eel or yellow eel to silver eel within their jurisdiction.

To complete the lifecycle surveys, the technical committee staff would like more research done on OTC marking. It is otolith marking; and that would be a way to mark the glass eels to do population assessments. We also need additional training on aging as aging would be a very important component in doing the yellow eel and the silver eel surveys to get population assessments.

The final topic we discussed was the scientific collection permits. The Management and Science Committee had discussed scientific collection permits; and they had recommended that 1 percent of a harvest from a state be assigned to scientific collection permits as a maximum. The technical committee recommended that should be changed slightly; so it is 1 percent of an individual state's landings be assigned to a scientific collection permit for eel.

We also recommend that no new fisheries for eels occur so in a state where there is only a yellow eel fishery, we do not recommend to have the scientific collection permit for glass eels. Understanding that developing aquaculture is difficult without having access to glass eels because there is not propagation of eels in aquaculture facilities at this time, we felt there should be a separate permitting system for aquaculture needs, especially from a commercial standpoint.

If a quota system is developed for glass eels in the U.S., we suggest that the board set aside some part of that quota to be used for aquaculture. That would be annually renewable unlike the scientific collection permits which are usually definitive in the time that they're implemented. We suggest that the aquaculture permits could be used by any jurisdiction on the board, but they would require approval by the board. We would like the board to make the decision on who gets the quota for the aquaculture permits. That summarizes the information that we have from the technical committee. At this time we could take questions, I guess.

MR. WILLIAM A. ADLER: I just noticed in the handout the young-of-the-year update analysis, the charts, some are up, some are down, some are flat. It is like there is no real indication that anything is changing. I mean we have some places it is getting better, some places it is getting worse, some places – and is that pretty much what you're finding?

MS. EYLER: Yes, the technical committee found no trend with the young-of-the-year survey in the past three years in comparison to the stock assessment time period. We don't want to make any changes to the stock assessment of the population.

MR. ROB O'REILLY: I'm interested in the same as Bill from a different reason. Time keeps rolling on; and Virginia has expended about $350,000 over time with the young-of-the-year survey; and I'm just wondering not so much when is it enough, but I'm wondering what mechanisms can be made available to utilize those surveys rather than hearing, as I have, for the fifth meeting now that there is really nothing linked from the young of the year further up. I saw the part in the life stage to look at the incremental change, I guess, from glass eel up to yellow eel, which right now that is wishful, and that is okay.

I mean you have to start somewhere; but maybe there is something here on the scientific collection permits. In Virginia, of course, where we stand – and we talked about this the last time – it is no commercial venture whatsoever. However, perhaps there could be a thinking of this life stage getting a little more attention where similar to the good points of the RSA that are promoted by the council, you could have a situation where an academic institution wished to pursue the life stage and part of the sale of the eels went towards that type of funding.

Has something like that been talked about yet by the technical committee? I think that is the advance forward that may give us an idea about not only the life stage in certain areas, but it also may help bridge this gap where we're collecting now for about the 15th year a young-of-year survey and what we hear is the trends aren't there; and I have been hearing that for a while. The main question about the life stage and is it possible the scientific collection permits can somehow, instead of commercial sales, be pushed back into academic investigation?

MS. EYLER: The first point with the variability of the young-of-the-year surveys, I think that they've doing long-term surveys particularly in Europe with young-of-the-year eels. They found that even though it is variable on an annual basis, over a long-term period they're able to get some meaningful results.

In Europe they've been doing surveys since the 1950's. They have a significant time period of information there. The hope is that with additional information we will be able to see some trends at some point. We had a part of the addendum that included a research set-aside, which might address selling eels to get funding to do additional research. That right now is not in the addendum, but it is something that we could consider and potentially could be added back into the addendum.

MR. WHITE: If we adopt a coast-wide quota, I think you're saying that the technical committee would still be opposed to any new fisheries. I guess I need to understand why that decision is not a policy decision in that new fisheries would not add any additional mortality. It would just determine who would be inflicting the mortality.

MS. KATE TAYLOR: The technical committee had discussed and has suggested no new fisheries continuously since the development of the benchmark assessment. The addendum would allow for the development of new fisheries provided that it is offset by decreases in mortality or increases in conservation and habitat enhancement in other areas so there was an overall net benefit to the population, which I will discuss in the next agenda item.

MR. WHITE: So you're saying that if we adopt a coast-wide quota, then that quota could be prosecuted by different states and not just the two states that now have it?

MS. EYLER: I think one thing the technical committee did point out is that we don't understand the habitat benefits, the differences in habitat between jurisdictions, so there may be more of a benefit of having a fishery for eels, for instance, in one place instead of another, if they're more successful in establishing themselves, say, in the Hudson River versus some of the small rivers in Maine. Because we don't understand that relationship, we don't encourage a new fishery for that reason.

MR. STOCKWELL: My question concerns the aquaculture permit and whether or not the technical committee considered any other alternatives other than taking a quota off the top of a coast-wide limit.

MS. EYLER: We felt like for the aquaculture permit to work, it had to be part of a quota system. Toward the end of the addendum there is sustainability permits that could potentially add glass eel harvest along the coast and add to the glass eel quota, which might offset some of the impacts it would have on the current states that have a glass eel fishery. Otherwise, we felt that it was adding a new fishery to the system.

MR. STOCKWELL: I will leave the rest of my comments for later in the afternoon.

MR. JOHN CLARK: Thanks for the report, Sheila. I was just curious as kind of a follow-up on Rob's question about the glass eel survey. One of the most striking things about the yellow eel landings has been the huge increase in Maryland's yellow eel landings since about 2010. I noticed that the Chesapeake and the Delaware Mid-Atlantic Young-of-the Year Surveys both had high levels around 2006/2007; and I was just wondering if the technical committee looked at any linkages between the glass eel indices and the yellow eel landings.

MS. EYLER: I don't think that we've looked at that specifically at this time. Obviously, there is likely a linkage, but we don't have good information on harvest versus effort data, so it is hard for us to assess that at this time.

MR. FEIGENBAUM: My first point is relating to the young-of-the-year surveys and Commissioner O'Reilly's questions about what is the value of the surveys when we hear time after time that there is no trend. I would refer my fellow commissioners to the fact that in the 2007 Fish and Wildlife decision not to list the eel as endangered; the authors pointed out that the lack of a downward trend in those recruitment surveys was a very important indicator of the reproductive capacity of the overall species.

Similarly, in the ASMFC Benchmark Assessment that was released that year, the stock assessment subcommittee had decided not to include young-of-the-year indices for precisely the reason that there were no trends indicated; but in the peer review process, that stock assessment was rejected. One of the grounds for the rejection was the fact that it did not include those young-of-the-year surveys.

The lack of a trend in the young-of-the-year surveys is just as meaningful in indicating that the species is not in collapse as it might be indicating that the species is not on the rise. In summarizing the results of the three-year assessment that the technical committee made, Sheila was quick to point out that she wants everyone to understand that this does not mean that recruitment is on the rise a few years; but it could have just as well be said that the statistics and the trends – I'm sorry, these indices are also indicating that the fishery is not in the decline.

I just wanted to suggest that those young-of-the-year surveys are very important, but I think it is wonderful to see that the technical committee is actually endorsing to move in a more thorough direction, which is to do actual lifecycle surveys. I remember it was Wilson Laney at either the last meeting or two meetings ago made the very smart suggestion that we don't necessarily need to do a young-of-the-year survey in every state and it might be more effective to do good regional lifecycle surveys; and we can get a lot more bang for our buck.

I think that from what I'm hearing, the technical committee has really picked up on that concept. Hopefully, in the future we can see that we can tailor our young-of-the-year surveys to those that are effective and those that we can then link to other lifecycle surveys so we can get a better understanding of the relationship between the different lifecycles.

My second point will be brief. I'm just wondering – and it is not a point; it is actually a question for you, Sheila – in terms of this aquaculture allocation, you said very deliberately that the decisions as to whether to allocate glass eel quota for aquaculture would be made at the board level and not at the state level.

I'm wondering like where is that line drawn; would it be the board's position that we as commissioners would be hearing applications for aquaculture permits from individuals regardless of what state they're from or would that decision actually be passed down to the state level? It is a question but obviously it is a little bit of a loaded question.

It seems to me that if this commission were to be put in the position of choosing winners and losers between various aquaculture applicants from within one state or from multiple states would be really a very challenging road for us to go on. I would suggest to my fellow commissioners that we should be very wary of that.

I understand that there are a lot of states and a lot of individuals from the various states that want to pursue aquaculture and want to get glass eel quota in order to do that. I look forward to participating in those discussions going forward; but hopefully a lot of those discussions will be passed to the state level; because once this commission tells a state what is an appropriate harvest level for a particular state, once we get beyond that point I think it would be very – it could become a little bit controversial to think that a bunch of commissioners in D.C. would

then make the next decisions as to winners and losers. Thank you, Mr. Chairman.

DR. LOUIS B. DANIEL, III: Well, I don't have a motion at this meeting, so that's a good thing. The issue still remains a pretty not topic in North Carolina, however, the interest in trying to generate some level of glass eel harvest to try these aquaculture ventures. I just don't get the sense from the technical committee discussions that there is really any interest at the technical committee of pursuing that.

There is no thinking outside the box as I've been able to see to try to figure out a way to make it happen; and that kind of confounds me a little bit because of the potential that we know from other jurisdictions, particularly Europeans, where it does have a great potential to help us in terms of restocking and reintroducing eels if we were to have a problem.

I think the level of certainty in the stock assessment for eels is pretty low from my understanding. I think as we move forward with this document – and we don't need to get into it today because it could last until this afternoon; but I think before we may have final approval on this document and it certainly has to go out to the public, I think we need to try to think a little more outside the box in terms of how we might make something like this happen. There is no doubt in mind that we can't come up with some kind of conversion rate from yellow eels to glass eels to try to provide some opportunity for these brick-and-mortar facilities.

I've talked with Mitch on several occasions. I know that there may be a long line of folks that would be interested in participating; I just don't know. But kind of like the eel issue in Maine that we just talked about, the swipe card system and the limited entry; you get what you get in a coast-wide allocation scheme; and if that is not enough, sorry; but at the same point providing some of those opportunities while at the time not greatly disadvantaging our yellow and silver eel fisheries is an important direction that I'm going to be looking for at the ultimate end of this addendum.

MR. PATRICK AUGUSTINE: Mr. Chairman, I listened to what Dr. Daniel said and I listened to what Mitch had to say. Then referring back to the status of the elver stock itself or the glass eel stock itself, when we talk about trends, there must be some kind of trend. I look at the number of glass eels or poundage of glass eels that has gone up in the last couple of years, 2012 and 2013, from about eight or nine thousand in 2011 up to 20,000 and 18,000; yet the report – unless I misunderstood it, the report showed that the survey for 2013 didn't show any change in quantity of glass eels out there.

Is it likely that we're missing them; we're not in the places where they're arriving and showing up? When you look at the incidental enforcement activities – I'll call them incidental because several people have gotten caught recently – we're finding several pounds or many pounds of illegal glass eels being taken.

If we look at what we're doing with this addendum, we're going to wipe out supposedly if we go forward a glass eel fishery that takes 15 or 20,000 pounds versus the hundreds of thousands of pounds of glass eels that are being killed. The real question is are we really trying to curtail the harvest of glass eels?

Are we really trying to bring them back; because when you put up there a possible recommendation for an aquaculture permit and then possibly suggest that it is not a – or it is a board issue and not a state issue, I think we miss the point completely to Dr. Daniel's point. When the group came in and made the presentation two years ago and then came back again last year and the thought of taking roughly 750 pounds every year to grow out and turn them over to a profit for an enterprise without any indication as to how many of those are going to put back into the wild, it just seems to me from this particular point of view that line item should be taken completely out and not even be considered.

Relative to whether it should be a state issue or a board issue, there is no question if you have an existing fishery, whether it turns out to be menhaden and it turns out to be eels or what, it

appears that if a state has control as to how they dole out their shares, whether it is recreational or commercial, it would be incumbent upon them to do what they would with it.

We have conservation equivalency in literally every single species of fish that we're dealing with; so to put it back on the board or put it up there as a possibility for the board to make the decision that they will dole out or make available any poundage for aquaculture or whatever I think is not in the best interest of what we're trying to accomplish. Relative to giving away other states' quotas, that is a tough one.

I think the way you do that is once you've prosecuted the fishery, as Florida and North Carolina and others have been very kind to New York with all our overages in bluefish and in menhaden, I think that's the way it works. I would assume if you wanted to have an elver fishery – I'm sorry, a glass eel fishery and an aquaculture, maybe you should go to our friend across the way there and ask if they would donate 750 pounds of their glass eels to the aquaculture industry.

That's a little ludicrous for an example, but that is what we're looking at. At the end of the day, what we're talking about is very subjective; it is not objective at all the way we're going. We have to remain as objective in this as we can. Thanks for welcoming me back; and I hope I'm not too talkative, but I'm not going to let you off the hook and I'm going to keep battling.

CHAIRMAN O'CONNELL: All right, Pat, we're going to have a job for you later on in the agenda, something you specialize in. Bob.

MR. BALLOU: Sheila, looking at the young-of-the-year updated analysis, the handout, I notice that the scales are very, very different, both comparing relative abundance indexes with regard to the various sites as well as the numbers caught with regard to the regions. Can you just quickly summarize in lay terms how we're supposed to look at these and understand those differences in scale.

MS EYLER: The numbers caught, there is a summary section for each region; so, for example, the Gulf of Maine is on the first page. Those for the summary data that were used in the stock assessment; we were not able to summarize the data on a regional level for this re-analysis. We did it per site and those are the smaller graphs that you see on the top of the page. When they do the summary, they still look at all the individual surveys and the index there of how much they have changed from one year to the next; and that gets rolled into this generalized survey.

MR. BALLOU: So if I could follow up; for example, comparing Southern New England and Delaware and Mid-Atlantic Coastal/Bay, I see that numbers caught is in the hundreds for Southern New England; it is in the single digits for Delaware and Mid-Atlantic. Can you just speak to how – are those comparable, those two?

MS. EYLER: What we're looking at is a change in index; so it is based on the sample location. Some sample locations catch large numbers of glass eels just by where they're located and other locations do not; so we're just looking at the change from one year to the next but not the actual numbers that are harvested.

MR. ABBOTT: Sheila, it is my understanding that eels originate in the Sargasso Sea; and from that point they get into the ocean – they're in the ocean and they move up the coast randomly and just land in particular rivers just by the way things are at the moment. What value is young-of-the-year when it can be so variable where glass eels can arrive in Delaware in greater abundance and New Hampshire at lesser abundance?

I look at the first page of the young-of-the-year, and I look at the Lamprey River in the upper right-hand corner, which is the place where they go up over the eel and where Doug's people catch them is just essentially down the street from me. I look at the relative abundance and it took really a good hike, which to me there is no logical scientific reason for that other than randomness. Looking at this really doesn't mean a whole lot to me.

MS. EYLER: I think inherently with the eel's biology you're going to have randomness on the coast. Another thing to keep in mind is that with recruitment it is going to take several years to see increased recruitment if we are protecting eels that are out-migrating just because of the time it takes for an eel to mature.

That also changes up and down the coast so the maturity stage or rate in the southern states is a shorter amount of time than in the northern part of the states. I think that leads to some variability. The ocean transport is an issue here; and so we really need to look at things from a coast-wide level and even more so than a regional level when we're looking at the young-of-the-year surveys.

MR. MARIUS BOUW: To Mr. Abbott there, just to let him know that we used to fish glass eels in Puerto Rico. The minute they turned on the sugarcane factories, the glass eels were gone. The minute the sugarcane factories were closed down; the glass eels came back within the next two or three days. A lot of it has got to do with the water quality.

They're very sensitive to water quality. That is the reason why probably in Maine you have an extra amount of glass eels whereas further south, Lake Okeechobee, for instance, the glass eels are very minimal because there is so much outflow of sewage and everything else that goes with it; the same in North Carolina.

DR. DANIEL: Just related to Dennis' point, which I think is astute, would just ask the question the level in which these glass eel samples are standardized and just thinking about the potential areas where various states might set their weirs or their dip nets or however they may be catching them; is their some way to standardize the volume of water filtered and make those comparisons or is it just we caught eels and we caught a hundred in an hour and there might be very different gear types; has that been standardized in the eel – or is that documented in the plan?

MS. EYLER: The methods for collection have been standardized, locations have been standardized; and if those need to be changed for a future assessment, we could do that.

DR. DANIEL: Yes; I was just curious. I just didn't remember when we were doing it if there was a specific way we were supposed to do it so that they were comparable from jurisdiction to jurisdiction and the actual densities of eels that we're reporting so they are comparable.

MS. EYLER: The collection methods and processing methods have been standardized.

CHAIRMAN O'CONNELL: All right, are there any other questions for Sheila? Being that we're five to one, what I suggest we do, unless somebody objects, is that we break for lunch and we reconvene at 2:00 o'clock. We've got a lot of work to do.

(Whereupon, the meeting was recessed at 12:55 o'clock p.m., May 12, 2014.)

— — —

MONDAY AFTERNOON SESSION

The American Eel Management Board of the Atlantic States Marine Fisheries Commission reconvened in the Presidential Ballroom of the Crown Plaza Hotel Old Town, Alexandria, Virginia, Monday afternoon, May 12, 2014, and was called to order at 2:00 o'clock p.m. by Chairman Thomas O'Connell.

CONSIDER DRAFT ADDENDUM IV FOR PUBLIC COMMENT
OVERVIEW

CHAIRMAN O'CONNELL: Thanks for everybody getting back on time. Again, for those of you that may have just joined us in the public, we're on the American Eel Management Board. We are on Agenda Item 6, consider Draft Addendum IV for Public Comment. Kate Taylor is going to provide an overview and then we will have board discussion.

MS. TAYLOR: Just for a little bit of background; as you know the board approved the original FMP for American eel in 1999. In 2006 the board initiated Draft Addendum II to

propose measures to facilitate escapement of silver eels on their spawning migration with the intent of halting further declines in juvenile recruitment in eel abundance.

At the annual meeting in September 2008 the board delayed management action on Addendum II in order to incorporate the results of the benchmark stock assessment into the management process. The board initiated a stock assessment, which was approved in May 2012. In response to the findings of the stock assessment, the board initiated Draft Addendum III, which was approved in August 2013 and did focus mostly on the commercial yellow and silver eel fisheries, as well as the recreational fishery.

Additionally at that time the board initiated this addendum, Draft Addendum IV, to focus on the coast-wide glass eel quota, monitoring requirements, enforcement measures and penalties, transferability, timely reporting and the New York Silver Eel Weir Fishery. Just as a reminder, additionally there is currently a petition under consideration by the U.S. Fish and Wildlife Service to list American eels under Endangered Species Act. The Fish and Wildlife Service is expected to have that decision to be released in September 2015.

Since the development of the FMP, landings of yellow eels have been around 1 million pounds. In 2013, thanks to the updated data provided by the states, we have the landings' information for 2013, which was about 900,000 pounds; and this was a 17 percent decrease in landings from 2012. Regionally there has been generally an increase in landings in the Mid-Atlantic Region in about the past decade and declining trends generally seen in the northern and southern portions of the range. That is kind of where we are with the status of the fishery in the U.S.

The board had also requested some information on management of European eels within the European Union as well as American eels in Canada by DFO. Just for reference, within the European Union the European eel stock is considered severely depleted. In 2007 the EU passed regulations to develop national eel management plans for all the EU countries at the river level basin.

The requirements of these plans was to allow for 40 percent of eels to out-migrate for spawning purposes. One of the other goals in the national eel plans was to use 60 percent of their catch of glass eels for those countries with a glass eel fishery for restocking purposes. However, in September 2013 the parliament has requested the European Commission to look at new regulations to help further stop the decline of the European eel. Specifically these new regulations are looking to close the loopholes that allow for continued overfishing and illegal trade of glass eels; also, to evaluate the current restocking measures that are in place within the EU countries at this time; and to assess whether there is actually any benefit of restocking to glass eel recovery; and also to require member states that do not comply with the reporting and evaluation requirements of the 2007 regulations, to reduce their eel fishing effort by 50 percent.

The European Commission is expected to review the new proposed regulations this summer. Also, just for reference for comparison to the U.S. landings; this shows the landings in Europe. Landings peaked at around 40 million pounds in the 1950's and 1960's. Major fisheries currently do occur in the Netherlands, France, Sweden and the UK. In 2012 the commercial harvest was estimated at about 5.2 million pounds and the recreational harvest at 1.1 million pounds.

Additionally, as Sheila mentioned earlier, the EU does have some information on recruitment going back to the 1950's; and this shows the general trend of the recruitment in the south and central region and then the northern region in Europe over the last fifty of sixty years. Looking to Canada, populations of American eel are widespread in Eastern Canada, but there have been dramatic declines that have been seen throughout the range, including Lake Ontario and the Upper St. Lawrence.

In 2010 there was a national management plan for American eel developed. The short-term of this plan was to reduce all eel mortality from all

anthropogenic sources by 50 percent relative to the 1997 to 2002 average. The long-term goal would be to include rebuilding overall abundance of American eel populations in Canada to its mid-1980's levels.

This is just showing the landings as reported by DFO. They declined through the early 1960's and increased to a peak in the late 1970's and has since declined to the lowest level in recent history. Kind of just overall, the international management of eels have looked at and implemented management measures similar to the measures that this commission has considered over the past decade, including seasonal and area closures, size limits, license cap, gear restrictions, lowering the recreational bag limit, trying to reduce effort, closing fisheries, working to reduce illegal harvest, trying to increase fish passage and also looking at restocking measures.

I'm kind of bringing you back to our stock here. Sheila previously mentioned the technical committee and SAS looked at the update trends in recruitment and found no change in the status of our stock, which leads us to the management options in Draft Addendum IV that the PDT has worked on over the past many months.

To begin with the glass eel fishery, Option 1 would be the status quo. Option 2 is the 2014 management measures. Under this option, the current 2014 fishing regulations for glass eel fisheries in Maine and South Carolina would become the new status quo and these would be required to be maintained going forward.

The board may choose to implement this option for one or both of these states; only for Maine, only for South Carolina or for both. That is something that comes up in the other options as we move forward. Option 3 is a closure of the glass eel fishery for Maine and South Carolina. This would either be delayed at the board's specific timeframe or an immediate closure. Option 4 is a quota based on landings; and there are three options.

The first is using the average landings from 2004 to 2013. The option for B is a 20 percent reduction from this 2004 to 2013 level. Option C would be to use the harvest reported in 2010. These sub-options are on Page 13 of the addendum. The total quota allocated to both Maine and South Carolina would be about 8,200 pounds to 3,300 pounds under the different options with about 95 percent allocated to Maine and 5 percent, the remainder, allocated to South Carolina.

Again, the board may choose to implement this option for either one or both of the states; and as we go through some additional options, you could implement those as well. Option 5 is dealing with quota overages. If the board implements quota management, they can consider options to address quota overages.

This would be equal payback. If the overages occur, the state will be required to deduct their entire overage from the quota the following year pound for pound. Then there could be an overage tolerance of up to 5 percent, which would be allowed without payback. Option 6 deals with quota underages; and this would allow states with a glass eel fishery up to 25 percent of the unused quota may be added to the state's quota the following year.

Any quota that is rolled over can only be used in the following year. It cannot be carried over for subsequent years. Just going back to the 5 percent overage allowance; it is not intended that this would allow or would be utilized every year. Consistent overages would require management action.

Option 7, as we previously began to discuss, is the aquaculture quota. Under this option the board may choose to allocate a percentage of the total quota for approved aquaculture purposes. This amount would first be deducted from the total glass eel quota; and then the remainder of the quota would be distributed as specified under the option.

There is an example that is given in the addendum. Also, as Mitch was kind of requesting some information earlier, it does allow the board to determine who would receive the quota; and there are specific measures under

this option that states how requests for quota would be submitted to the board and then also reviewed.

Option 8 in the addendum deals with aquaculture permitting; and so any harvest of glass eels for commercial aquaculture purposes must be collected under an approved aquaculture permit issued by the state or jurisdiction that the collection will occur in and is subject to any monitoring and reporting requirements as specified by the jurisdiction.

This is an option that the board consider outside of the aquaculture quota if it decided to. Option 9 would increase the reporting requirements and specifically would implement daily trip level reporting with daily electronic accounting to the state for harvesters and dealers in order to ensure accurate reporting of glass eel harvest. The PDT stressed that this would likely be necessary if a quota system was implemented, as previously discussed earlier in the Maine Elver Fishery.

Option 10 includes recommendations for monitoring requirements; specifically, that states or jurisdictions with a commercial glass eel fishery must implement a fisheries-independent lifecycle survey covering glass, yellow and silver eels within at least one river system. The PDT and the technical committee has currently worked to develop some of those methodologies; and we could work with the state to implement those monitoring requirements and provide information as needed.

Moving on to the yellow eel fishery, Option 1 is the status quo. Option 2 would be to implement a quota based on landings. Based on the discussions from the board at previous meetings, the PDT has developed a criteria in the application of distribution of the quota. The first is that states be allocated a minimum of a 2,000 pound quota.

This is not expected to promote a notable increase in effort, but will hopefully reduce some of the administrative burden in monitoring quota. The second criteria would be that no state is allocated a quota that is more than 10,000 pounds above its 2010 level. The third is that no state or jurisdiction is allocated a quota that is more than a 15 percent reduction from its 2010 harvest level.

Using these criterion will hopefully minimize some of the impact in quota allocations that reduce the variability in landings from year to year. There were three options for quotas that are presented under this option. The first is using the 2010 landings. The second is a 10 percent reduction from the landings; and the third is a 20 percent reduction from the landings.

The board received a handout at the start of this meeting with some revisions to the quota based on updated landings. Under this option there was an increase of a few hundred pounds to New Jersey, Delaware and Florida under the no reduction alternative, but the rest remain the same. Under this alternative the total coast-wide quota ranges from about 980,000 pounds to 870,000 pounds with the allocation percentages divided off as specified in the table.

Option 3 is a weighted yellow eel quota option. The PDT worked with a few volunteer commissioners to develop an alternative quota allocation method. Like the previous option, the total coast-wide quota is based off of the 2010 harvest level; and there are options for a 10 and a 20 percent reduction from that harvest level.

The differences under this option; the allocation to states is based on a weighted distribution. The three highest landings from the period of 2004 to 2013 were averaged by state. These were weighted at 30 percent. This was combined with the average landings by state from 2011 to 2013; and this was weighted at 70 percent.

Under these options the total coast-wide quota ranges from 980,000 to about 780,000. Again, on the flipside of that handout, there are some revised quotas under this option that differ from what appeared in the draft addendum in the briefing materials. Roughly, North Carolina and Florida had their quotas reduced by around two to four thousand pounds; and that 6,000 pounds was distributed amongst the rest of the states just due to an error.

This revised table, if approved for the addendum, would go and be replaced in the draft addendum for public comment. Option 4 and Option 5 can be implemented if the board chooses a quota management system. Option 4 deals with quota overages. If an overage occurs, the state would be required to reduce their following year's quota by the same amount.

Option 5 is for quota transfers. States or jurisdictions implementing a commercial quota for American eel could request approval for a transfer of all or part of its annual quota to one or more states. The states that receive the automatic 2,000 pound quota would not be eligible to participate in this transfer. Option 6 focuses on a coast-wide catch cap. Again, this would be based off of the 2010 harvest levels like the previous options. Under this option states and jurisdictions would be allowed to fish until the cap is reached.

Once the cap or threshold is reached, all states and jurisdictions would be required to close all directed fisheries and prohibit landings. One of the benefits of the catch cap is that it reduces the administrative and legislative burden of implementing state-specific quota systems as described in the previous options while still controlling the total amount of fishing mortality that is occurring annually.

Additionally, a coast-wide cap does not require a specific allocation by state or jurisdiction, which can be problematic due to the fluctuations in landings that occur as a result of environmental and market conditions. However, the PDT notes that under the catch cap system that timely reporting would still be needed, most likely daily and place to ensure that the cap was not exceeded.

Additionally, if the cap was exceeded, the only payback mechanism would equally impact all states involved in the fishery even if the overage occurred or was largely the result of one state. Also, a mortality cap may promote a derby-style fishery, which could possibly flood the market and drive down prices.

Lastly, implementation of a mortality cap could result in early coast-wide closures and eventual elimination of historic and profitable fisheries that are prosecuted later in the year. There is a graph in the document that shows the landings by month coastwide. Under these options for the coast-wide catch cap, as I mentioned, there is the harvest at the 2010 level, that 978,000 pounds; and then a 10 and a 20 percent reduction from that level.

Moving on to the silver eel options, as the board remembers, under Addendum III states and jurisdictions were required to implement no take of eels from September 1st through December 31st from any gear type other than baited pots and traps or spears. These gears may still be fished, but retention of eels was prohibited.

New York was granted a one-year exemption from the requirements under Addendum III; so that their fishery could be addressed in Addendum IV. Option 1 is the status quo. The current regulations would remain in effect and the one-year exemption would expire on December 31, 2014.

Option 2 would be an extension of the sunset provision at a timeframe specified by the board. Option 3 would be for a time closure and specifically no take of eels in the Delaware River and its tributaries within New York from August 15th through September 30th from any gear type other than baited pots and traps or spears and weirs; for example, fyke nets and pound nets.

The table here just shows the average landings by month and the impact that this option might have. Option 4 would be a license cap. Under this option the Delaware River Weir Fishery would be limited to those permitted New York participants that fished and reported landings anytime during the period from 2010 to 2013.

Once the license is issued, they would not be eligible for transferability; and only one license can be issued per participant. Additionally, the board had requested the PDT look at transferability and allowances for glass eel quotas for states that currently do not have them.

The PDT analyzed many different options; and the best strategy that they had for addressing these two requests was the development of sustainable fishing plans.

Under these plans states or jurisdictions would be allowed to manage their American eel fishery through an alternative management program to meet the needs of their current fishermen while providing conservation benefits for the American eel population. The basis for these programs is the shad and river herring plans; and also kind of as an example, the European Union country-specific plans that they have developed overseas.

The technical committee does caution that the American Shad and River Herring Plans as well as the European Eel Management Plan were initiated recently and is difficult to evaluate the effect; but this would have the ability to support eel populations and also get information on the lifecycles and lifecycle monitoring for American eel.

Specifically under these plans states must be able to assess with some level of confidence the status of abundance and the level or mortality that is occurring within their jurisdictions. Once documented, states would be allowed to allocate that fishing mortality to any American eel fishery that they choose, even if the states does not currently participate in that fishery. They also would be allowed to allocate it for aquaculture or research purposes.

States would be allowed to increase the fishing mortality rate provided it is offset by decreases in other mortality through habitat improvement, restoration programs, increasing fish passage so that that there is an overall net gain to conservation. Basically under this plan it would allow states, if they could assess their level of mortality, to then allocate it as they would like to either a glass, yellow or silver eel fishery or for aquaculture or restoration or research purposes.

It would also allow them to petition the board and technical committee to take into consideration any habitat improvements that the state has implemented and use that to increase their fishing mortality or increase their quota or increase whatever management measure they choose to implement.

There is also an option or kind of a sub-option under the state sustainable fishing plan for kind of a transfer plan to address transferability here. If states are unable to assess the current level of mortality and abundance with certainty, which the technical committee and PDT notes might be difficult for some systems; if that is the case and the board chooses to adopt quota management, then a state would be allowed to develop a specific sustainable fishing plan to request a transfer of quota from one fishery to another; so you could transfer from a yellow to glass eel fishery based on the life history characteristics inherent to that area.

Again, the states that are allocated a minimum of the 2,000 pound quota would not be eligible for this transfer provision. The law enforcement also weighed on some of the options under consideration in this addendum to provide information to the board.

The Law Enforcement Committee found that the status quo measures for all eel fisheries is impractical for enforcement, specifically for the glass eel fishery given the enforcement challenges associated with the prosecution of the fishery in those states that currently are closed to harvest of glass eels.
A quota system would be difficult to enforce. Although enforceability depends largely on how quota systems are managed, increasing the complexability of the quota system would generally reduce enforceability. Keeping it simple is preferable. The enforcement of time area closures for the silver eel fishery is considered a reasonable alternative.

The Law Enforcement Committee recommends that specific changes to regulations to enhance field enforcement and/or penalties are encouraged by the states; and those that have already been implemented as we discussed earlier in the state of Maine really have improved the outcome of arrests and convictions within those states.

Additional, because of the cross-state nature of illegal glass eel harvest, strengthening extradition or bail provisions for criminal violations would greatly enhance the deterrent effect for enforcement actions. If approved for public comment today, the public hearings would be held over the summer with the board considering final approval at the August meeting. That is my presentation of the draft addendum. Thank you, Mr. Chairman.

DISCUSSION AND ACTION

CHAIRMAN O'CONNELL: Great job, Kate; a lot of information there. There are I think a total of 21 options currently in the addendum. I think just to try to facilitate our discussion, I think we should first focus on any clarifying questions of the options and then we can get into options that people feel like should be dropped or added. Dan.

MR. McKIERNAN: It may be a question or maybe a comment. When this goes to hearing, it seems to me that you want the public to say things like I want Option 1 or Option 2; but some of these options are not mutually exclusive. I think especially in the glass eel section, I don't think those should all be independent options since clearly they're not.

Some of them are linked so is it possible to rewrite that section when something is not mutually exclusive to just make it a proposed plan provision so that the public doesn't zero in on choosing one or the other when actually you could choose of set of them.

MS. TAYLOR: That is very common in ASFMC documents. It says in the addendum for like Option 6, the quota overages, or Option 5, the underages, or Option 7, that it is applicable only if specific ones are taken; but the rest are not mutually exclusive and that is something that is easy to get across. It is done many public hearings so I can do that.

MR. McKIERNAN: I still think you should rewrite it. I don't think you should have ten options in something if you're not asking for the choosing of one. I think you should rename them as something other than options; call them proposals. Options to me is now I'm choosing. Do any folks feel that way?

MR. DAVID SIMPSON: This has come up before and I have suggested using the term "issue"; Issue Number 3 is quota management or monitoring as distinct from how are we going to allocate; so something think about. I find it confusing, too, when Option 10 really doesn't relate to Option 2; it is not an alternative; it is a different subject; so maybe "issue".

MR. O'REILLY: Mr. Chairman, not to that particular conversation; but since this is going to the public and originally is was going to be one addendum; I don't see a lot, in case I missed it, about Addendum III requirements. There is a statement in the management options that talks about these regulations will be implemented in combination with what was specified under Addendum III. That is on Page 10.

There is reference under silver eels to one of the adopted measures; but I think the public would benefit from know exactly what was passed under Addendum III somewhere in this document. In particular – and I know it is probably not even practical – since the technical committee has said many, many times that the objective is to reduce mortality at all life stages, I wonder if the technical committee has talked about the potential of the management options that were adopted under Addendum III as to what they may provide, even if it is not quantitative, towards reducing mortality at all life stages. Thank you.

CHAIRMAN O'CONNELL: Do you want to respond, Kate?

MS. TAYLOR: I just did want to point out that on Page 2 of the document it does specify what the provisions were in Addendum III. If you would like me to reiterate that paragraph later on in the document; I can work with you, Rob. Also, the technical committee did look at some of the impact that the Addendum III regulations would have; specifically that increasing the minimum size from six to nine inches really

only has the result of delaying mortality. They did note, though, that the pigmented eel tolerance might have a significant impact; and they were interested to see how that would be implemented and what the effects of that requirement would be.

CHAIRMAN O'CONNELL: We'll follow up, Dan, and look and see if there is a better way to outline those options and to recognize the linkages between them based upon some of the input unless we hear otherwise. Jim.

MR. GILMORE: That was a great presentation, Kate. That was a great summary because I have been readying it half-heartedly the last few days and it got me focused. Actually two questions; the first one has to do with – and is just any of the quota options that we're talking about doing – is first off the Year 2010 was picked for the yellow eel, for example, and essentially – but what is the confidence for each one of those?

I can tell you right now in New York the confidence in that data is really low; so we're now going to embark on quota based on bad data. It is the best data we have; I understand that. That is question number one is if we could really get a sense of what the confidence level of these data sets, whatever, because some of the states have very good programs for catching their landings.

Other states are working on them, which is us right now, but they're pretty poor, and then other ones may not be improving. That is question one; if we could somehow put some confidence level how good the data is. Secondly, if you look at the distribution of this, we have a disparate distribution again.

So here we go again; we're going to give – I think Tom is going to be quiet on this, but he is going to get 50 percent of the fishery. And then how are going to get out of that if we find out we improve our landings and then suddenly maybe some of the other states should be getting a higher landing; how are we not going to start another Holy War in two years when we start getting better data?

CHAIRMAN O'CONNELL: In regards to the first question, Kate or Sheila, do you guys have response?

MS. TAYLOR: You kind of did address that this is the best option that we did have. This is the option – the 2010 harvest data was that it is through our stock assessment process; so if we're going to have confidence in any of the data, it would be the best data that we could use versus data that was outside of the stock assessment process. Certainly, the board would have the ability to revisit allocation down the line if they so choose to do so through an addendum process.

MR. STOCKWELL: Mr. Chair, my comment was specific to the thread that Dan initiated and your summary resolved that. Thank you.

MR. RUSS ALLEN: Mr. Chairman, just to get back to Jim's question about using the 2010 data; that really strikes me as unfavorable for New Jersey fishermen considering that was our lowest year of landings since 2003. As you know, our effort has been down in New Jersey because of the lack or horseshoe crabs for bait; so it kinds of puts us in a little bit of damper there.

It takes me back to when we had the working group and we made recommendations back last August to this board; and we recommended that allocation be based on the average of the three highest landings from 2002 and 2012. I don't see too many of the working group recommendations in here; and I find that kind of misleading to everybody who has been involved with that working group.

I wasn't going to bring this up until we actually started talking about the quota; but I just feel that this iteration of this addendum is much different than the Addendum III. The options were a lot different and a lot different from what the working group recommended. I'm kind of having a hard time looking at this and saying, okay, we've picked 2010 because it is the last year of the assessment; and it kind of gets rid of all the historical perspective of the fishery itself,

which was a little bit different five years before that.

I'm kind of distraught on that issue. I don't want to slow down the process, but to me – and I don't get too upset about these things too often – this was really a disservice to New Jersey on the one hand and probably some other states when they really go and look it. Other states profited from that; and that is kind of disturbing. Thank you.

CHAIRMAN O'CONNELL: I guess to maybe add a little comment to that is one of the things that we observed in Addendum III was there was a great disparity in the impacts to the states; and these options were intended to kind of address some of that disparity. I think I would comment, Russ, is that if you feel like there are options that were previously presented to the board that are viable options that we can add them to this addendum and take them out to public comment.

DR. DANIEL: I'm not sure where we are in the deliberations, but just a couple of maybe clarifying questions. First, elver IDs, how do we know that the elvers that we're catching are – do we have a good cross-section of IDs and we know they're not myrophis or some other elver that is coming in; or especially when you start looking at the little bit larger eels, are we confident in our IDs?

Second, with Option 7, the aquaculture quota, I just want to make sure that I'm clear that any opportunity for, lack of a better example, the American Eel Farm to get involved in aquaculture of domestic eels would have to get quota from the existing glass eel quota that currently is held by Maine and South Carolina. I'm just making that is the only option that is there.

Then the final really more of a suggestion would be to strongly recommend that we remove quota underages, Option 6, and not have any provisions to roll over any underage of glass eel quota. That flies in the face of many of the requests that we've made in the past around this board asking for rollover; and the answer has always been we're never going to allow an underage to roll over on a stock that is overfished; yet we still don't allow rollovers on stocks that aren't overfished.

There is a real disconnect on how we handle this; and I think until we have a very clear discussion on this perhaps at the Policy Board on how we're going to do rollovers, if we've got a stock that is being considered for listing under the Endangered Species Act, I would strongly recommend we not allow quota underages to be rolled over.

CHAIRMAN O'CONNELL: You asked the question on where we are in the process; I thought we'd provide the board a limited amount of time to have some clarified questions, which these have been, and they we'll – you know, my suggestion is to take – we've got like four issues. We've got the glass eel fishery, yellow, silver and then the sustainable fisheries management plan – to try and take them one by one and agree to what options we want to include or exclude. Pat.

MR. AUGUSTINE: Mr. Chairman, as a follow-up to Russ' comment, he indicated that the working group had suggestions and some recommendations on averaging several years together. Were those years proven to be not reliable or doable or was it just put aside out of hand? He raised a legitimate question; and he appeared to be very sincere about it. It will affect us as it affects them and several other states. What years were you talking about if, Mr. Chairman, you could ask Mr. Allen that and found out what the response is from the technical committee would be helpful.

MS. TAYLOR: The working group recommendations were presented to the board; and based on the board discussions and how they were directing the PDT, there was clear direction to go forward with some other options implementing kind of a maximum and a minimum allocation threshold for the states, which is how the Option 2 allocations were developed.

Then working with commission volunteers, this is how the weighted option quota allocations

were included in the document, which kind of takes some of the strategies that was included from the working group discussions. Overall, if you look at the amount of coast-wide quota, they typically all range from about a million to some around 700,000 pounds from the working group discussions, from the previous Addendum III options.

The ones included in here are 980,000 pounds to about 780,000 pounds; so they all kind of fall in that range. It is really just this allocation issue that there are many ways to look at it, which is why the commission volunteers who helped with this addendum requested that the mortality or catch cap be included as an option as well to get around that issue.

MR. AUGUSTINE: A quick follow-on, Mr. Chairman; it was a good answer, Kate, but you lost me somewhere in there. I'm still not – well, I'm not comfortable that the option that they put forward or the suggestion they put forth either was not clear enough to the board when we passed judgment on it and said throw it out, we don't want that, let's go another way.

When I happened to take a quick look down that way and the gentleman to my left was like, whoa, his eyes got big and his glasses almost feel off his head; so I'm not sure the answer was the one that would satisfy him let alone me, because it is still not clear if a three-year average of the three highest years would be more appropriate across the board – and we saw it as an example as we did here – it would seem to satisfy not only my quest for information but probably it would clarify it in the public's mind also.

I see this going down exactly the same place we went with summer flounder; and if we end up with any form of quota share, there are going to be winners and losers one more time. We did it with menhaden. One state ends up with 85 percent; others of us have to beg for transfer of quota. I really think to base this whole approach on one year of data to establish a quota is just – it is not acceptable. The follow-on would be with Dr. Daniel had suggested something about Option 6 and I'm also opposed to the same thing he was opposed to; and when he is ready to make a motion on that, I would be more than willing to offer a second to that section.

CHAIRMAN O'CONNELL: All right, Pat, Kate is going to provide a follow-up on this.

MS. TAYLOR: Just for clarification, the total coast-wide quota was based on the 2010 harvest level of 978,000 pounds; but the allocation options was based on the average landings in each state from 2004 to 2013. We looked at how much each state landed during that time period and then applied that to the coast-wide harvest of the 2010 harvest landings.

Also, just for reference, the public and the board has deliberated and considered and discussed other quota options in Addendum III and that was using the average from 1980 to 2011; 1990 to 2011; and 2000 to 2011; and so were three options plus reductions of 20, 30, 40 and 50 percent from those base years that the board has already looked at. Again, those quotas ranged from a million and a half pounds to 600,000 pounds.

MR. AUGUSTINE: Thank you; it satisfies my need and I think I have to pass it off.

MR. ALLEN: At the top of Page 16 it says the allocations are based on 2011 to 2013 landings and not 2004 to 2012. That is kind of what has thrown me.

MS. TAYLOR: I'm sorry, that is my mistake; the glass eels was 2004 to 2013. You're right, it is 2011 to 2013. It is different base years for the two different fisheries.

CHAIRMAN O'CONNELL: All right, we will keep going around; and if you guys want to add something to the draft addendum, this is the opportunity today. David.

MR. SIMPSON: I have a couple of motions relative to glass eel, 3.1.1, which I think the staff has. I might take them in opposite order from which I gave them. One of the things that seems to missing in the addendum is an opportunity for states that don't currently have a glass eel

fishery to enter one. There is this sustainable fishery concept, but it is rather complex.

I don't think it fits – you know, it is crafted or modeled after the anadromous fisheries plans for alewives, bluebacks, American shad; but the catadromous eel, I don't think it fits that model well because the whole concept of sustainable fishery management for a state is that if you enhance spawning, you will enhance recruitment which will return to your waters; and you don't have that concept for the catadromous fish. Do you have the motion that I provided that you could put? I would like to add a new option under the glass eel quota based on enhanced passage initiated after January 1, 2013.

Under this option states may earn glass eel quota via stock enhancement programs that increase glass eel passage. In other words, if you remove a dam or you provide passage over an obstruction and can quantify the number of glass eels that then are able to continue their lifecycle, that some fraction of those – and I provided a range of alternatives from 5 to 25 percent, in 5 percent increments – that you would be able to harvest that portion.

My thinking, given the value of this resource, states could then use the revenue that could potentially be generated from licensing of such activity and reinvest it in further enhancement programs. That is my motion; and if I can get a second.

MR. AUGUSTINE: You've got it.

CHAIRMAN O'CONNELL: I've got Pat Augustine as the second; move to add a new option: **glass eel quota based on enhanced passage initiated after January 1, 2013. Under this option states may earn glass eel quota via stock-enhancement programs that increase glass eel passage. The amount of quota earned shall not exceed an amount equal to Sub-option 1, 5 percent; 2, 10 percent; 3, 25 percent of the enhanced glass eel passage.** Motion by Mr. Simpson; seconded by Mr. Augustine. Discussion on the motion? Kate asked if this would require technical committee review, David.

MR. SIMPSON: I don't think so. I think when a state develops a proposal under this alternative, if it is passed, there will be discussion about what the technical requirements are of estimating the number of additional glass eels that now get to survive to the next life stage.

But to burden the addendum with all of what you saw in the sustainable fishery plan, I think it is too much now; and, frankly, is so burdensome that – I mean you're asking for things that the stock assessment couldn't provide; so it is kind of dead in the water. I'd like to get some public comment on the concept and then hopefully work out through – if it is successful, through individual applications for glass eel quota down the road.

MR. STOCKWELL: Thanks for the motion, Dave. Is your intent that this will be in lieu of Section 3.1.4 or an addition to? That is the state-specific sustainable fishery management plans.

MR. SIMPSON: That is sort of the board's prerogative. I didn't see the sustainable plan being workable. I thought this was a cleaner more understandable alternative; but I'd kind of like to hear the rest of the board's thoughts on that.

MR. KELIHER: Is it your intent, Dave, to be specific to only states to establish new fisheries or for a –

MR. SIMPSON: No, it would not; it would be any state. Whether they have a fishery now or not, if they make that investment and enhance passage, then they're earning some additional fishery potential.

MR. KELIHER: I think on the same line that Terry was going and based on your comments; I'm very uncomfortable with the language for the state-specific fisheries management plan similar that we have with river herring. I think you've made some really good points. My only druthers is I'm also very concerned, as you might imagine, with the aquaculture language that is in place. This may be a good place to

think about a friendly amendment to add language that would deal with state-specific changes to be able to access product or glass eels for state aquaculture.

MR. CLARK: I just had a couple of questions to the glass eel passage. I'm sorry if I missed it; does that include just like an eel ladder to allow glass eel passage?

MR. SIMPSON: Yes, any kind of stock enhancement that allows the eel to continue its lifecycle.

MR. CLARK: And then would the quota that you get just be applicable to that water basin that you're allowing the passage on?

MR. SIMPSON: No, I think it might actually have been more effective if it could happen there; but it might be more effective if it happened in another system that was dead-ended; so the glass eels in another area that is banging their head against a dam and are doomed, that might be the place to have that fishery.

MR. BALLOU: Dave, I'm trying to understand the intent here. It strikes me that it may be your intent to essentially establish a baseline and then allow harvesting on the surplus above that baseline. Is that indeed your intent? In order for this option to be exercised, would a state first have to establish what the current eel passage metric is and then be able to show that through the stock enhancement program that the state has enacted there has been an actual measureable increase in glass eel movement; is that your intent with this?

MR. SIMPSON: No, I that again reaches the level of so burdensome you couldn't achieve it; but the idea of a an eel passage, a particular project where you could sample the success of that passage, the number of eels passing over that, provide a good estimate of it and you would get 5 to 25 percent of that incremental increase; so you're not burdened with trying to figure out throughout your entire state what glass eel numbers are year to year, because that is sort of the whims of nature anyway.

MR. ROSS SELF: Just for clarification; you used the term "earned quota"; I'm assuming you intend this to be additional quota on top of whatever the proposed quota may have been for the coast-wide glass eel fishery. It is not a reallocation of that existing quota; it would be additional quota on top of that?

MR. SIMPSON: That's right.

DR. DANIEL: I kind of support the concept here, but I think there are some pretty sticky problems. One, I go back to one of the original amendments where we had put in a placeholder for a glass eel interest, and that doesn't seem to hold a lot of water. I wonder how much this will.

But then the other thing that really concerns me is knowing that there might be a lot of public money involved in creating these passageways and then indicating for the intent of passing eels and then for a regulatory body like this to give those eels away to commercial enterprise is going to create some major political nightmares for us if we move forward with this.

MR. KELIHER: This is to increase upstream passage; what about downstream passage?

MR. SIMPSON: Well, if it leads to a dead end, it is not enhancing the stock; so I guess expected in any diadromous stock-enhancement program, if the accommodation isn't there for downstream passage, it doesn't ultimately benefit the stock. On the flipside I suppose if you knew that and as a state you were investing money anyway in passage so that you could provide eel biomass to a system, even if it didn't ultimately help the northwestern hemisphere stock, there might still be a reason for a state to do it and no harm to the coast-wide stock.

MR. ABBOTT: I think I like this motion, but I'm not sure that I really do because I can just see in the future if this was implemented that there would be a lot of mathematics and manipulations and how you calculate everything to allow yourself some quota. I think a simpler

thing in my mind is to go back – not go back in time, but simply look at where we are.

Years ago we allowed the state of Maine and the state of South Carolina to harvest glass eels. I don't think that this board is bound by the actions of what was done in the past. We're in the year 2014; and if this board chooses to change things, I think that every state should be entitled to some amount of quota by their action.

The more I think about this, the more I think that we should be moving in that direction versus states doing things to earn what probably should be theirs or some part of it should be theirs. We essentially right now are using a coast-wide quota, which is Maine's quota. Whatever Maine is taking is essentially a proxy for a coast-wide quota.

I just don't see as we move forward that we disadvantage states like North Carolina, who would like the ability to harvest some amount of glass eels for an aquaculture project, they should have that opportunity and it shouldn't be restricted to one or two of the states that represent 15 along the Atlantic Coast. That is my speech for the day.

CHAIRMAN O'CONNELL: If the board wants the perspective of the technical committee person, we can ask Sheila for her input as well. Mitch.

MR. FEIGENBAUM: I actually want to build a little bit on the previous point and a point that Ritchie made this morning. It was very clear at our last meeting that we asked the technical committee to please embark on some watershed analysis and to offer some options or to at least give some guidance on the question of what is the potential productivity of the watersheds in the different states.

The reason that the board had asked the technical committee to do this was precisely because of the concerns Dennis just raised. As fish managers we know that any watershed can sustain a certain amount of harvest and the fact that one state in the past has harvested glass eels and the fact that another state has harvested no glass eels really doesn't form the basis of sound science.

If there is going to be glass eel quotas and if there is going to be a coast-wide glass eel fishery, then first and foremost we should make sure that the allowable harvest in any state and in any watershed is sustainable based on the dynamics of that watershed. I was just one of several people who asked the technical committee to embark on that analysis.

According to Table 4 that has been handed out to us, basically six states are being told under the current options, notwithstanding the motion that is the board, but before this motion came up, we basically have an addendum that precludes six states from ever having any glass eel fishery simply because they didn't have significant adult eel fisheries in the past. Shutting those states out of the process seems to me not the kind of thing that could ever gain public support.

What could gain public support is if the technical committee would come back and say that the watersheds in Massachusetts comprise 10 percent of the watersheds in the United States; therefore, as a target for a quota-setting, they would be entitled to 10 percent of the quota. If it turns out that Maine comprises 25 percent of the available freshwater habitat for the species, then logically they would have 25 percent of the quota.

Now, that was only proposed as an option. I'm not saying that's the only way to go; but I'm very disappointed that the plan development team basically glossed over the issue or kicked the can down the road to the future. We know that there are some very complex but nonetheless accessible mapping from both the Fish and Wildlife Service and some of the other federal agencies.

We can put together a document and the technical committee can review a document that gives this board at least a starting point as to what is the watersheds that are available in the different states. I don't see how we can go to the public and suggest that states may be entitled to open up a glass eel fishery in the future; but

six of them can't because they didn't have adult eel fisheries in the past.

That is not conservation; that is not science-based fishery management. That is just simply relying on history and politics to make decisions. If I lived in New Hampshire, Massachusetts, Rhode Island, Connecticut, South Carolina or Georgia, I would be really troubled by this approach. If I lived in Maryland, I guess I'd be real happy with it.

CHAIRMAN O'CONNELL: All right, I have got two people signed up, and I think we've had a lot of discussion on this issue; that after the next couple of comments, we should consider voting it up or down. Bill.

MR. ADLER: In keeping with the idea that Pat brought up about is it upriver, downriver, in-river or where river, I also have a problem with the wording where it says because they did stock-enhancement program, they could get an increase; who determines that, yes, you've got stock enhancement; yes, you get some? Would it be the board that a state would come and say I did this, this, this, and this; and we would be the determining factor that, yes, you did it; so we're going to give you more quota or whatever comes down. Who determines that I guess is the question?

CHAIRMAN O'CONNELL: I'll let David address that.

MR. SIMPSON: The state would develop a proposal, make a case, it would be reviewed by the technical committee and approved or disapproved by the board. If Connecticut did an eel passage project, did some monitoring to calculate the passage that was achieved, which you would do in any kind of project to see if it worked; that would be your basis; you'd make your case; and it would be voted up or down by this body.

My point is I represent one of those states that has no alternatives under this addendum for a glass eel fishery; so this was one approach that I thought was viable, that sort of creates new productivity and uses a small fraction of it to provide a fishery. I do have a follow-up motion just for those who made the comment that would provide some minimal amount of allocation of glass eel to every state.

It would be a little bit of a reallocation – I'll just telegraph it – a hundred pounds per state as a concept so that, yes, the history-based allocation that has burned many of us in the past doesn't burn us in the future; that there isn't a punishment for being conservative and a reward for being more aggressive in terms of the fishery. This is one of the ideas and the others will follow up; so I hope people will support it.

CHAIRMAN O'CONNELL: David, just to clarify, it was asked earlier whether the technical committee would review these, and I think the answer was no; but it sounds like maybe it was just a misunderstanding of the question. It sounds like the intent of this is to have technical committee review it and then the board take final approval. Okay, she is seeing nodding heads. Are you guys ready to have a 30-second caucus?

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All right, let's take the vote here. All right, all those in favor please raise your right hand; all those opposed please raise your right hand; null votes; any abstentions. **The motion carries with two abstentions.** Dave, you have another motion you mentioned.

MR. SIMPSON: I did; I have one follow-up motion.

CHAIRMAN O'CONNELL: While we're waiting for this motion to be put on the screen, as it was mentioned earlier it is difficult for the public to absorb a large suite of options. We want this addendum to be comprehensive, but we also should be looking at if there are any options that the board feels is not acceptable at this time. As David goes forward with this next motion, let's stick with glass eels and try to work through that and then move forward with the yellow eel options.

MR. SIMPSON: This is the follow-up; and this would be under **Option 4, which is glass eel quota based on landings;** I think we need to broaden that a little bit; **so to add a sub-option that sets a minimum glass eel quota of 100 pounds per state.** I'd simply model this after the yellow eel idea that no state should get less than 2,000 pounds, which I thought was a pretty decent, smart thing to do. That is my motion and I hope I can get a seconder.

MR. AUGUSTINE: Seconded for discussion purposes, Mr. Chairman.

CHAIRMAN O'CONELL: Go ahead, Pat.

MR. AUGUSTINE: A follow-up to that; I think it is the right thing to do. I'm just wondering because we've questioned the actual status of the stock whether or not this throws a wrinkle in the whole process. I mean we've talked about not knowing exactly what the glass eel population is. We've questioned the report that –

CHAIRMAN O'CONNELL: Pat, let me just get a second on the motion before we get a discussion going. Did you second it, Pat? I didn't see that; go ahead; sorry to interrupt you.

MR. AUGUSTINE: I did it fast so you wouldn't be able to stop me. No; as I said, I seconded it for discussion purposes because of the technical report saying that they weren't comfortable with the glass eel report and the status of the stock. On the other hand, as I was going to continue, it does give every state at least something to work with.

If you do not have a glass eel fishery now, as you go forward in developing these passages, as a follow-on to the previous motion that Mr. Simpson made; it only seems logical that this may in fact suggest to some of those states that they should try to enhance their passages and help the overall population.

MR. GILMORE: Just a quick question, Dave; would this be transferable to another state?

MR. SIMPSON: Yes; I think that is in another part of the addendum, but I would anticipate it is transferable. To clarify Pat's question, this would not be adding glass eel harvest. This would in effect be reallocation. Whatever the total number of pounds we set as a coast-wide cap on glass eel harvest, each state would get a minimum of a hundred pounds. The balance of it would go to the states that have existing quotas in the proportion that they historically have.

CHAIRMAN O'CONNELL: All right, Kate has got a question.

MS. TAYLOR: Just for clarification; you mentioned transferability was looked at in the document, but that was for the yellow eel fishery; so would you like transferability under this option? It seems that you would.

MR. SIMPSON: Yes.

MS. TAYLOR: Okay; and also would there be any other enforcement or penalty or monitoring requirements that would go along with the 100-pound quota?

MR. SIMPSON: I think all of those are necessary in this fishery in particular. Part of the logic is that all of our agencies are saddled with some level of enforcement burden in this fishery because it exists; and I think even if we closed, we'll still have an enforcement burden. Again, this would at least provide some level of fishery to sort of balance off the cost of enforcement that we're going to have anyway.

MR. DAVID BORDEN: I like the concept here, but I'm a little apprehensive about simply picking a hundred pounds. I can kind of align my thinking with a lot of the speakers, probably four or five speakers before this that all pointed out we really need some kind of more objective way of allocating a glass eel fishery.

I just remind everybody a lot of states – Rhode Island fell under this category – adopted a minimum size on eels when the initial threat of a developing fishery came out; so we acted proactively and essentially prohibited a glass eel fishery. A number of the other New England states in New England did that and I think a

number of states in the Mid-Atlantic did that. The commission has a long-standing position of not penalizing states for acting in that manner. I think what we really need to do is to remand this back to the technical committee and ask them to come up with another set of allocation formulas that would be based on watershed or some other criteria that kind of addresses the equity issue.

MR. ROY MILLER: Mr. Chairman, assuming this one comes up for a vote, I'm going to vote against it using the same rationale I did over the previous vote. A number of years ago we had an enforcement nightmare in our state when there was a glass eel fishery. It took a number of years to get it regulated and get it outlawed.

I think this is a step back and causes the public to wonder what justification we had, say, 15 years ago in closing the glass eel fishery when now we're proposing that it is going to open while at the same time we're saying the species is depleted and in need of additional management. I don't see where this is going in any direction other than additional harvest; and I'm going to oppose it for that reason. Thank you.

DR. DANIEL: If that were the reason, I would, too, Roy. Back in August I guess when the American Eel Farm first came and we were all intrigued about the potential for domestic aquaculture and have some product harvested here in the U.S., processed here in the U.S., and consumed here in the U.S. I think everybody for the most part agreed with that concept.

A lot of things happened between last August and now where we're still sort of where we were last August. It has been my intent and I think the intent of at least a few members of the board that we would like to see some domestic aquaculture move forward if there is viability there, if it can work.

I like the concept of the motion of getting everybody's foot in the door; but I know what the result will be is some states are going to just go out and try to harvest a hundred pounds at $800, $1,000, however much a pound; and that really defeats the purpose. I think if we're going to allow any glass eel harvest above and beyond what we currently allow, it should be for bona fide brick-and-mortar aquaculture facilities to test that model, to test that case that we all seem to be pretty intrigued with about nine months ago.

MR. KELIHER: Mr. Chairman, I was wondering why Mr. Abbott was being so supportive of Maine this morning and now I know because he wants to go to a state-by-state quota system and take it all away from us. I think what Dave Borden said does ring true to me is there is an arbitrary nature to this just going by a hundred pounds per state.

I think having the technical committee look at this a little bit differently to try to create some rationale may be a better approach. The concept isn't bad; and I think the idea of having something set aside for aquaculture in a state is not that bad. Whether this is what it would get to is another question; but I think the technical committee doing a little additional work here wouldn't be bad. I think I'm going to vote against this.

MR. FEIGENBAUM: Mr. Chairman, briefly I would point out to my fellow commissioners that at the American Fishery Society Symposium on eels that is going to take place in mid-August; one of the presentations is going to be from a group of French scientists that are going to address the very question of how to establish a TAC for glass eels.

I think that this is going to prove very helpful to a lot of these questions. There is going to be a lot of information presented at that Quebec Symposium. I really encourage everyone to just spend five minutes on the web, pull up the agenda for that symposium and you will see how much really interesting information is going to be presented. I echo the comments of the last few speakers that we do need to at least take some initial steps to creative objective standards by quotas are set, especially if we're going to expand the fishery into other states. Thank you.

CHAIRMAN O'CONNELL: The technical committee has been referenced a couple of times

if they've looked into this before; so I'm going to give a minute to Sheila to provide any perspective from her committee.

MS. EYLER: Yes; the technical committee has discussed this to some degree. Part of it comes out with the sustainable fishing plans that we have at the end of the document. We have an idea of watershed sizes; we have looked at that for each jurisdiction, but we really didn't feel the technical committee could come forward with a proposed quota by state for something like this. We really felt that had to be coming from the board.

MR. SIMPSON: I'll just say that the idea of an objective criteria for fair allocation of resources has been an elusive goal to the commission – you know, think about summer flounder. I mean that's why I offered a very small entry level, get your feet wet type of amount that doesn't gouge a primary existing player or anyone else.

Some states won't participate and that is expected; others may want to. Again, I heard it said a couple of times, which is not accurate, this is not an additional harvest. This does not add an additional glass eel to the mortality rolls. This is a reallocation; and if it passes – well, I'll just leave it at that.

CHAIRMAN O'CONNELL: All right, I think we've had a good discussion on it. Let's take a 30-second caucus. Do you have a quick comment, Craig?

REPRESENTATIVE CRAIG A. MINER: Not a comment; just a quick clarifying question. Did I understand Sheila to say that the technical committee was looking for the board to make a decision when it came to setting this threshold?

MS. EYLER: Yes; we've suggested that there be a quota; but as far as allocation goes between the states, the technical committee did not weigh in on that.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All right, all in favor please raise your right hand; all opposed please raise your right hand; any null votes; any abstentions. **The motion fails six, nine, zero, three.** So sticking with glass eels, there are ten options currently in the plan. I suggest we kind of get focused right on those and see if there is any that we want to remove at this point in time. Terry.

MR. STOCKWELL: Mr. Chairman, I can generally support the wide range of alternatives and thank the PDT for all the work – and I know it was a bucket load of work that they did since our winter meeting. However, with the one exception of Option 7, the aquaculture quota, Dave's first motion I think was a good motion. I'm not sure whether we're going to go – what the board is going to do if we put the Section 3.1.1 ahead.

If we do put it ahead for public comment, whether or not it will in fact be supported in the final action. Before lunch I asked Sheila if the technical committee considered additional alternatives for aquaculture quota, and she referred to that section. Dave has offered us another approach. I believe that either of these measures will allow for a more reasonable development of aquaculture opportunities, which as Louis said I think the board generally supports. Both of those measures would be far less punitive to the Maine and South Carolina fisheries than I believe Option 7 is. **I'm going to make a motion to remove Option 7 from Section 3.1.1. in the draft document.**

CHAIRMAN O'CONNELL: We've got a second by David Borden and let's get it up on the screen. All right, move to remove Option 7 (glass eel aquaculture) from Section 3.1.1. Seconded by Mr. Simpson. For the record, I'll correct it; the second was Mr. David Simpson. Louis.

DR. DANIEL: Yes; I think Option 7 says under this option the board may choose to allocate a percentage of the total quota for approved aquaculture purposes. I think that is precisely what we've been wanting to do if given the opportunity, and this does that. If we take this out, we have no mechanism to do anything for the bona fide brick-and-mortar aquaculture

facilities. I don't think there is anything sacrosanct or lifelong about any quota allocation. We'll probably find that out in multiple species we'll be dealing with over the next year. I would speak strongly in opposition to the motion and ask the board to do the same.

MR. SIMPSON: The opportunity was just before the board in my view and was voted against; and so now I see this as instead of six or eight states getting a hundred pounds that one state wants several hundred pounds because I've only heard of one state that has come forward with such a very specific use for this product. I oppose it on that ground.

MR. CLARK: Mr. Chair, just a question; with Option 8, would states still be allowed to issue aquaculture permits even if Option 7 is not in there for such as what Louis Daniel was talking about to have an aquaculture operation in their states? I'm just a little confused between these two options.

MS. TAYLOR: That is correct, that Option 8 just would require that glass eel harvest for commercial uses for aquaculture would not occur under a scientific collection permit; but the state would be using that through an aquaculture permit process.

MR. KELIHER: I guess this question is for Kate. Under the state-specific sustainable fisheries management plans; was there any talk about, because it is a state-by-state issue, utilizing yellow eel quota or allocation to somehow convert into glass eels so you could keep this specifically within a state as it relates to aquaculture?

MS. TAYLOR: Under the plan once the state assesses the mortality that was occurring, it would be able to allocate that mortality to any life stage that it wanted to. Additionally, as I mentioned, there was a transfer plan in there so that if the board did approve a quota for the yellow eel fishery, the state would be able to come forward and transfer that yellow eel quota to a glass eel fishery or a silver eel fishery or for aquaculture or research purposes.

MR. KELIHER: Mr. Chairman, I think that would accomplish what a state might want to do then as far as aquaculture within reallocating quota for aquaculture for that state.

CHAIRMAN O'CONNELL: There is one option, yes. Kate.

MS. TAYLOR: I just did want to remind the board that the states with the 2,000 pound quota would not be eligible for that.

MR. GROUT: Well, first of all, that was a point I was going to make to my good friend Commissioner Keliher's point. I look at this as an option that should be in there to be taken out to public hearing. I'm not sure how I'd feel one way or the other about it, but I think it would be pretty important to get public comment on this because aquaculture is something that I think has been stated this board has shown a support for domestic aquaculture programs; and this might be a way of doing it. There may be other ways.

I think the motion that was put forward by David Simpson also helps get at that; but we have got to wait until we get our eel passage projects in place, and that may take some time. This would be a way that the board could address the aquaculture needs on a quicker basis. I hope we keep this in there just for the public hearing.

CHAIRMAN O'CONNELL: That is everybody on the list; let's take a 30-second caucus and then vote on the motion.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All right, all those in favor please raise your right hand; all those opposed please raise your right hand; any null votes; abstentions. **The motion fails two, fifteen, zero, two.** Go ahead, Doug.

MR. GROUT: Well, I had a modification that I wanted to make to one of the options. It is Sub-Option 5B, the quota overage tolerance where we essentially wouldn't count anything above 5 percent overage. I have a lot of problems with that from a stock that is depleted. **What I would like to do is make a motion that would say**

that up to – a tolerance of up to 5 percent overage would be allowed without payback if the current stock status is not overfished. If I can get a second to that, I'll provide my justification.

CHAIRMAN O'CONNELL: Doug, the stock's condition is currently depleted and not overfished.

MR. GROUT: Correct; so what I tying this measure is a future stock assessment that would say that our eel stock is not overfished.

CHAIRMAN O'CONNELL: Let's see if we have a second on the motion and then we'll have discussion. Let's get it on the screen. While we're getting it on the screen, Doug, Kate was just saying the current stock status is not classified as overfished; so this would be an allowable – is that clear? **All right, we have move to insert in Option 5, Section 3.1.1, Option 5, Sub-Option B: "a tolerance of up to 5 percent overage would be allowed if the current stock status is not overfished.** Follow-up, Doug.

MR. GROUT: Because of Kate's clarification, I would say not depleted or overfished. My point is to get to the point where we have a stock that is not overfished anymore or not depleted; the stock is good shape.

CHAIRMAN O'CONNELL: Does everything else look good on the motion, Doug?
MR. GROUT: Yes.

CHAIRMAN O'CONNELL: Is there a second on the motion; I've got Rick Bellavance. Move to insert in Section 3.1.1, Option 5, Sub-Option B: "A tolerance of up to 5 percent overage would be allowed if the current stock status is not depleted or overfished. Motion by Mr. Doug Grout; seconded by Mr. Bellavance. Discussion on the motion? Louis.

DR. DANIEL: Again, back to my comment – and I want to do something on Option 6 at some point, but we don't allow this for summer flounder. We don't a tolerance of over the quota for anything else I'm aware of. Maybe we do, but I'm not sure why eels are so special. I don't think they are very special compared to some of the others – no, not bluegills. I didn't say that again. I mean if we're going to allow a 5 percent overage on our quotas, let's allow it for stocks that aren't overfished and be consistent.

CHAIRMAN O'CONNELL: Are there any other comments? All right, 30-second caucus.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All right, we'll take a vote. All those in favor please raise your right hand; all those opposed please raise your right hand; any null votes; abstentions. **The motion fails.**

DR. DANIEL: Yes; for the same reason I mentioned earlier on in the question session, Mr. Chairman, I'd like to make a motion that we remove Option 6, quota underages, from the document.

CHAIRMAN O'CONNELL: Seconded by Dennis Abbott. Remove Option 6 under the glass eel section. Go ahead, David.

MR. SIMPSON: I wonder if Louis would want to amend his own motion to strike Sub-Option 5B for the reasons you stated before and not have a tolerance. That seemed to be what you wanted to do; you didn't want to leave a tolerance in there.

DR. DANIEL: Yes; I don't want any tolerance on an overfished, depleted stock, for sure. Then I think down the road maybe in other plans we could – I think the Policy Board really needs to discuss this so that we're consistent in all our plans and have a guideline on how we deal with underages and tolerances for stocks that are overfished, overfishing occurring and any of those kinds of things.

Then I think if we're going to allow rollovers or tolerances for stocks that aren't overfished and overfishing is not occurring, then I think we need to allow it for all of them and not pick and choose**. I would be glad to friendly amend that motion to also remove 5B, which is**

similar to the Option 6 motion, if that is okay with my seconder.

CHAIRMAN O'CONNELL: Dennis is shaking his head that he is agreeable to it. Do other people want to speak on the motion? Doug.

MR. GROUT: I would like to third that motion.

CHAIRMAN O'CONNELL: All right, we've got move to remove Option 5B (quota overage tolerance) and 6 under Section 3.1.1 (quota underages). Motion by Dr. Daniel and seconded by Mr. Abbott. We had a brief a discussion; let's have a 30- second caucus.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All right, all those in favor please raise your right hand; all those opposed please raise your right hand; any null votes; any abstentions. **The motion carries unanimously.** All right, we're getting there. Are there any other changes to the options that are currently in and discussed today for the glass eel fishery? Ritchie.

MR. WHITE: I don't have an addition or a change, but I was hoping Dave Borden would, because I thought he was close to coming up with some language that could go back to the PDT to address this issue which seemed to have a fair amount of support on the board of some way of figuring out a way in which other states have some access to some quota. David, I hope you can come up with something.

MR. McKIERNAN: **I would move to request the technical committee to investigate a watershed-based allocation scheme for the glass eel fishery quota and postpone all glass eel deliberations until Addendum V and proceed with the yellow and silver eel options.**

CHAIRMAN O'CONNELL: Just take a look at the screen, Dan, as it gets written to make sure it is correct. Dan, how does it look?

MR. McKIERNAN: Yes, that's it.

CHAIRMAN O'CONNELL: All right, do I have a second on the motion; Mr. Borden. Move to request the technical committee review a watershed-based allocation scheme for glass eel quota and postpone options to Addendum V and proceed with yellow and silver eel options in Addendum IV. Motion by Dan McKiernan; seconded by Mr. Borden. Do you want to speak on the motion, David?

MR. BORDEN: I concur with the sentiment here, but I think most of the members sitting around the table want to get on with addendum, would like to move it along. I'm just trying to pick up on the thought that came up earlier. It seems like there is going a workshop in the next couple of months where a lot of these issues are going to get fleshed out.

Rather than just separate this issue out, it seems to me what we need to do is simply task the technical committee with evaluating this. They'll get back to us in a couple of months; we will have the results of the workshop; we put it all into one package and then send it out the door. That would be a slightly different strategy than what Dan put in the motion.

CHAIRMAN O'CONNELL: Sheila wants to provide a little perspective to kind of manage the board's expectations on what they can do.

MS. EYLER: The technical committee has looked at watershed sizes by state. We drew up a list of the watersheds within a state and how large the watershed is. We do not have an idea right now of impediments in the watersheds to know really what is accessible for eel habitat within that state. We also do not know what the historical range of eels was in each habitat. That is something that we're looking at for the ESA listing as well.

We do not have access to that information right now. What we could provide to you is a list of basic drainage area for eels that is the potential for a state; but that's really that we could do. If you wanted to make a quota based on those numbers; that is all the technical committee is going to be able to get to you in the near future.

MR. SIMPSON: This is a question. What this would do is just maintain status quo for glass eel fisheries. There would be Maine's self-imposed quota; South Carolina, whatever they're doing; and we wouldn't change anything else; is that would happen if this motion passed?

CHAIRMAN O'CONNELL: We're getting different answers from the motion maker and the staff; so we need to clarify that. Kate.

MS. TAYLOR: Well, it would remove the glass eel options from the addendum; and so it would just continue on with Maine and South Carolina implementing those measures as they are. At some point if the glass eel options were brought forth, then in Addendum V they would be addressed.

MR. SIMPSON: So that would remove any possibility of the board considering lowering the overall removals from the fishing rate, all those opportunities will be foregone here. I think we've already received the analysis from the technical committee on this.

MR. ABBOTT: Mr. Chairman, I just think that there are two parts to this motion; and I don't really think they're related. I don't know that we shouldn't do – if we're going to vote on anything, we should divide the question and vote on the request about a watershed-based allocation scheme and then make a vote about whether to proceed with the addendum with only yellow and silver eels.

MR. AUGUSTINE: Mr. Chairman, rather than divide the question, I'd suggest that we defeat this motion. It is counterproductive to what we're trying to accomplish today. We're trying to move this thing forward. To delay it for any period of time other than wait for the conference results that are going to be coming along in a couple of months and burden the technical committee with anymore effort just doesn't seem to make sense. I would move to call the question, Mr. Chairman, and hope you all vote it down.

MR. KELIHER: I will be happy to kind of hold the turn right here because I have a motion that may get at what Dave Simpson put on the table in a way that kind of melds some things together.

CHAIRMAN O'CONNELL: All right, do you guys want a brief caucus? Louis.

DR. DANIEL: That is intriguing what Pat has said; but I think we have folks that are interested in the aquaculture aspects of this plan. I don't know how many; I know one that is very interested. This provides an opportunity for the public to comment on this issue. Now we may come back after public comment and decide to do just that; but I think we owe it to the public and the folks that have been traveling to these meetings for the last year or two at least a sense of what the public thinks in regards to aquaculture and glass eels.

CHAIRMAN O'CONNELL: All right, all those in favor please raise your right hand; all those opposed please raise your right hand; any null votes; abstentions. **The motion fails.** Pat.

MR. KELIHER: Mr. Chairman, do we have the motion that Dave Simpson made earlier? That may help bring a little clarity to this. Lance Stewart brought it up at the past winter meeting; and we've brought this up several times. I believe I asked the technical committee the question regarding understanding that all habitats are not created equal.

Within the state of Maine and I'm sure within all of the other states, we definitely can show that there are glass eel runs where they are trying to move upstream into habitats that has no value for growing out eels into other life stages. If a state could demonstrate that, why couldn't we allow the harvest up to a minimum of a hundred pounds, whatever the number is? Why couldn't we try to develop some language here that would allow that to happen? A state would have to demonstrate to the technical committee that they are going to harvest from low-value habitat that would not impact the overall abundance of eels coastwide.

CHAIRMAN O'CONNELL: Pat, what I'm thinking is – and it is up to the board – it seems

like that could potentially fall under the sustainable fisheries management plan section that we haven't got to yet; and maybe as we work through these other issues, everybody can give some thought to that, and we can see if the board is interested in adding something like that to the sustainable plan section or not. All right, we're still on glass eels. Is everybody comfortable with where we are on glass eel options for public comment? Let's move on to an even easier one, right, yellow eels. I guess there are six options in there right now. Let's try to focus on those that we want to remove or add. Rob.

MR. O'REILLY: Mr. Chairman, I can't quite say I've kept up with all the changes from last August with the various tables have been produced; but there is a comment on Page 18 under weighted yellow eel quota that says additionally the technical committee does not recommend implementing the coast-wide quota above the 1998 to 2010 harvest. That is 907,671 pounds.

In looking at the past tables, which aren't in this document, I realize this, all of those were less than that amount. In looking at the three options under Option 2, really you have one that is under that amount and that is 2C. When you look at the three options under Quota Options 3 or Table 5, you do have two, Option 3B and Option 3C, that are less.

My comment is how important it is for us to go by that information of the technical committee of the 907,671 pounds. I'm not ready to excise an Option 3 yet, but I must say it is a big surprise when I saw that option. The way the weighting is done, it relies heavily on the modern data because the 2011 to 2013 is 70 percent.

I want to hear from other commission members as to how they find this. I'm mindful of what Russ Allen said earlier, which was the working group was looking at an average of 2002 to 2012. In my case what I remember is I had asked at a previous meeting if 2012 could be considered. I'm not saying it is right or wrong to have 2013 here. I hope all the commercial data is in and that there is confidence in that; because it is May and sometimes that still is a little bit of a problem. Overall, I would like to hear more comments on Option 3; and then I realize even for Option 2, that has recent years as well.

CHAIRMAN O'CONNELL: Just to comment; I think the technical committee was clear to reduce harvest across all life stages. I don't know if Sheila is able to provide what that baseline period is, but we just identified some options in glass eels that allow that harvest to expand what it was prior to the last assessment as well; so it is something that the board is going to have to contend with as to what options are feasible to go out for public comment. John.

MR. CLARK: I know from looking at this and Tom has looked at it a lot, Rob, and it is just really difficult looking at the landings' data to find a reference period that would have worked for all states. I think that was part of the impetus behind looking at the weighted averages. I know from what Russ said and what Jim said, our state has the same problem where we had some good years, but they were several years back because of lack of bait.

I think when we look at the yellow eel landings, that they've been fairly steady since about 1996. That's one of the reasons I thought the catch cap would be the best idea because we wouldn't have to find a quota for each state and deal with that. I also don't think that – one thing that I would just like added to the addendum is under the discussion of the European Eel Fishery, there is talk about the precarious state of that fishery, the actions they've taken in Europe; and then it is put there that they still landing 2012 over 5 million pounds of eels.

Whereas, under the American Eel Fishery it is not pointed out for the U.S. coast we only landed about a million pounds of eels. You put Canada in and 2012 we were still just about 2 million pounds for the entire coast of North America, from Canada all the down to Florida. I would just like that made more clear that by sticking with the 2010 landings as the cap or the amount that we working the quota from, we're not at a

historically high level of catch or anything like that. I just would like that made a little more clear in the document. Thank you.

MR. FEIGENBAUM: Thank you, John, for making that important point. It is great to know that someone is really paying closely. I don't mean to be overcritical, Kate, but I also would like to take exception and ask the technical committee if they would please reconsider the statement that the status in Canada is showing dramatic declines over the entire range.

I don't think there is any evidence of that at all. I don't disagree that there has been a dramatic decline in the Upper St. Lawrence and Great Lakes Region; I don't believe there is evidence of – I mean, of course, the word "dramatic" is very subjective anyway; but I do think that conveys a little bit of a misleading impression about the fishery.

I just want to also point out one last thing. The reason that we're even talking about yellow eel measures again; if you recall at the end of the process when we agreed to Addendum III and put it out to public comment and then voted on it, we didn't resolve glass eel issues at that time. We asked the technical committee to go back and bring us glass eel options.

What the technical committee did – it wasn't the technical committee; it was the PDT – when the PDT met to talk about glass eel options and they understood that many states wanted to open up the possibility of future glass eel fisheries, the PDT early in their deliberations had a vote or took the position that if you're ever going to convert to glass eel fisheries, you need to start with a yellow eel quota; the concept being that any state's ability to expand into the glass eel fishery should be premised on where they stand today in connection to the yellow eel fishery.

Now, it seems to me from some of the discussion that we've already had, that the mood of the board is really to move to a more objective measure for assessing what should be the appropriate level of harvest of glass eels; and it shouldn't be based on what was your historical yellow eel harvest.

If we agree with that, why are we revisiting the issue of yellow eel quotas when, as John points out, we're basically fishing at historical low levels? Our fishery of yellow eels is at or near historically low levels. Our stock assessment group says that our stocks are at historically low levels because they look at the catch data.

That is what the depletion-based model did. It looked at what are your catches, it smoothed it out with confidence intervals, and then said we're at a historically low level. Basically low population and low catch right now are just being considered synonymous. If we're at a historical level of low catch and low harvest, it seems like it is a fairly decent place for us to be.

As John was kind enough to point out, we're five times lower than where the traditional level of fishing in Europe was – I'm sorry, we're ten times lower in this country. John pointed out they're at 5 million pounds, but that is down from their historical levels, which were over 10 million. If we're going to move towards an objective basis for establishing glass eel quota at some point in the future, then is it really necessary for us to go forward with yellow eel quotas at this time when really there is only one state in the entire country that is harvesting anything even close to a significant amount of yellow eels. It is Maryland.

There is not another state in this country that is harvesting significant numbers of yellow eels. We've reduced this fishery to one of the smallest fisheries managed by ASMFC; and to keep going in that direction is really just – we're getting to the point where we're just going to kill the fishery because there is not a critical mass there to cover the overhead of running a fishery. Thank you.

CHAIRMAN O'CONNELL: And we do have a status quo option in the addendum; and just to defend staff a little bit, the statement commented earlier is directly from the DFO Report on the status of the Canadian eel population; so right or wrong, that is the reference for that. Russ.

MR. ALLEN: Mr. Chairman, I'm kind of with Rob on this trying to engage everybody's

thought process before I make a motion. I just want to hear what people have to say about going back to the working group recommendations. I don't want to add a whole 'nother suite of options in there; so as Rob said if, say, Option 3 is removed from there, then it would be a good sign to maybe put that in there. I'm just trying to gauge and try to get some feedback from the board before we do that and wasting a half hour to an hour, which we don't have. Any opinions on that would be much appreciated.

REPRESENTATIVE KUMIEGA: There has been a lot of discussion that the catch data isn't good enough to really – so I wonder if maybe there should be an option, not that I feel comfortable making this motion, because this isn't that big of a fishery in Maine, but a motion to quantify cap and possibly reduce effort. That seems to be more – since we don't have good landings' data in a lot of states; maybe it should be an effort management at least for the time being.

CHAIRMAN O'CONNELL: Walter, Kate was asking to explain it a little bit more. What I got from that was that rather than a quota look at management options to quantify cap or reduce effort and go at it that way; correct? So if there are any ideas on that front; that could be added to the draft addendum. Is there any other board input on the yellow eel options? Marty.

MR. BOUW: Just to give you an idea about the catches at the moment, I don't know what the technical committee looked at for the volume of eels at the moment. Actually, effort data is way down, probably about 60 percent. At the moment the stock assessment, the way I see it where we buy every week, is 60 percent small eels.

You can get 50,000 pounds of small eels next week if you want to. The big eels is very limited. The weather has a lot to do with it this year. Of course, even North Carolina was very, very cold; so it is in a very late stage of catching. A lot of people go back to crabs; they don't stay on eels. That's one of the causes I would like to bring up that the stock assessed for this year is a very, very rough year; but there are plenty of small eels; there is plenty of stock there.

CHAIRMAN O'CONNELL: Kate does have the working group options that were put forth previously if the board wanted to examine that. You do see some minor adjustments in some states. Go ahead, Russ.

MR. ALLEN: Well, for lack of getting any other information; **I'll be willing to make a motion to include the working group allocation recommendations from their August memo to the board, which was based on the average of three highest landing values from 2002 to 2012.** There is a table in that working group memo that has that. **That inclusion is for Option 2 and 3**; so it gives you a whole 'nother suite of options within there.

CHAIRMAN O'CONNELL: I think we're going to try to bring them up on the screen just so people can take a look at.

MR. ALLEN: The table that is in there isn't quite the same as the tables that are in the current addendum.

CHAIRMAN O'CONNELL: We'll get the motion on the board and see if can get a second. Pat, are you going to second it? Rob, do you have a comment while we're waiting for the motion to be written?

MR. O'REILLY: Yes; I just wanted to ask about the working group process. Was that to further the information that we had previously through 2010; because the three options from last August all concluded with 2010? Was that the genesis of the working group to get started on that?

CHAIRMAN O'CONNELL: Not being involved with the workgroup, I am not certain. Russ.

MR. ALLEN: The working group was put together because we couldn't come to any substantial decisions on anything at that point. We met a few times in June and July and then put this memorandum together that I believe was

given to the board back at the August meeting. There were members of the board, there were technical committee members and AP members that were all involved.

CHAIRMAN O'CONNELL: All right, I've got the motion and let me read it: move to include the working group allocation recommendation from their August memo to the board as an option to include the three highest landing years from 2002 to 2012 for Options 2 and 3. Motion by Mr. Allen; seconded by Mr. Augustine. Is there discussion on the motion? John.

MR. CLARK: That option was one that was favorable to Delaware as well as New Jersey. I understand that, but I know that one of the problems we had, as I mentioned before, was that you don't want to just ignore what has been happening in recent years. I know, Russ, you've got the same problem we do, which is that female horseshoe crabs, when is that ever going to become legal again to use as bait, when are our eelers going to get that?

I look at our landings and they dropped 40 percent between 2007 and 2008 when you couldn't get female horseshoe crabs anymore. That is the reason I don't really like any of these state-by-state quotas is because you just can't find an allocation that really works for all the states. Thanks.

MR. ALLEN: Yes; I agree with you on some points there, John, for sure. We will still have the 2010 base landings in the tables themselves in Addendum II and III. It is just the allocation that changes because the allocation was based on 2011 to 2013, which back at that time you were on the working group and we all decided that we – okay.

MR. CLARK: Like I said, my point was just that I don't think based on landings' data that we can get a really fair allocation that – I mean, I don't think Maryland should be penalized for the fact that the state has been able to take bigger harvests lately. That is why I thought a cap would be kind of the way to do it although I know a cap has plenty of problems also; but I just don't see a fair way to allocate – where every state is going to feel like they got a fair share of the quota.

MR. ALLEN: Well, to me that doesn't pertain to what the motion is. It is more for making a separate motion to get rid of the quota system itself. This is just a way to at least give the public to have a couple of options that we're not just talking recent; we're talking fairly recent in 2002 to 2012; and that's kind of what the working group decided on.

CHAIRMAN O'CONNELL: Is there any other discussion on the motion? Rob.

MR. O'REILLY: I'm pretending I'm taking an eye exam to read that up front there. (Laughter) I'm wondering how many of those totals are under 907.671 pounds? I see a 1 up there somewhere, so I know that is not. Again, that is just a reflection on what the technical committee advised that I mentioned before. I think we keep that in mind at some later date.

MR. ALLEN: I agree with you again; and it doesn't change the 2010 landings, which is still the same in those tables. All I'm looking for is that percent allocation column on the left-hand side after the state; that is the only thing that I want to see be put into the addendum and not the rest of those landings from all the different timeframes. It is kind of misleading having the table up there in the first place.

CHAIRMAN O'CONNELL: Yes, this is just basically a different allocation option; and the differences are this option provides more of a historical perspective; and those states that have more recent landings are more disadvantaged who have to take more dramatic reduction to get below the 2010 level. The options that were presented in the draft addendum today weight more recent harvest during the allocation. Doug.

MR. GROUT: Just a clarification, Russ; since you're focusing on the percent allocation; would this option still include the minimum 2,000 pounds for the states of Georgia, South Carolina and New Hampshire?

MR. ALLEN: Yes; that would have no change. The tables would remain exactly the same except you'd have those options for the allocation change; that's about it. It should read 2002 to 2012.

CHAIRMAN O'CONNELL: Move to include the working group allocation recommendation from their August memo to the board as an option to include the three highest landing years from 2002 to 2012 for Options 2 and 3. Motion by Mr. Allen; seconded by Mr. Augustine. Let's have a brief caucus.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All right, Kate just wants to clarify something that I think you guys know, but go ahead, Kate.

MS. TAYLOR: I just want to clarify that there are six different quota options currently in the addendum; and so the addition of this will give 12 different quota options in the addendum.

MR. ALLEN: You're correct and I was trying to avoid that by doing some other things, but we didn't get anywhere.

CHAIRMAN O'CONNELL: All right, all those in favor please raise your right hand; all those opposed please raise your right hand; null votes; abstentions**. The motion carries**. Okay, still on yellow eels; any other changes? Dan.

MR. McKIERNAN: I'm concerned about Option 5 that prohibits states that have the minimal 2,000 pound quota from participating in transfers; and I would like to see that struck. I would like to see states that have the minimum 2,000 pound quota, if that goes forward, to be allowed to transfer.

CHAIRMAN O'CONNELL: Do you want to make that into a motion, Dan?

MR. McKIERNAN: **Motion to modify Option 5 to allow states with automatic 2,000 pound quotas to participate in quota transfers.**

CHAIRMAN O'CONNELL: Do we have a second to the motion?

MR. McKIERNAN: Can I explain it?

CHAIRMAN O'CONNELL: Let me get it on the screen and see if we get a second, Dan. We've got a second; Bob Ballou seconded the motion. Go ahead, Dan.

MR. McKIERNAN: As I read this, I can imagine a scenario where one of our law enforcement officers might uncover a commercial fisherman or a dealer who may not have reported and suddenly we have this unexpected overage of just a couple of thousand pounds, but it might be a hundred percent of our quota. We may have to call a state with an underage and say can we have fish for next year so we can have this mini mal quota. At the 2,000 pound level, if we don't take it, I just don't see the downside to flipping that fish to a state that needs it.

CHAIRMAN O'CONNELL: Move to modify Option 5 in Section 3.1.2 (quota transfers) to allow states with a 2,000 pound quota to participate in quota transfers. Motion by Mr. McKiernan; second by Mr. Ballou. Is there discussion on the motion? David.

MR. SIMPSON: I just want to be clear this doesn't in any way jeopardize us somehow going over the quota? I mean the 2,000 pounds came from other states; and so it is sort of conservation neutral doing this; is that right?

CHAIRMAN O'CONNELL: Yes; that 2,000 pounds would be accounted for in the annual quota. The reason that the PDT added this option was to remove the administrative burden of monitoring that level of harvest. This motion would allow those states to transfer that quota. Rob.

MR. O'REILLY: I have to oppose the motion. I think the basis for the pounds being allotted are for harvest opportunities. I know Dan makes the case that might occasionally pop up; but I really think that this is something that if it is not taken, then so much the better for the resource.

MR. McKIERNAN: There are six states at 2,000 pounds; so the total aggregate amount to only 12,000 pounds on a quota that will be almost a million; so I think it is minimal. I urge you to support this.

CHAIRMAN O'CONNELL: Okay, a brief caucus.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All right, all those in favor please raise your right hand; all those opposed; any null votes; abstentions. **The motion carries**. We're still on yellow eels. Bob.

MR. BALLOU: Mr. Chairman, I don't have suggested addition or subtraction but just the suggestion that we add information to the addendum that reflects state landings over the periods that we're using to calculate the allocations. I find Tables 4 and 5 a bit confusing, and I think the public might as well since they speak to the 2010 landings, then they speak to an allocation formula, which is based on a calculation of landings that I don't think shows up in the addendum. I think to ease the process of helping the public understand how those tables were developed, we should provide that information. Thank.

CHAIRMAN O'CONNELL: All right, staff are saying they can do that. Are there any other issues with yellow eel options in this draft addendum? Russell.

MR. RUSSELL DIZE: I would just like to give a little bit of history on what Maryland has done to conserve eels over the years. About 25 years ago or 20 years ago, we had a 3/8 by 3/8 mesh eel pot, which is the only way we can catch eels in Maryland. About 15 years or so ago we went to half by half, which that allows you as what the up-to-date Atlantic States Marine Fisheries Commission had voted on. We have had that for 15 years to conserve eels. Now, according to the technical committee the eels wander up and down the coast and they say, oh, we might go in that, we might go in Delaware Bay or Chesapeake Bay. Somehow or another we keep increasing in eels in Maryland. We're doing better and better. My belief is because we've taken the measures to control what we catch. Thank you.

CHAIRMAN O'CONNELL: All right, let's move on to silver eels. Jim.

MR. GILMORE: Mr. Chairman, I just wanted to go in a couple of things on the silver eel fishery and particularly into Option 4, but I just wanted to do a quick recap. Addendum III and IV, both the goals were to reduce harvest of all life states. This I think from the reports going back a year ago was considered a pretty small fishery.

None of the addendums talk about completely eliminating a fishery. However, here we are a few months later and we still have options that are going to completely eliminate this fishery. What I wanted to do was just a couple of facts; and then I just want to modify – through a motion a brief modification, which I think should be pretty quick.

First off, looking at this fishery, there are a few things we've learned in the last few months. Again, going back to the data, we're talking about 0.5 percent of the coast-wide landings. That is looking at a yellow eel fishery; because that is what this is. This is actually not a silver eel fishery. Most of the eels coming out, they're all yellow. Some percentage of them are going to out-migrate, but the majority of the eels are yellow eels.

The eels that the fishermen want to keep are the smaller eels. They actually don't care about the larger ones; so I'll talk to that in a second. The number of permits on this has varied, but we're only talking about at a height 15 permits; so, really, again, a very, very small fishery. Back in May of 2013 the AP concurred that this was a small fishery and just recommended that there be a cap put on it.

Then we got wrapped around the axle a little bit because there were some discussions about – and which were all unsubstantiated – about all

these large females and impacts to the coastal population. None of this was realistic. I mean, we were talking a very, very small numbers. We got to August and we agreed to put options back in that would cap this fishery.

Again, now we've got to this addendum, and this addendum again has particularly all the options in there; but the one talking about a cap, Option 4, is still eliminating the fishery. I want to put a motion up to modify Option 4; but before I do that I simply want to add in that – and I think this has been stated before.

I think what we need to look at is the efforts that are going on across all the states that are trying to get at the eel population. New York is looking at not in this addendum but with weir modification so we increase passage of some of the eels so that more are escaping into the ocean. Secondly, we would like to look at a manual release. Remember, these guys don't want the larger eels.

They want the small yellow eels; and if we can come up with a size limit based cutoff that above a certain size they would release those and we're getting more escapement of eels that are going to turn into silver eels; again a better conservation measure. Lastly, we have something called a New York Eel Project that is done through the Hudson River Estuarine Reserve where they have been doing monitoring on glass eels and they're doing fish passage.

They're essentially adding more things to this. We've got 250 volunteers and we're trying to get more money to get more eel passage upstream. We're looking at the other aspects of this and not just what is going on in the fishery; so a lot of work going on in New York and in the other states. Again, I'm trying to get this that we're preserving an artisanal fishery, very small; and we want to go with a cap and not a complete elimination of this fishery.

My motion is I would move to modify Option 4 to remove the third sentence, "Once issued, licenses are not eligibility for transferability" and modify Sentence 4 to read "This would result in reduction of licenses". All this does, Mr. Chairman, is essentially we will cap the fishery. As the addendum says, we will identify that number through the public process. I don't know what that is exactly now, but obviously less than the 15 we've had. Essentially it would be capped at that; we would monitor it; and then it would go on and we decide how to transfer those later on; but not eliminate the fishery completely. Thank you.

CHAIRMAN O'CONNELL: I've got a second from Pat from Maine. We'll give staff a second to finish writing it up. All right, move to modify Option 4 in Section 3.1.3 to remove the third sentence, "Once issued, licenses are not eligible for transferability"; and modify the last sentence to read, "This would result in a reduction of licenses." Motion by Mr. Gilmore; seconded by Mr. Keliher. Is there discussion on the motion?

MR. LEROY YOUNG: I have a question for Jim. If this is a silver eel fishery but they're harvesting yellow eels; what are we really talking about? Is this part of the yellow eel quota or is it part of the silver eel harvest.

MR. GILMORE: Well, right now the way the addendum – it was listed as a silver eel fishery because some percentage of them will essentially out-migrate and then metaphase into silver eels. Again, we'd have to go back and if we put this back in the yellow eel fishery, I think it is going to complicate it more. Technically, the majority of the eels they are keeping, from my understanding, they're actually yellow eels; and why sorting them is more difficult is because none of them have silvered out at that point when they're catching them in the Delaware.

MR. FEIGENBAUM: I can support this motion although I do have to question whether weirs that are targeting out-migrating eels could be said to be anything other than targeting a silver eel fishery. But be that as it may, I think that New York has made a fair point about the fact that no other state has been asked to eliminate a fishery completely. That was an option.

Here there was no option that I believe would have allowed New York to keep that fishery;

whereas, in the glass eel fishery I think status quo is it is still an option. But in any event, if I misspoke I apologize. I can support the motion and I just think it goes the point that watershed management and ecosystem management really needs to be our ultimate goal.

When states do open up the possibility of having glass eel fisheries, the folks in New Jersey and New York along the Delaware River are going to realize that they really can't have a glass eel fishery on this river. It is just too wide, too deep of a river to support a glass eel fishery; so it's important I think as a group that we give states the flexibility to manage their fisheries in a logical way consistent with the geography and not just based on hypothetical principles.

CHAIRMAN O'CONNELL: And just to add to the background, all the other states were required to close during this period but given the cultural and historical perspective of the fishery; that is why the board allowed that one-year extension to allow more discussion on this issue. Rob.

MR. O'REILLY: I have a couple of questions. Jim, you had mentioned the licenses and 15 came out; but I see in 2012 there were only a dozen. In 2013; did that go up a little bit or was that just something that you were speaking about? A second question, just to get them both to you, would you mentioned briefly getting a size frequency and would you expect pretty good cooperation with that to maintain a yellow eel essentially fishery, as you mentioned?

MR. GILMORE: To the first question, Rob, for 2013 it was ten licenses we issued; and again this year we had another ten. We were going to try to put a number in here. I think the AP had recommended six; but we wanted to go out to the public again to get a better handle of how actual fishermen we have that are exploiting this versus how many guys are just getting permits.

Again, they're giving us landings' information so we can actually try to ferret out the guys that have actually been doing this many years as opposed to the guys who are just trying to come up with an option of using this later on. Secondly, the only limitation we in that, Rob, is defining that.

I talked to staff and I said could we get that length cutoff, whatever, defined, and they said that it is probably going to take a good year to get the data behind that and maybe – but from what I understand from the fishery – and again we'll get this at the public comment period is that, yes, that would be pretty good cooperation because that is the value in the fishery are those smaller eels and not the big out-migrators.

MR. CLARK: Jim, you say this this is a yellow eel fishery, but they are fishing during the time you expect silver eels to be out-migrating; so in addition to length data I would like to see some histological data from the gonads of these things to prove that these aren't mature eels. I mean we know the silvering doesn't occur all at once so they – I mean the time of year they're fishing for these things – and I would just like to reiterate that there is a good reason biologically to close silver eel fisheries because we know those are eels that are heading out to spawn. I just want to leave it at that.

MR. MILLER: Jim, I'm trying to understand the language in the motion. It says once issued, licenses are not eligible for transferability; and yet it ends with this would result in a reduction of licenses. If licenses are transferable; how does it result in a reduction in licenses?

MR. GILMORE: My apologies, Roy. It probably would have been clearer if I had just rewritten the entire option. If you look at the addendum itself and if you go to Option 4, I'll read that and maybe that will clarify it. If you do this replacement that says, "Under this option, the Delaware River Weir Fishery would be limited to those permitted New York participants that fished and reported landings anytime during the period 2010 to 2013. Refer to Figure 6 for the number of licenses issued annually of the active participants in the fishery."

That next sentence was eliminated; that sentence is gone; and then only one license can be issued per participant; and then this would result in a

reduction of licenses; the cap that we would put on results in the reduction of the licenses. Again, my apologies, I tried to do it quickly and it is confusing based upon the sentences; but if you add those in, that is what ends up hopefully happening.

MR. BALLOU: Jim, I'm looking at this Figure 6 and it looks like the upshot, if this were to go forward, this particular option as you're proposing to amend it, the reduction would be from about 12 to about 8 or nine; does that jive with – am I reading this correctly? I'll pause and then I might have a follow-up. Is that what you mean by this will result in a reduction of licenses; that being a reduction from about 12 to about 8?

MR. GILMORE: Yes, Bob, that is correct; it could go lower, though. Again, we're trying to find out the true number of traditional fishermen in this; so if it was only six or seven, we'd go down to that.

MR. BALLOU: And if I could follow up; so if something dramatic happened, relatively speaking – I mean we're talking about throwing numbers here; but in 2010, and that is the number of participants in this fishery essentially doubled, if I'm reading this correctly; at least the number of licensed and close to being the number of licensed and active; so can you just speak to why the proposal here is to cap at the post-2010 levels versus the prior 2010 levels? Thank you.

MR. GILMORE: Most of that, Bob, we got from the public meetings. I think the larger of them that were actively fishing this were at the meeting; and essentially they said there is – you know, some years they get into the fishery to augment their income, whatever, and they've had good and bad years; so it seemed to be more of a socio-economic reason why this thing goes up and down.

We looked back to the late nineties and it was up to 15 permits, and some of those were the same guys; and there was like more guys fishing back then. Again, we're trying to focus in on the guys that really use this more as a tradition and also as a consistent form of their income; but that variability has been the cost of just year-to-year variations in economics.

CHAIRMAN O'CONNELL: All right, we've got a motion on the table and we've had some discussion. Let's take a 15-second caucus and vote on the motion.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: All right, all those in favor please raise your right hand; all opposed please raise your right hand; any null votes; any abstentions, one abstention. **The motion carries**. Are there any other proposed changes to the silver eel section? Walter.

REPRESENTATIVE KUMIEGA: Under the state-specific sustainable FMPs; could New York reduce turbine deaths and use that as an equivalency, for example, to keep this fishery open?

MS. TAYLOR: Yes; that would be an option.

CHAIRMAN O'CONNELL: All right, unless somebody objects, we're going to move on to the sustainable fisheries management plan section. Are there any suggested changes, additions or eliminations to that? Pat.

MR. KELIHER: Mr. Chairman, I've got a motion and I can either send it to you or I can just read it quickly. **I would move to include Item Number 4 to 3.1.4: States would be allowed to harvest a maximum of 200 pounds of glass eels annually for the use in domestic aquaculture facilities if they can show that they can be harvested from a watershed that does not contribute to the spawning stock of American eel.**

CHAIRMAN O'CONNELL: We're going to get that onto the screen. One suggestion from staff is to maybe change the word "minimal" instead of "no impact to the stock" because it would be difficult to demonstrate there would be no impact. Are you okay with that change?

DR. DANIEL: Would the maker consider 750 pounds a friendly amendment?

CHAIRMAN O'CONNELL: All right, the motion to add Item Number 4 in Section 3.1.4: States would be allowed to harvest a maximum of 200 pounds of glass eels annually for the use in domestic aquaculture facilities if they can show that they can be harvested from a watershed that minimally contributes to the spawning stock of American eel. Motion by Mr. Keliher; second by Ritchie White. Is there discussion on the motion? Dan.

MR. McKIERNAN: Is it necessary to clarify domestic aquaculture to mean grow out to minimum legal size?

CHAIRMAN O'CONNELL: Okay, we need to figure out a way to add that to the motion. Ritchie, are okay with that as well? Go ahead, Kate.

MS. TAYLOR: Just a question for clarification; this Option Number 4, would states be required to go through numbers one, two or three; where it says that states must be able to assess with some level of confidence the status of eel abundance and current level of mortality that is occurring on the American eel populations within their jurisdictions; and then once adequately documented, states would be allowed to allocate the fishing mortality – so would this just be kind of like a separate item and not really number four; but it would just kind of be a separate item that would allow this? Does that make sense?

MR. KELIHER: It does, Kate; it probably would be a separate item. My seat mate here wanted to know how do we define "minimally contributes"; and I think from my perspective that would be a proposal that would come through a state to the technical committee to make that determination.

MS. TAYLOR: That was my second question is if there would be technical committee review on these proposals?

MR. KELIHER: Yes.

MR. SIMPSON: I just need some insight into aquaculture. I can't picture how many large stainless steel tanks you'd need to grow out 200 pounds of glass eels to I don't how many tens of thousands of pounds of legal-sized product – do we have the proportions right? It just seems like that is a tremendous amount of little baby eels. Can anyone help me with the proportionality here?

MR. BOUW: Looking at actually the plan of Mr. Daniel's there, the 750 pounds, we probably could use about 66 tons by the time it was nine inches.

MR. SIMPSON: Sixty-six tons coming out of 750 pounds?

MR. BOUW: Yes; as for the 750 pounds, from baby eels up to a nine-inch eel, it would be the equivalent to about 66 tons, which is about 140,000 pounds. That is a big farm.

MR. WHITE: Well, just some thinking to Dave's question; it doesn't mean you have to do the 200 pounds – up to – and it doesn't mean that it is one aquaculture project. Maybe there are six.

MR. ALLEN: Just a quick question; a state is not limited to harvesting the 200 pounds and using it in its own state aquaculture facilities; they could go to any state? I just wanted to make sure that was clear.

MR. KELIHER: I wasn't considering any limitations here.

MR. MILLER: Mr. Chairman, with all due respect to Commissioner Keliher; I'm having some problems with this particular motion. One, I don't know how to define "minimally contributes". That is a value judgment. Two, I'm trying to picture what these runs would look like. Are talking culverts up into a trickle or what are talking about?

Because if the eels in our state can't get access to freshwater, as John Clark has pointed out, in estuarine waters; so just assuming they don't have access to freshwater doesn't mean that they

can't contribute to the spawning stock. I guess I just don't understand the intent of the motion. Although I agree – I'm not opposed, let's put it that way, to the concept of using some quantity of glass eels to support aquaculture. Thank you.

MR. KELIHER: I'll use the young-of-the-year site that we have in Maine. West Harbor Pond is where we collect elvers for that young-of-the-year assessment. That pond has zero to no oxygen at lower levels and does not support any populations of juveniles or adults once they're up within that – there may be a few because there may be some way up in the upper part, but it does not contribute in any meaningful way. If we are going to move to a full lifecycle assessment, we would not use this site beyond what we do for glass eels at this time. I'm looking at some locations similar to that and not just picking a culvert. I don't know if that helps, Roy.

MR. MILLER: I don't really have a follow-up. I believe what Pat is telling me. There may be a particular situation where there is absolutely no potential for rearing eels upstream of some impediment; but even in that particular system, I have to wonder is there potential for rearing eels downstream of that impediment.

MR. GILMORE: Would these be transferable, Pat? Was that the idea of this, that we'd have transferability between the states?

MR. KELIHER: Yes.

DR. STEWART: I would like just to weigh in on this because I was heavily involved 20 years ago trying to get glass eels farmed in Connecticut. I fished them for two years in maybe twelve different streams; but most of them are little small tributaries. The biggest impediment I see as a lot of glass eel migration up is chlorine at the mouths of some of these very nice upstream habitats.

You would see those glass eel runs; but in many of these little trickles, just I had mentioned to Pat, you can catch five gallons of glass eels, and there is no headwater pond. If there is one, it may be half an acre pond; and the rest of it is a trout stream. A lot of that is a dead-end situation so it is real from my observations; and whether you can find it and optimize on it, but I think we need to get started with some leniency on aquaculture for a trial basis.

MR. FEIGENBAUM: I'm going to echo John Clark's sentiments that were expressed by Roy Miller. By the way, I think I could support this motion; but the use of the term "minimally contributes" is really problematic. Eels make U-turns. They go into the freshwater; and if they find that it is not appropriate habitat, they don't just sit there and die. They go back into the estuary.

Dr. Brian Jessup, renowned eel scientist in Canada, has done the strontium calcium analysis on the otoliths of eels; and he can verify that the majority of eels in any system migrate between the freshwater and the saltwater throughout their life. A very sizable percentage of the eels live their entire life in the estuary and do not even ascend to the freshwater.

Dave Cairns is going to produce a paper at the Quebec Symposium indicating that probably less than 10 percent of all eel habitat in North America is even subject to fishing because, in fact, most of that habitat is in the estuaries.

While I do think that watershed analysis is vitally important for us to understand where are the eels being recruited to, the suggestion that watershed analysis will tell us that certain watersheds are more important that others – the eels in that habitat are more important than others, I can't agree with that. I might be able to support the motion; but some of the premises that we're talking about here are just inaccurate; they are just inaccurate.

CHAIRMAN O'CONNELL: All right, let's do the 30-second caucus and I will read the motion.

(Whereupon, a caucus was held.)

CHAIRMAN O'CONNELL: Move to add Item Number 4 in Section 3.1.4: States would be allowed to harvest a maximum of 200 pounds of glass eels annually for the use in domestic

aquaculture facilities (to grow out to the minimum legal size) if they can show that they can be harvested from a watershed that minimally contributes to the spawning stock of American eel. Motion by Mr. Keliher; seconded by Mr. White.

All those in favor please raise your right hand; all those opposed please your right hand; any null votes; any abstentions, two abstentions**. The motion carries**. Are there any other issues related to the sustainable fisheries planning section of the draft addendum? All right, Ritchie.

MR. WHITE: In the glass eel section, would it be possible to have under any of the quota options that show a poundage, that we could also show the technical committee's recommendation for a coast-wide quota; so that the people commenting on this, they can see that when they're deciding which option to take.

CHAIRMAN O'CONNELL: Under the yellow eel section there is a clear sentence that states what the technical committee recommendation is; but you're suggesting that something like that also be added to the glass eel section?

MR. WHITE: That's correct.

CHAUIRMAN O'CONNELL: All right, moving forward, are there any comments on the law enforcement section? Pat.

MR. KELIHER: The colonel is coming up at a high rate of speed. I was reviewing the law enforcement section on the way down; and I mentioned to Joe – I asked if he had a chance to take a look at that, and he said he did. He thought there needed to be further discussion with the Law Enforcement Committee and that may need to be updated; so I didn't know if the colonel wanted to comment on that.

COLONEL FESSENDEN: Actually we went over this a year or so ago; and since then we have developed this quota system in Maine. We're pretty excited about it; and I've been asked to put on a presentation tomorrow about the quota system and how it is working in Maine. I'd like to be able to present that and maybe talk to the committee tomorrow and see whether or not they'd like to review our comments and resubmit, maybe. Certainly, I'm just one member of committee and I have to go through the committee and talk about it. I just want to reserve that if I can.

MS. TAYLOR: The comments in the document were provided based on the LEC Conference Call in March, before the start of the glass eel season.

COLONEL FESSENDEN: I'm sorry about that; I thought we did those last year. I missed that call, evidently.

CHAIRMAN O'CONNELL: No problem. All right, are there any other comments on the law enforcement section? Bill.

MR. ADLER: **Mr. Chairman, is it appropriate to make a motion to approve document as amended for public hearing?**

CHAIRMAN O'CONNELL: Yes, it is.

MR. ADLER: **I'll so make that motion.**

CHAIRMAN O'CONNELL: Seconded by Pat Augustine. We got a motion moved to approve Draft Addendum IV for public comment as modified today. Motion by Bill Adler; seconded by Pat Augustine. Do you guys need to caucus? Is there discussion on the motion? Pat.

MR. KELIHER: Yes; it is just to clean up on Page 11 under Option 2, second paragraph. This refers to Maine DMR as Maine Department of Natural Resources and just needs to be correctly referenced that it is the Maine Department of Marine Resources.

CHAIRMAN O'CONNELL: We will make that change. Rob.

MR. O'REILLY: At the discretion of staff, in the document you had mentioned there was sort of a clear case for the yellow eel fishery; the recommendations of the technical committee – on Page 18, which starts with the PDT and ends

with subsequent addenda and talks about 907,671 pounds; if that could go in the front on 3.1.2 as the second paragraph, I think the public would see it. Right now it is sandwiched into the weighted yellow eel quota; and it might not stand out as much. It is just a suggestion, if possible.

CHAIRMAN O'CONNELL: I think that is a good suggestion. Are there any other comments before we vote on this motion? Are you guys ready to vote? All right, all those in favor please raise your right hand; any opposed; null votes; abstentions. **The motion carries unanimously**.

ELECTION OF VICE-CHAIR

CHAIRMAN O'CONNELL: The next item on the agenda is elect a vice-chair. Pat.

MR. PATRICK GEER: I would like to nominate John Clark.

CHAIRMAN O'CONNELL: Do we have a second; Pat Augustine.

MR. AUGUSTINE: I make the second and move we close nominations and cast one vote for the gentleman across the way, Mr. Clark.

CHAIRMAN O'CONNELL: All right; are there any objections? Welcome along, John.

OTHER BUSINESS

Is there any other business coming before the board today? Mitch.

MR. FEIGENBAUM: Quick question and I don't know who I am addressing it to; maybe you, Bob. I understand that in the last several months the state of Florida issued elver harvesting permits for multiple fishermen. I was wondering if – I don't know if anyone is here from Florida – if there is any update on the status of that process.

I was under the impression, from talking to Bob, that Florida was aware that was not in compliance with ASMFC's Fishery Management Plan and that it was the intention of the Florida Legislature to just – it needed some time to pass the legislation to clean that up. I was wondering if that was the case.

MR. ESTES: That does not have to go through our legislature. We are going to our commission in September to request that we advertise a rule which we expect will be passed, assuming there are no problems in November.

ADJOURNMENT

CHAIRMAN O'CONNELL: Is there any other business? Is there any objection to adjourn? The meeting is adjourned.

(Whereupon, the meeting was adjourned at 4:50 o'clock p.m. May 12, 2014.)

Atlantic States Marine Fisheries Commission

DRAFT ADDENDUM IV TO THE FISHERY MANAGEMENT PLAN FOR AMERICAN EEL FOR PUBLIC COMMENT

ASMFC Vision Statement:
Sustainably Managing Atlantic Coastal Fisheries

June 2014

Revised June 20, 2014
Parts of Section 3.1.2 Yellow Eel Fisheries Management Options were revised, including Tables 5-7. Changes are highlighted in yellow.

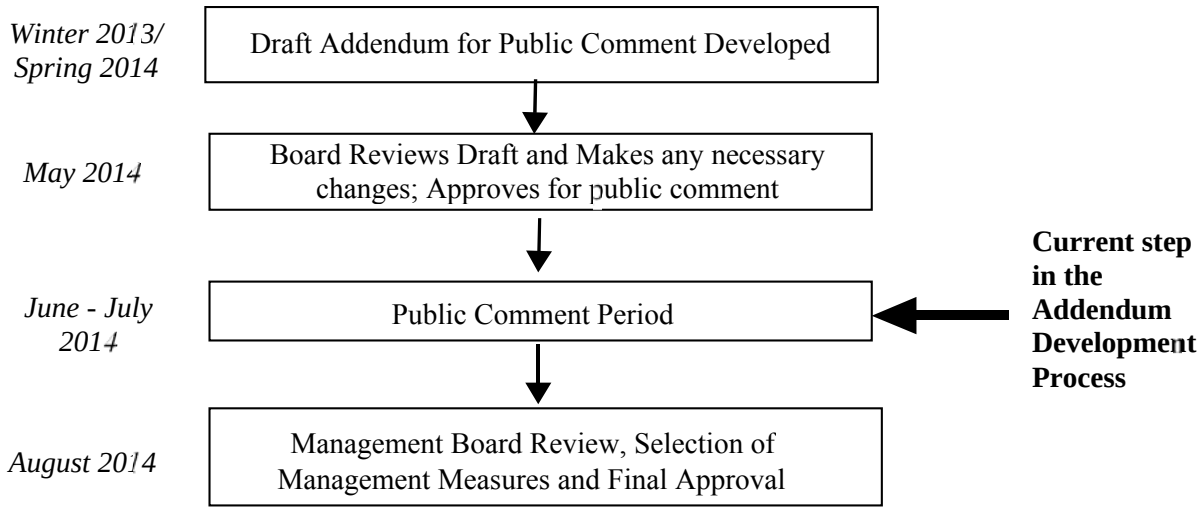
PUBLIC COMMENT PROCESS AND TIME LINE

The public is encouraged to submit comments regarding this document at any time during the public comment period. Regardless of how they were sent, comments will be accepted until 11:59 P.M. (EST) on July 17, 2014. Comments received after that time will not be included in the official record. The American Eel Management Board will use public comment on this Draft Addendum to develop the final management options in Addendum IV to the American Eel Fishery Management Plan.

You may submit public comment in one or more of the following ways:

1. Attend public hearings in your state or jurisdiction.
2. Refer comments to your state's members on the American Eel Management Board or Advisory Panel, if applicable.
3. Mail, fax or email written comment to the following address:

Kate Taylor
Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201
comments@asmfc.org (Subject line: American Eel)



EXECUTIVE SUMMARY

The Commission's American Eel Management Board (Board) initiated the development of Draft Addendum III in August 2012 in response to the 2012 Benchmark American Eel Stock Assessment, which found the American eel population in U.S. waters is depleted. The assessment found the stock is at or near historically low levels due to a combination of historical overfishing, habitat loss and alteration, productivity and food web alterations, predation, turbine mortality, changing climatic and oceanic conditions, toxins and contaminants, and disease. Draft Addendum III included a range of options for the commercial glass, yellow, and silver eel fisheries, as well as the recreational fishery. In August 2013, the Board approved some of the measures from Draft Addendum III (predominately the commercial yellow eel and recreational fishery management measures) and split out the remainder of the management measures for further development in Draft Addendum IV. This Draft Addendum proposes additional management measures for the commercial glass, yellow, and silver eel fisheries. No additional changes to the recreational fishery are proposed in this Draft Addendum. The goal of Draft Addendum IV is to reduce overall mortality and increase conservation of American eel stocks. Specifically, the management options under consideration are:

Commercial Glass Eel Fisheries Management Options

Option 1 – Status Quo
Option 2 – 2014 Management Measures
Option 3 – Closure of the Glass Eel Fisheries
Option 4 – Glass Eel Quota
Option 5 – Quota Overages
Option 6 – Glass Eel Harvest Allowance Based on Stock Enhancement Programs
Option 7– Aquaculture Quota
Option 8 – Aquaculture Permitting
Option 9 – Reporting Requirements
Option 10 – Monitoring Requirements

Commercial Yellow Eel Fisheries Options

Option 1 – Status Quo
Option 2 – Adjusted Yellow Eel Quota (Allocation Base Years = 2011 – 2013)
Option 3 – Adjusted Yellow Eel Quota (Allocation Base Years = 2002 -2012)
Option 4 - Yellow Eel Quota based on 2010 Landings
Option 5 – Weighted Yellow Eel Quota
Option 6 – Quota Overages
Option 7 – Quota Transfers
Option 8 – Catch Cap

Commercial Silver Eel Fisheries Measures

Option 1 – Status Quo
Option 2 – Extension of Sunset Provisions
Option 3 – Effort Reduction/Time Closures
Option 4 – License Cap

Sustainable Fishing Plans for American Eel

Fishing Mortality Based Plan
Transfer Plan
Aquaculture Plan

TABLE OF CONTENTS

1. INTRODUCTION

The Atlantic States Marine Fisheries Commission (Commission) has coordinated interstate management of American eel (*Anguilla rostrata*) from 0-3 miles offshore since 2000. American eel is currently managed under the Interstate Fishery Management Plan (FMP) and Addenda I-III to the FMP. Management authority in the exclusive economic zone (EEZ) from 3-200 miles from shore lies with NOAA Fisheries. The management unit is defined as the portion of the American eel population occurring in the territorial seas and inland waters along the Atlantic coast from Maine to Florida.

2. BACKGROUND

2.1. STATEMENT OF THE PROBLEM

The Commission's American Eel Management Board (Board) initiated the development of Draft Addendum III in August 2012 in response to the 2012 American Eel Benchmark Stock Assessment, which found the American eel population in U.S. waters is depleted. The assessment found the stock is at or near historically low levels due to a combination of historical overfishing, habitat loss and alteration, productivity and food web alterations, predation, turbine mortality, changing climatic and oceanic conditions, toxins and contaminants, and disease. Draft Addendum III for Public Comment included a range of options for the commercial glass, yellow, and silver eel fisheries, as well as the recreational fishery. In August 2013, the Board approved some of the measures from Draft Addendum III for Public Comment (predominately the commercial yellow eel and recreational fishery management measures) and split out the remainder of the management measures (commercial glass and silver eel fisheries) for further development in Draft Addendum IV. At that time, the Board directed the American Eel Plan Development Team (PDT) to develop Draft Addendum IV to include, but not limited to, 1) a coastwide glass eel quota, 2) adequate monitoring requirements, 3) adequate enforcement measures and penalties, 4) transferability, and 5) timely reporting. The goal of Draft Addendum IV is to reduce overall mortality and increase overall conservation of American eel stocks.

2.2. LIFE HISTORY

American eel (*Anguilla rostrata*) inhabit fresh, brackish, and coastal waters along the Atlantic, from the southern tip of Greenland to Brazil. American eel eggs are spawned and hatch in the Sargasso Sea. After hatching, leptocephali—the larval stage—are transported at random to the coasts of North America and the upper portions of South America by ocean currents. Leptocephali are then transformed into glass eels via metamorphosis. In most areas, glass eel enter nearshore waters and begin to migrate up-river, although there have been reports of leptocephali found in freshwater in Florida. Glass eels settle in fresh, brackish, and marine waters; where they undergo pigmentation, subsequently maturing into yellow eels. Yellow eel can metamorphose into a silver eel (termed *silvering*) beginning at age three and up to twenty-four years old, with the mean age of silvering increasing with increasing latitude. Environmental factors (e.g., food availability and temperature) may play a role in the triggering of silvering. Males and females differ in the size at which they begin to silver. Males begin silvering at a size typically greater than 14 inches and females begin at a size greater than 16-

20 inches (Goodwin and Angermeier 2003). However, this is thought to vary by latitudinal dispersal. Actual metamorphosis is a gradual process and eels typically reach the silver eel stage during their migration back to the Sargasso Sea, where they spawn and die.

Eels make extensive use of freshwater systems, but they may migrate to and from or remain in brackish and marine waters. Therefore, a comprehensive eel management plan and set of regulations must consider the various unique life stages and the diverse habitats of American eel, in addition to society's interest and use of this resource.

2.3. STATUS OF MANAGEMENT

American eel occupy a significant and unique niche in the Atlantic coastal reaches and tributaries. Historically, American eels were very abundant in East Coast streams, comprising more than 25 percent of the total fish biomass. Eel abundance had declined from historic levels but remained relatively stable until the 1970s. Fishermen, resource managers, and scientists postulated a further decline in abundance based on harvest information and limited assessment data during the 1980s and 1990s. This resulted in the development of the Commission's Interstate Fishery Management Plan (FMP) for American Eel, which was approved in 1999. The FMP required that all states maintain as conservative or more conservative management measures at the time of implementation for their commercial fisheries and implement a 50 fish per day bag limit for the recreational fishery. The FMP also required mandatory reporting of harvest and effort by commercial fishers and/or dealers and specific fisheries independent surveys to be conducted annually by the states.

Since then the FMP was modified three times. Addendum I (approved in February 2006) established a mandatory catch and effort monitoring program for American eel. Addendum II (approved in October 2008) made recommendations for improving upstream and downstream passage for American eels. Most recently, Addendum III (approved in August 2013) made changes to the commercial fishery, specifically implementing restrictions on pigmented eels, increasing the yellow eel size limit from 6 to 9 inches, and reducing the recreational creel limit from 50 fish to 25 fish per day.

2.3.1. INTERNATIONAL MANAGEMENT

Despite data uncertainties with European eels and American eels in Canada, both the European Union and the Department of Fisheries and Oceans Canada have taken recent management actions to promote the rebuilding of local stocks.

2.3.1.1. EUROPEAN MANAGEMENT

While American and European eels (*Anguilla anguilla)* are two separate species, the spawning grounds and early life history habitats are believed to overlap. Therefore oceanographic changes could influence both stocks. Currently, the European eel stock is considered severely depleted (ICES, 2013). Major fisheries occur in the Netherlands, France, Sweden, and the United Kingdom, with total 2012 commercial harvest in the EU estimated at 5.2 million pounds and recreational harvest estimated at 1.1 million pounds (Figure 1; ICES, 2013). In 2007, the European Union (EU) passed legislation which required EU countries to develop and

implement measures to allow 40% of adult eels to escape from inland waters to the sea for spawning purposes. In addition, beginning in 2008, EU countries that catch glass eel (defined as juvenile eels less than 4.7 inches long) were required to use 35% of their catch for restocking within the EU and increase this to at least 60% by 2013.

To demonstrate how they intend to meet the target, EU countries were required to develop national eel management plans at river-basin level. To date, the European Commission has adopted all plans submitted by 19 EU countries, plus a joint plan for the Minho River (Spain/Portugal). Management measures implemented though these plans vary from country to country, but are similar to most management measures considered or implemented in the U.S. The management measures include:

- Seasonal closures
- Size limits (11 – 21.6 inches)
- Recreational bag limit (2 - 5 fish/angler/day)
- Gear restrictions (banning fyke nets, increasing mesh size)
- Reducing effort (e.g. by at least 50%)
- Prohibiting glass, silver or all commercial fishing
- Commercial quotas
- Implementing catch and release recreational fisheries only
- Reducing illegal harvest and poaching
- Increasing fish passage
- Restocking suitable inland waters with glass eels

In 2013 the International Council on the Exploration of the Seas (ICES) completed an evaluation on the implementation of the national management plans (ICES, 2013a). ICES concluded that, given the short time since implementation, restrictions on commercial and recreational fisheries for silver eel has contributed the most to increases in silver eel escapement. The effectiveness of restocking remains uncertain (ICES, 2013a). ICES advises that data collection, analysis, and reporting should be standardized and coordinated to facilitate the production of stock-wide indicators to assess the status of the stock and to evaluate the effect of management regulations.

In response to the evaluation, European Parliament passed a resolution in September 2013 requesting the European Commission present new legislation to further conserve European eel populations. The new law must close the loopholes allowing the continued overfishing and illegal trade; evaluate current restocking measures and their contribution to eel recovery; require more timely reporting on the impact of eel stock management measures; and require member states that do not comply with the reporting and evaluation requirements to reduce their eel fishing effort by 50%. The European Commission's new legislative proposal, which is expected to be presented in Summer 2014, must aim to achieve the recovery of the stock "with high probability".

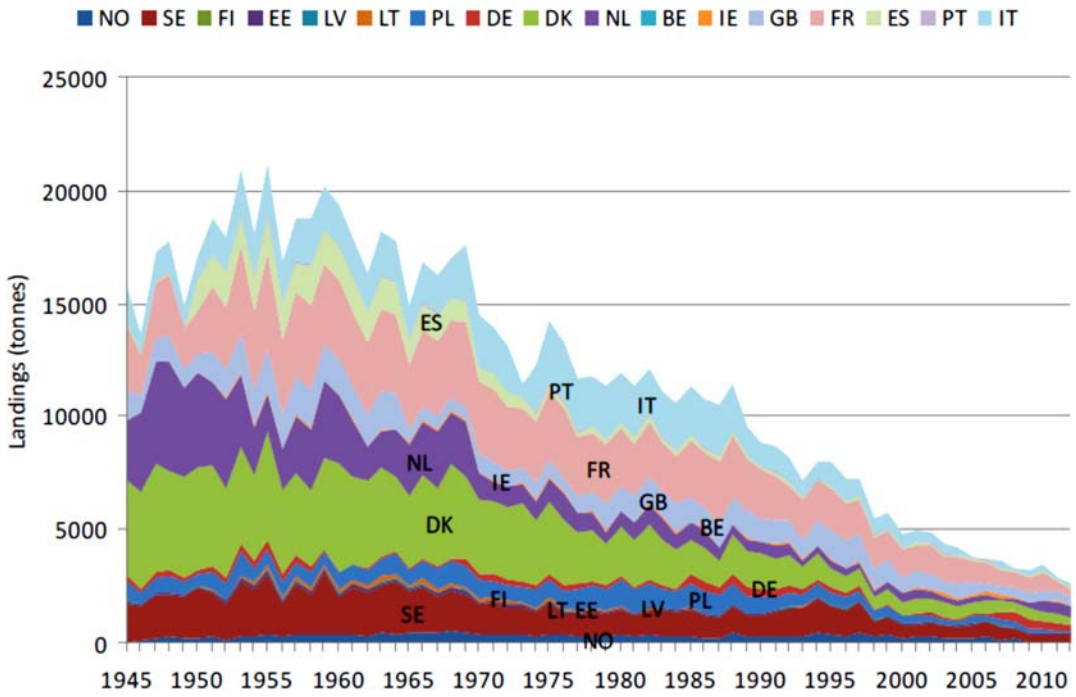


Figure 1. Total landings of European eel (all life stages) from 2013 Country Reports (Note: not all countries reported). NO = Norway, SE = Sweden, FI – Finland, EE = Estonia, LV = Latvia, LT = Lithuania, PL = Poland, DE = Germany, DK = Denmark, NL = Netherlands, BE = Belgium, IE = Ireland, GB = Great Britain, FR = France, ES = Spain, PT = Portugal, IT = Italy. *From ICES, 2013a.*

In November 2013, ICES completed an update on European stock status to provide management advice for the 2014 fishing year (ICES, 2013b). The update found that annual recruitment of glass eel to European waters has increased over the last two years, from less than 1% to 1.5% of the reference level in the "North Sea" series, and from 5% to 10% in the "Elsewhere" series[1], which may or may not be the result of the regulatory changes (Figure 2). However, despite recent increases, production of offspring is very low and there is a risk that the adult stock size is too small to produce sufficient amount of offspring to maintain the stock (ICES, 2013b). The biomass of escaping silver eel is estimated to be well below the target (ICES, 2013b). ICES continues to recommend that all anthropogenic mortality affecting production and escapement of silver eels should be reduced to as close as possible to zero, until there is clear evidence of sustained increase in both recruitment and the adult stock. The stock remains critical and urgent action is needed (ICES, 2013b).

2.3.1.2. CANADIAN MANAGEMENT

American eel are widespread in eastern Canada, but there are dramatic declines throughout its range, including Lake Ontario and the upper St. Lawrence. Although trends in abundance are highly variable, strong declines are apparent in several indices. The American eel was

[1] The North Sea series are from Norway, Sweden, Germany, Denmark, Netherlands, and Belgium. The Elsewhere series are from UK, Ireland, France, Spain, Portugal, and Italy.

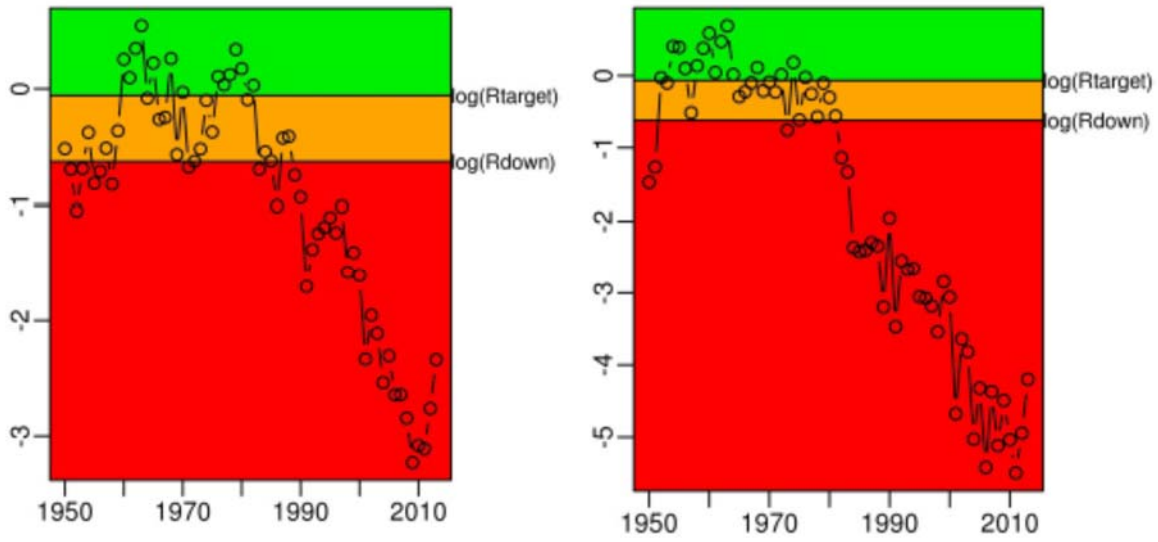


Figure 2. Trends in recruitment ("Elsewhere", left, and "North-Sea", right) of European eels with respect to healthy zone (green), cautious zone (orange) and critical zone (red). *From ICES, 2013b.*

first assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2006 and was designated as a species of "Special Concern." The status was re-examined by COSEWIC in 2012 and it was recommended to list the species as Threatened under the Canadian Species at Risk Act (similar to the U.S. Endangered Species Act). A National Management Plan for American Eel in Canada was developed by the Canadian Eel Working Group which specifies short and long term goals for recovery (DFO, 2010). One of the short-term goals of the plan is to reduce eel mortality from all anthropogenic sources by 50% relative to the 1997-2002 average. Long-term management goals include rebuilding overall abundance of the American eel in Canada to its mid-1980s levels.

Canadian commercial yellow and silver American eel fisheries occur in New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador, and Québec (Figure 3). Fishing occurs in both fresh and marine waters, but many rivers and coastal habitats remain unfished. Elver fisheries in Canada occur only in Scotia-Fundy and the south coast of Newfoundland. Overall total reported American eel landings in Canada declined through the early 1960s, increased to a peak in the late 1970s, and have since declined to the lowest level in recent history (Cairns et al, 2014). Winter recreational spear fisheries of yellow eels also occur in the Southern Gulf of St. Lawrence.

Recent management measures to meet the goals of the National Management Plan have included:

- Minimum size limits raised to 20.8 inches (Gulf region), 13.75 inches (Maritimes region) and 11.8 inches (southwestern New Brunswick, Newfoundland and Labrador)
- Reduction to seasons
- Area closures
- Buyouts of licenses
- Glass eel fisheries are not permitted in areas where fisheries exist for larger eels
- Enforcement of regulatory definitions on fyke nets

- Measures to reduce high grading
- License caps, limited entry, and license reductions
- Gear restrictions, including a 1" x ½" escapement panel
- Quota reductions, including 10% cut in glass eel fisheries

The first large-scale eel stocking experiment occurred in the Richelieu River, a tributary to Lake Champlain, in 2005. Since then, a total of seven million elvers have been stocked in Canadian waters. Stocking initiatives can be considered as a potential threat because their effects are uncertain, manifestation of some effects may only be apparent years after, and because of the documented negative effects of stocking of on other fish, particularly salmon (COSEWIC, 2012). Continuing habitat degradation, especially owing to dams and pollution, and existing fisheries in Canada and elsewhere may constrain recovery (COSEWIC, 2102).

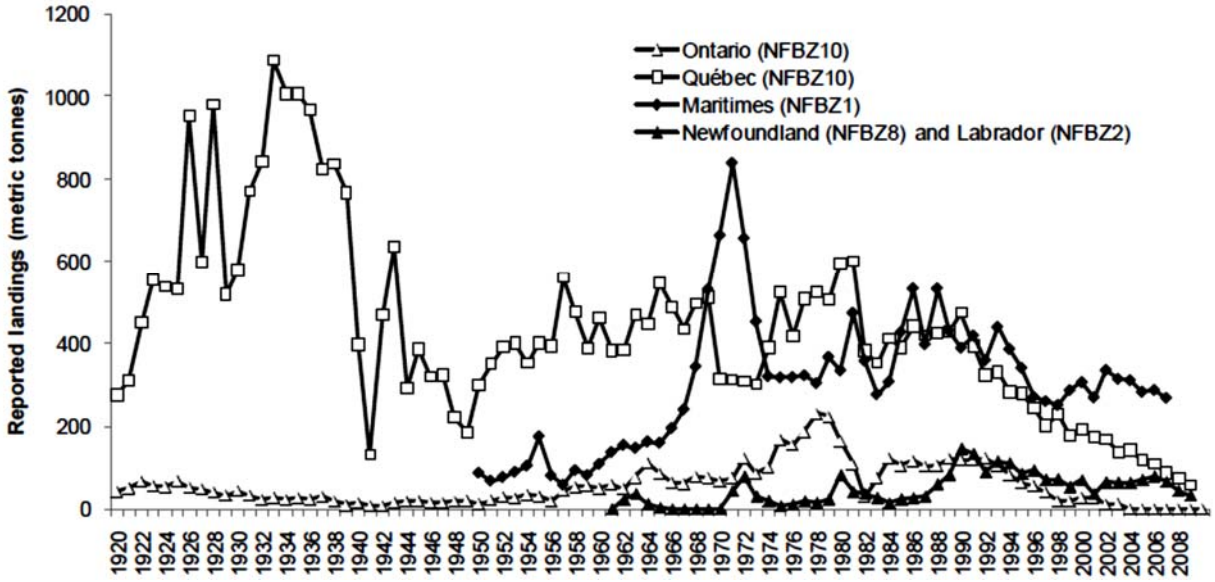


Figure 3. Reported landings of all life stages from Quebec, Ontario, the Maritime Provinces, and Newfoundland and Labrador from 1920 – 2010. *From COSEWIC, 2012.*

2.3.2. ENDANGERED SPECIES ACT CONSIDERATION

American eel were petitioned for listing as threatened under the Endangered Species Act (ESA) in April 2010 by the Center for Environmental Science, Accuracy, and Reliability (CESAR, formally the Council for Endangered Species Act Reliability). The U.S. Fish and Wildlife Service (USFWS) published a positive 90 day finding on the petition in September 2011, stating that the petition may be warranted and a status review will be conducted. CESAR filed a lawsuit in August 2012 against USFWS for failure to comply with the statues of the ESA, which specifies a proposed rule based on the status review be published within one year of the receipt of the petition. A Settlement Agreement was approved by the court in April 2013 and requires USFWS to publish a 12-month finding by September 30, 2015. The USFWS previously reviewed the status of the American eel in 2007 and found that, at that time, protection under the Endangered Species Act was not warranted.

The five factors on which listing is considered include:

1. Present or threatened destruction, modification, or curtailment of its habitat or range;
2. Over-utilization of the species for commercial, recreational, scientific, or educational purposes;
3. Disease or predation;
4. Inadequacy of existing regulatory mechanisms; and
5. Other natural or manmade factors affecting its continued existence.

2.4. STATUS OF THE STOCK

The Benchmark Stock Assessment was completed and accepted for management use in May 2012. The assessment indicated that the American eel stock has declined in recent decades and the prevalence of significant downward trends in multiple surveys across the coast is cause for concern (ASMFC, 2012). The stock is considered depleted, however no overfishing determination can be made at this time based solely on the trend analyses performed (ASMFC, 2012). The ASMFC American Eel Technical Committee (TC) and Stock Assessment Subcommittee (SAS) caution that although commercial fishery landings and effort have declined from high levels in the 1970s and 1980s (with the recent exception of the glass eel fishery), current levels of fishing effort may still be too high given the additional stressors affecting the stock such as habitat loss, passage mortality, and disease as well as potentially shifting oceanographic conditions. Fishing on all life stages of eels, particularly young-of-the-year and in-river silver eels migrating to the spawning grounds, could be particularly detrimental to the stock, especially if other sources of mortality (e.g., turbine mortality, changing oceanographic conditions) cannot be readily controlled.

In 2014 the TC and Stock Assessment Subcommittee (SAS) completed an update of the young of the year (YOY) indices included in the benchmark stock assessment. The FMP requires states and jurisdictions with a declared interest in the species to conduct an annual YOY survey for the purpose of monitoring annual recruitment of each year's cohort. The benchmark assessment included data only through 2010. Since that time some states have heard anecdotal information about increased recruitment as well as recorded evidence of increased recruitment in their fisheries independent YOY surveys.

Based on the update of the YOY indices, the TC found no change in the YOY status from the benchmark assessment with the exception of one survey in Goose Creek, SC (Table 1). YOY trends are influenced by many local environmental factors, such as rainfall and spring temperatures. While some regions along the coast have experienced high catches in 2011, 2012, and/or 2013, other regions have experienced average or lower catches. For example in 2012, Rhode Island and Florida had below average counts, with Florida having its lowest catch of their time series; New Hampshire, New York, Virginia, and Georgia had average counts; and Maine, Connecticut, New Jersey, Delaware, and Maryland had their highest YOY catches on record. The TC stresses high YOY catches in a few consecutive years do not necessarily correspond to an increasing trend since the YOY surveys can fluctuate greatly. Additionally, due to the limited extent of sampling, trends at the state level may not be reflective of what is actually occurring statewide or coastwide. The YOY indices were only one factor in the determination of the depleted stock status for American eel, so therefore there is no

recommended change in the conclusions of the benchmark assessment and the depleted stock status is still warranted.

Region	State	Site	SA Result	Update
Gulf of Maine	ME	West Harbor Pond	NS	NS
	NH	Lamprey River	NS	NS
	MA	Jones River	NS	NS
	MA	Parker River	NS	NS
Southern New England	RI	Gilbert Stuart Dam	NS	NS
	RI	Hamilton Fish Ladder	NS	NS
	NY	Carmans River	NS	NS
Delaware Bay/ Mid-Atlantic Coastal Bays	NJ	Patcong Creek	NS	NS
	DE	Millsboro Dam	NS	NS
	MD	Turville Creek	NS	NS
Chesapeake Bay	PRFC	Clarks Millpond	NS	NS
	PRFC	Gardys Millpond	NS	NS
	VA	Brackens Pond	NS	NS
	VA	Kamps Millpond	NS	NS
	VA	Warehams Pond	NS	NS
	VA	Wormley Creek	NS	NS
South Atlantic	SC	Goose Creek	NS	↓
	GA	Altamaha Canal	NS	NS
	GA	Hudson Creek	NS	NS
	FL	Guana River Dam	NS	NS

Table 1. Results of the Mann-Kendall trend analysis applied to 2012 Benchmark Stock Assessment (SA) and updated YOY indices developed from the ASMFC-mandated recruitment surveys. Trend indicates the direction of the trend if a statistically significant temporal trend was detected (P-value < α; α = 0.05). NS = not significant.

2.5. STATUS OF THE FISHERY

The American eel fishery primarily targets yellow stage eel. Silver eels are caught during their fall migration as well. Eel pots are the most typical gear used; however, weirs, fyke nets, and other fishing methods are also employed. Yellow eels were harvested for food historically, today's fishery sells yellow eels primarily as bait for recreational fisheries. From 1950 to 2012, U.S. Atlantic coast landings ranged from a low of approximately 664,000 pounds in 1962 to a high of 3.67 million pounds in 1979 (Figure 4). After an initial decline in the 1950s, landings increased to a peak in the 1970s and early 1980s in response to higher demand from European food markets. In most regions, landings declined sharply by the late 1980s and have fluctuated around one million pounds for the past decade. The value of U.S. commercial yellow eel landings as estimated by NOAA Fisheries has varied from less than a $100,000 (prior to the 1980s) to a peak of $6.4 million in 1997.

State reported landings of yellow eels in 2013 totaled 907,671 pounds (Table 2) which represents an 17% decrease (~187,000) in landings from 2012 (1,104,429 pounds). Since 2000, yellow eel landings have increased in the Mid-Atlantic region (NY, NJ, and MD) with the exception of Delaware and the Potomac River. Additionally, yellow eel landings have declined in the New England region (ME, NH, MA, CT) with the exception of Rhode Island. Within the Southern region, since 2000 landings have declined in North Carolina but increase in Florida. In 2013, state reported landings from New Jersey, Delaware, Maryland, and Virginia each totaled over 80,000 pounds of eel, and together accounted for 86% of the coastwide commercial total landings.

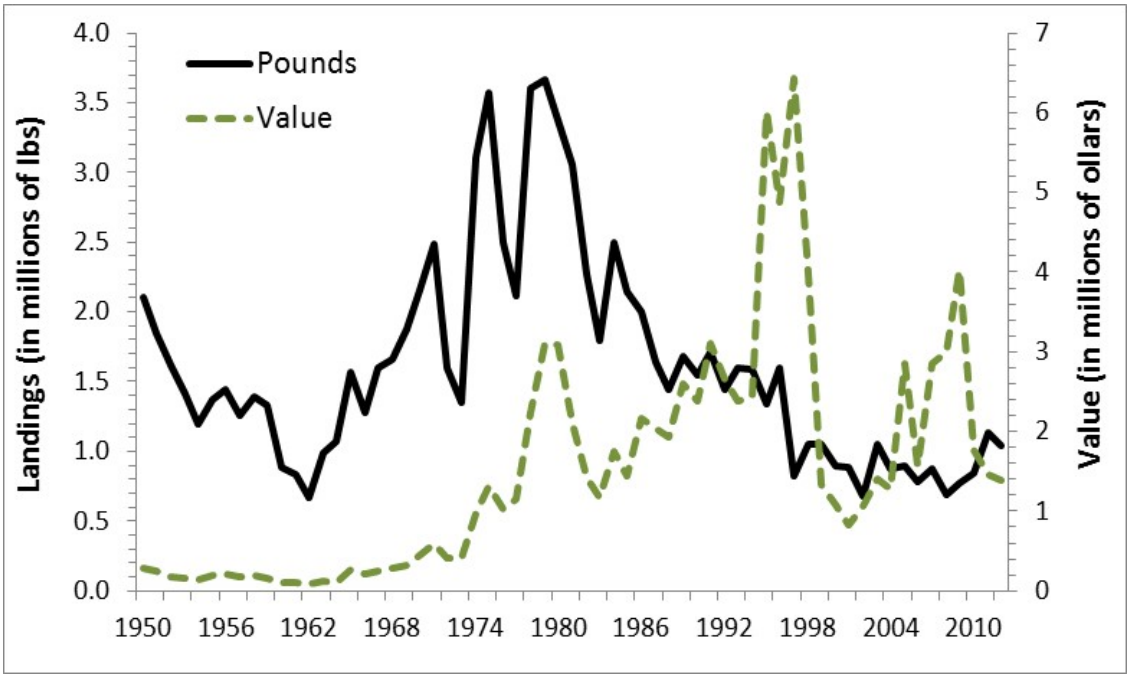


Figure 4. Total commercial landings (in pounds) and value (in millions of dollars) of yellow eels along the U.S. Atlantic Coast, 1950–2012.

Glass eel fisheries along the Atlantic coast are prohibited in all states except Maine and South Carolina. In recent years, Maine is the only state reporting significant harvest (Table 3). Harvest has increased the last few years as the market price has risen to more than $2,000 per pound, although in 2014 prices were recorded between $400 and $650 per pound. Glass eels are exported to Asia to serve as seed stock for aquaculture facilities. Landings of glass eels in 2012 were reported from Maine and South Carolina and totaled 22,215 pounds.

Because eel is managed by the states and is not a target species for the NMFS, landings information for states that rely on the NMFS estimates may be underreported. In addition, at least a portion of commercial eel landings typically come from non-marine water bodies. Even in states with mandatory reporting, these requirements may not extend outside the marine district, resulting in a potential underestimate of total landings. Despite concern about the level of under reporting, reported landings are likely indicative of the trend in total landings over time.

Table 2. Harvest (in pounds) by state of yellow eels from 1998 - 2013. *NA = Not available, * Confidential*

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	PRFC	VA	NC	SC	GA	FL	Total
1998	20,671	459	5,606	967	5,606	16,896	94,327	131,478	301,833	209,008	123,819	91,084		*	13,819	1,015,649
1999	36,087	245	10,281	140	10,281	7,945	90,252	128,978	305,812	163,351	183,255	99,939	*		17,533	1,054,121
2000	14,349	310	5,158	25	5,158	5,852	45,393	119,180	259,552	208,549	114,972	127,099	*		6,054	911,824
2001	9,007	185	3867	329	1,724	19,187	57,700	120,634	271,178	213,440	96,998	107,070	*	*	14,218	915,585
2002	11,616	67	3842	234	3,710	26,824	64,600	90,353	208,659	128,595	75,549	59,940	*	*	7,587	681,609
2003	15,312	36	4,047	246	1,868	3,881	100,701	155,515	346,412	123,450	121,043	172,065		*	8,486	1,053,119
2004	29,651	65	5,328	971	1,374	5,386	120,607	141,725	273,142	116,163	123,314	128,875			7,330	953,931
2005	17,189	120	3,073	0	341	25,515	148,127	110,456	378,659	103,628	66,701	49,278			3,913	907,000
2006	17,259	93	3676	1034	3,443	7,673	158,917	120,462	362,966	83,622	82,738	33,581			1,248	876,712
2007	9,309	70	2853	1230	885	15,077	164,331	131,109	309,215	97,361	56,463	34,486			7,379	829,767
2008	7,992	25	6,046	8866	6,012	15,159	140,418	80,003	381,993	71,655	84,789	24,658	*		15,624	843,762
2009	2,525	83	1217	4855	630	13,115	121,471	59,619	324,773	58,863	119,187	65,481			6,824	778,643
2010	2,624	80	277	4642	164	13,220	107,803	68,666	511,201	57,755	78,076	122,104	*	*	11,287	978,004
2011	2,700	129	368	1,521	20	56,963	129,065	90,631	715,162	29,010	103,856	61,960			25,601	1,216,986
2012	10,785	167	532	1,484	3,560	48,637	111,810	54,304	583,057	90,037	122,058	64,110		*	11,845	1,104,429
2013	1,826	106	NA	2,244	2,638	32,573	89,300	80,811	539,775	32,290	84,385	33,980		*	17,246	917,454

Table 3. Harvest (in pounds) and value of the glass eel fishery in Maine and South Carolina from 2007 - 2013. **South Carolina landings are confidential.*

	Maine		South Carolina	
Year	**Landings**	**Value**	**Landings***	**Value**
2007	3,713	$1,287,485	No activity reported	
2008	6,951	$1,486,355	No activity reported	
2009	5,119	$519,559	No activity reported	
2010	3,158	$584,850	<500	<$100,000
2011	8,584	$7,653,331	<500	<$500,000
2012	20,764	$38,760,490	<5,000	<$2,500,000
2013	18,076	$32,926,991	<5,000	<$2,500,000

3. MANAGEMENT OPTIONS

It is important to emphasize the 2012 American Eel Stock Assessment was a benchmark or baseline assessment that synthesized all available fishery-dependent and independent data yet it was not able to construct eel population targets that could be related to sustainable fishery harvests. This is not an uncommon result of baseline stock assessments. The development of sustainable population and fishery thresholds will be a priority of future stock assessment. Despite the absence of fishery targets derived from population models, it is clear that high levels of yellow eel fishing occurred in the 1970s and 1980s in response to high prices offered from the export food market (Figure 4). For all coastal regions, peak catches in this period were followed by declining catches in the 1990s and 2000s, with some regions now at historic low levels of harvest. Given that high catches in the past could have contributed to the current depleted status the PDT believes it is prudent to reduce mortality while enhancing and restoring habitat. This approach is further justified in light of the public interest in eel population conservation demonstrated by two recent petitions to list American eel under the Endangered Species Act.

The implemented provisions will be considered a compliance requirement and are effective upon adoption of the Addendum or as specified by the Board. Management measures include all mandatory monitoring and reporting requirements as described in this Section.

3.1 COMMERCIAL FISHERY MANAGEMENT OPTIONS

The 2012 American Eel Stock Benchmark Stock Assessment recommended mortality should be reduced on all life stages. Therefore, this draft addendum proposes a suite of management options to reduce overall mortality that may be used in combination in order to maximize the conservation benefit to American eel stocks. If new regulations are implemented by the Management Board through this addendum, these regulations will be implemented in combination with the regulations as specified under Addendum III, unless otherwise approved by the Board. States /jurisdictions shall maintain existing or more conservative American eel commercial fishery regulations, unless otherwise approved by the Board.

3.1.1. GLASS EEL FISHERIES MANAGEMENT OPTIONS

The following options apply to the glass eel fisheries operating in Maine and South Carolina. For all other jurisdictions, states are required to maintain existing or more conservative measures at the time of implementation of the American Eel FMP. These measures prohibit the development of glass eel fisheries in the remaining states and jurisdictions. Addendum III restricts the development of pigmented eel fisheries in states that allow glass eel harvest.

Option 1 – Status Quo
Under this option the current regulations for glass eel fisheries as specified under the FMP and Addenda I-III will remain in place.

Option 2 – 2014 Management Measures
Under this option, the current 2014 fishing regulations for glass eel fisheries in Maine and South Carolina will be required to be maintained. In 2014 Maine pro-actively implemented new regulations to manage the glass eel fishery through output controls (quota management) instead of input control (gear and licenses restrictions). The state worked with industry and tribal representatives to develop a quota that was a 35% reduction from 2012 landings. South Carolina made no changes to their management program for the 2014 glass eel fishing season. Less conservative management measures than those in place in 2014 will require approval by the Management Board. States may always implement more conservative management measures.

The PDT commends Maine Department of Marine Resources for implementing a quota system to management the glass eel fishery. Quota management provides a more reliable method to track mortality, increases accuracy of harvest data, and reduces opportunities for illegal harvest. However, the PDT notes that the 2014 quota was reduced from the 2012 landings, which were the highest landings on record. This still represents an increase from average landings in the past decade (2004 – 2013) and the baseline year of 2010 (last year included in the benchmark stock assessment) from which a reduction was recommended. Further reductions may be warranted. Quota allocation and levels are subject to Board revision or update as a result of a new benchmark stock assessment or other information on stock status. The Board may choose to implement this option for one or both applicable states (i.e. for only Maine, only South Carolina, or for both states.)

In 2014, Maine regulations included, but were not limited to:
- 11,749 pound annual quota
- Individual tribal and non-tribal quotas
- Penalties for exceeding quota (license suspension for a year for a first offense and permanent revocation for a second offense; mandatory fine of $2,000 for anyone who continues to fish after reaching his or her quota.)
- A swipe card system to track catch from harvester to a licensed dealer
- Set-aside of up to 10% to prevent exceeding the overall quota
- March 22 start date with a 10 week season [2]

[2] In 2014 the season began later than March 22nd as a result of the time needed to implement the new regulations.

In 2014, South Carolina regulations included, but were not limited to:

- A maximum of 10 individuals are issued permits with approved gears
- A limit on gear and operation per permit
- Fishing allowed in only specific areas
- Monthly effort and harvest reporting

The PDT recognizes that harvest in South Carolina may be drastically reduced beginning in 2014 as a result of Addendum III which prevents landing of pigmented eels in the glass eel fishery. In 2013, glass eel account for ~23% of the total catch. If landings of glass eels in South Carolina exceed 500 pounds in 2014, the Board will consider additional management restrictions.

Option 3 – Closure of Glass Eel Fisheries

Under this option no glass fisheries will be allowed to operate within state and jurisdictional waters.

Sub-Option 3a – Immediate Closure

Under this sub-option all glass eel fisheries will close upon final approval of the addendum.

Sub-Option 3b – Delayed Closure

Under this sub-option the glass eel fisheries will be closed within five years after final approval of the addendum or at another timeframe specified by the Management Board.

Option 4 – Glass Eel Quota Based on Landings

Under this option glass eel harvest for states and jurisdictions with a glass eel fishery will be regulated annually through a quota system. Examples for quota management are described in the following sub-options. The PDT cautions that recent research by Carruthers et al (2014) has found that methods to set catch limits at or above the average of recent catches has led to some of the highest probabilities of overfishing. Additionally, the PDT cautions the use of data outside of stock assessment period (2011 - present), especially when taking into account the market influences on landings and unprecedented level of illegal harvest in recent years. The Board may choose to implement this option for either one or both states (i.e. for only Maine, only South Carolina, or for both states) or different sub-options for each state (i.e. Sub-option 4b for Maine and Sub-option 4a for South Carolina).

Sub Option 4a – Average Landings from 2004 - 2013

Under this option, glass eel landings will be managed through a quota system, with allocation based on the average landings from 2004 - 2013. The annual quota would be set at 8,257 pounds, with 97% (8,008 pounds) allocated to Maine and 3% (250 pounds) allocated to South Carolina (Table 4). This period was chosen as it includes harvest from recent years and it includes the time period covered by the 2012 American Eel Stock Assessment. However, the PDT cautions the use of data outside

of stock assessment period, especially when taking into the market influences on landings and unprecedented level of illegal harvest in recent years. The Board has the ability to re-visit quota allocation through subsequent addenda.

Sub Option 4b - 20% reduction from 2004 - 2013 landings average
Under this option, glass eel landings will be managed through a quota system, with allocation based on the average landings from 2004 - 2013. The annual quota would be set at 6,606 pounds, with 97% (6,406 pounds) allocated to Maine and 3% (200 pounds) allocated to South Carolina (Table 4). This period was chosen as it includes harvest from recent years and it includes the time period covered by the 2012 American Eel Stock Assessment. The Board has the ability to re-visit quota allocation through subsequent addenda.

Sub Option 4c - 2010 Landings
Under this option, glass eel landings will be managed through a quota system, with allocation based on the landings from 2010. The annual quota would be set at 3,397 pounds, with 93% (3,158 pounds) allocated to Maine and 7% (239 pounds) allocated to South Carolina (Table 4). 2010 was chosen as it was terminal year in the 2012 American Eel Stock Assessment. The Board has the ability to re-visit quota allocation through subsequent addenda. This is the preferred PDT option.

Table 4. Proposed quota allocations (in pounds) for Maine and South Carolina.

	Sub-option 4a: Average 2004 - 2013 Landings	**Sub-option 4b: 20% reduction**	**Sub-option 4c: 2010 Landings**
Maine	8,008	6,406	3,158
South Carolina	250	200	239
Total	8,257	6,606	3,397

Option 5 – Quota Overages
This option is only applicable if quota management is chosen (Option 4 of this Section).

If a quota system is implemented in a state, the Board may choose to implement a mechanism to address quota overages. If overages occur, the state will be required to deduct their entire overage from the quota the following year, pound for pound.

Option 6 – Glass Eel Harvest Allowance Based on Stock Enhancement Programs
Under this option any state or jurisdiction can request an allowances for harvest of glass eels based on stock enhancement programs implemented after January 1, 2013. Stock enhancement programs must show a measurable increase in glass eel passage and/or glass eel survival. Examples of stock enhancement programs include, but are not limited to, habitat restoration projects, fish passage improvements, or fish passage construction. Fish passage projects may

focus on upstream or downstream passage or both. Harvest shall not be restricted to the basin of restoration (i.e. harvest may occur at any approved location within the state or jurisdiction).

Requests for harvest must include a description of the stock enhancement program, fishery requested, monitoring program to ensure harvest is not exceeded, monitoring program to ensure stock enhancement program targets are annually met, adequate enforcement capabilities, and adequate penalties for violations. Requests must be submitted to the Commission by September 1st of the preceding fishing year. Requests are subject to TC review and Board approval. After the first year of implementation the TC will evaluate the program and provide recommendations to the Board on the overall impact of and adherence to the plan. If the stock enhancement program cannot be assessed one year post-implementation, then a secondary review must occur within three years post-implementation. If changes to that habitat or fishway occurs in subsequent years, the Commission must be notified through the annual compliance report and a review of the harvest allowance may be initiated. The PDT recommends that the Board implement an overall cap for coastwide harvest.

In addition to the above requirements, the Board will need to select an individual state or jurisdiction harvest cap. The following are proposed options for harvest limits:

Sub-Option 6a – 5% Harvest Cap
Under this sub-option, harvest within a state or jurisdiction shall not exceed 5% of the quantified contribution provided by the stock enhancement program. The stock contribution percentage may be based on, for example, the amount of available suitable habitat that will become accessible, passage numbers, or other appropriate metrics.

Sub-Option 6b – 10% Harvest Cap
Under this sub-option, harvest within a state or jurisdiction shall not exceed 10% of the quantified contribution provided by the stock enhancement program. The stock contribution percentage may be based on, for example, the amount of available suitable habitat that will become accessible, passage numbers, or other appropriate metrics.

Sub-Option 6c – 25% Harvest Cap
Under this sub-option, harvest within a state or jurisdiction shall not exceed 25% of the quantified contribution provided by the stock enhancement program. The stock contribution percentage may be based on, for example, the amount of available suitable habitat that will become accessible, passage numbers, or other appropriate metrics.

Option 7 – Aquaculture Quota
This option is only applicable if Option 2 or 4 of this Section is chosen.

Under this option, the Board may choose to allocate a percentage of the total quota for approved aquaculture purposes. This amount would first be deducted from the total glass eel quota (as specified under Options 2 or 4), then the remainder of the quota would be distributed as specified under the option. Requests for quota by aquaculture facilities must be submitted to the Board Chair by July 1st of the preceding year. Requests must include:

pounds requested, location of harvest, method of harvest, dates of harvest, prior approval of any applicable permits necessary to harvest, capacity of the facility the glass eels will be held, description of husbandry methods, description of the markets the eels will be distributed to, timeframe for the request (up to three years), monitoring program to ensure harvest is not exceeded, adequate enforcement capabilities, and adequate penalties for violations. Approval of aquaculture quota requests will be determined by the Board by September 1st. Approval of a request does not guarantee approval of a request in future years. Eels produced from aquaculture operations that were harvested under an approved aquaculture permit may not be sold until they reach the legal size in the jurisdiction of operations, unless otherwise specified.

Example: The Board approves Sub Option 4a for both Maine and South Carolina and also approves a 10% aquaculture quota. The glass eel quota would be set at 8,257 pounds, with 10% first allocated to aquaculture requests (825 pounds) and the remaining 7,432 pounds distributed to Maine (97%, 7,209 pounds) and South Carolina (3%, 222 pounds).

Option 8 – Aquaculture Permitting

Under this option any harvest of glass eels for commercial aquaculture purposes must be collected under an approved Aquaculture Permit issued by the states or jurisdiction the collection will occur in and subject to any monitoring and reporting requirements as specified by the jurisdiction. Since it is not possible at this time to propagate American eels in captivity, continual harvest of American eels under a research or scientific permit for commercial aquaculture purposes is not recommended by the TC.

Option 9 – Reporting Requirements

Under this option states with a glass eel fishery would be required to implement daily trip level reporting with daily electronic accounting to the state for harvesters and dealers in order to ensure accurate reporting of glass eel harvest. This type of system would be essential for quota monitoring accuracy given the sharp increase in market value and rise in illegal harvest. Increased dealers license requirements would also help address the underreporting problem by preventing people who lack a long-term interest from entering into the fishery.

Option 10 – Monitoring Requirements

Under this option states or jurisdictions with a commercial glass eel fishery must implement a fishery independent life cycle survey covering glass, yellow, and silver eels within at least one river system. The development of life cycle surveys was one of the main recommendations from the 2012 benchmark stock assessment. If possible and appropriate, the survey should be implemented in the river system where the glass eel survey (as required under Addendum III) is being conducted. This survey would include but not be limited to collecting the following information: fisheries independent index of abundance, age of entry into the fishery/survey, biomass and mortality of glass and yellow eels, sex composition, age structure, prevalence of *A. crassus,* and average length and weight of eels in the fishery/survey. Survey proposals will be subject to TC review and Board approval.

3.1.2. YELLOW EEL FISHERIES MANAGEMENT OPTIONS

Currently commercial yellow eel fisheries operate in all states with the exception of Pennsylvania and the District of Columbia. Management measures selected by the Board in Addendum III went into effect January 1, 2014. These measures included a 9 inch minimum size limit for both the commercial and recreational fishery and a ½ by ½ inch minimum mesh requirement for the commercial fishery.

Option 1 – Status Quo
Under this option the current regulations for yellow eel fisheries as specified under the FMP and Addenda I-III will remain in place.

Option 2 – Adjusted Yellow Eel Quota (Allocation Base Years = 2011 – 2013)
The use of quotas will provide a flexible management system that will be able to respond to fluctuations in market conditions while providing a quantifiable conservation benefit to the species. Under this option yellow eel harvest for states and jurisdictions with a yellow eel fishery will be regulated annually through a quota system. The coastwide quota is set at the 2010 harvest levels. This year was chosen as the baseline as it represents the last year of data that was included in the benchmark stock assessment and the assessment recommends reducing mortality from this level. Allocation to states and jurisdictions is based on the average harvest from 2011 – 2013 as a way to maintain the current distribution on fishing effort along the coast. The PDT cautions that recent research by Carruthers et al (2013) has found that methods to set catch limits at or above the average of recent catches has led to some of the highest probabilities of overfishing. Additionally, the TC does not recommend implementing a coastwide quota above the 1998-2010 average harvest (907,671 pounds, Table 2). States or jurisdictions will need to ensure that their monitoring and reporting requirements are sufficient to prevent repeated overages. The Board has the ability to re-visit quota allocation through subsequent addenda

The PDT recommends the following criteria be applied to increase equity in the distribution of the quota:

1. States be allocated a minimum allocated quota fixed at 2,000 pounds in order to provide all state's a quota level sufficient to cover any directed or bycatch landings without creating an administrative burden. The 2,000 pounds quota is not expected to promote a notable increase in effort in the fishery.
2. No state is allocated a quota that is more than 10,000 pounds above its 2010 harvest.
3. No state or jurisdiction is allocated a quota that is more than a 15% reduction from its 2010 harvest.

The following sub-options detail the proposed quota allocations:

Sub – Option 2a: No Reduction
Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and the allocation to states based on the states average harvest from 2011 - 2013. Under this sub-option, the annual quota would originally be set at 978,004 pounds (2010 landings, Table 5). After allocation of

the quota, New Hampshire, Massachusetts, Rhode Island, Connecticut, South Carolina, and Georgia qualify for the 2,000 pound allowance (PDT Criteria #1 above). Additionally, the New York, Maryland, and Virginia quotas would exceed 10,000 pounds and therefore would be reduced accordingly (PDT criteria #2 above). Lastly, the North Carolina and PRFC quotas represents a 60% and 21% reduction, respectively, and therefore would be increased accordingly (PDT Criteria #3 above). **The resulting quota would then be set annually at 986,286 pounds. This represents an 0.8% increase from 2010 landings coastwide**.

Sub-Option 2b: 10% Reduction

Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and the allocation to states based on the states average harvest from 2011 - 2013. Under this sub-option, the annual quota would originally be set at 880,203 pounds (2010 landings with a 10% reduction, Table 5).

After allocation of the quota, New Hampshire, Massachusetts, Rhode Island, Connecticut, South Carolina, and Georgia qualify for the 2,000 pound allowance (PDT Criteria #1 above). The New York quota would exceed 10,000 pounds and therefore would be reduced accordingly (PDT criteria #2 above). Additionally, the New Jersey, North Carolina, and PRFC quota represents an 26%, 64%, and 29% reduction, respectively, and therefore would be modified accordingly (PDT criteria #3 above**). The resulting quota would be set annually at 937,701 pounds. The resulting quota represents an actual 4.1% decrease from 2010 landings coastwide.**

Sub-Option 2c: 20 % Reduction

Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and the allocation to states based on the states average harvest from 2011 - 2013. Under this sub-option, the annual quota would originally be set at 782,403 pounds (2010 landings with a 20% reduction, Table 5).

After allocation of the quota, New Hampshire, Massachusetts, Rhode Island, Connecticut, South Carolina and Georgia qualify for the 2,000 pound allowance (PDT Criteria #1 above). The New York quota would exceed 10,000 pounds and therefore would be reduced accordingly (PDT criteria #2 above). Additionally, the New Jersey, Delaware, North Carolina , and PRFC quota represents an 26%, 21%, 68%, and 37% reduction, respectively, and therefore would be modified accordingly (PDT criteria #3 above**). The resulting quota would be set annually at 868,939 pounds. The resulting quota represents an actual 11% decrease from 2010 landings coastwide.**

Table 5. Quota options under the no reduction, 10% reduction and 20% reduction scenarios, with the total quota based on landings from 2010 and the allocation to states based on the states average harvest from 2011 - 2013. Gray boxes represent states which qualified for Criteria #2. Black boxes represent states which qualifies for Criteria #3. **This Table was revised on June 20, 2014.**

	2010 Landings	Allocation	Option 2a: No Reduction	Option 2b: 10% Reduction	Option 2c: 20% Reduction
Maine	2,624	0.47%	4,597	4,137	3,677
New Hampshire	80	0.01%	2,000	2,000	2,000
Mass	277	0.04%	2,000	2,000	2,000
Rhode Island	4642	0.16%	2,000	2,000	2,000
Connecticut	164	0.19%	2,000	2,000	2,000
New York	13,220	4.26%	**23,220**	**23,220**	**23,220**
New Jersey	107,803	10.19%	99,659	91,633	91,633
Delaware	68,666	6.97%	68,167	61,350	58,366
Maryland	511,201	56.72%	**521,201**	499,251	443,779
PRFC	57,755	4.67%	49,092	49,092	49,092
Virginia	78,076	9.58%	**88,076**	84,323	74,954
North Carolina	122,104	4.94%	103,788	103,788	103,788
South Carolina	2		2,000	2,000	2,000
Georgia	103	0.11%	2,000	2,000	2,000
Florida	11,287	1.69%	16,528	14,875	13,223
Total	978,004	100%	986,286	937,701	868,939

Option 3 – Adjusted Yellow Eel Quota (Allocation Base Years = 2002 -2012)

The use of quotas will provide a flexible management system that will be able to respond to fluctuations in market conditions while providing a quantifiable conservation benefit to the species. Under this option yellow eel harvest for states and jurisdictions with a yellow eel fishery will be regulated annually through a quota system. The coastwide quota is set at the 2010 harvest levels. This year was chosen as the baseline as it represents the last year of data that was included in the benchmark stock assessment and the assessment recommends reducing mortality from this level. Allocation is based on the average of the three highest landing values from 2002 – 2012. The PDT cautions that recent research by Carruthers et al (2013) has found that methods to set catch limits at or above the average of recent catches has led to some of the highest probabilities of overfishing. Additionally, the TC does not recommend implementing a coastwide quota above the 1998-2010 average harvest (907,671 pounds, Table 2). States or jurisdictions will need to ensure that their monitoring and reporting requirements are sufficient to prevent repeated overages. The Board has the ability to re-visit quota allocation through subsequent addenda

The PDT recommends the following criteria be applied to increase equity in the distribution of the quota:

1. States be allocated a minimum allocated quota fixed at 2,000 pounds in order to provide all state's a quota level sufficient to cover any directed or bycatch landings without creating an administrative burden. The 2,000 pounds quota is not expected to promote a notable increase in effort in the fishery.
2. No state is allocated a quota that is more than 10,000 pounds above its 2010 harvest.
3. No state or jurisdiction is allocated a quota that is more than a 15% reduction from its 2010 harvest.

The following sub-options detail the proposed quota allocations:

Sub – Option 3a: No Reduction

Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and allocation based on the average of the three highest landing values from 2002 – 2012. Under this sub-option, the annual quota would originally be set at 978,004 pounds (2010 landings, Table 6).

After allocation of the quota, New Hampshire, South Carolina, and Georgia qualify for the 2,000 pound allowance (PDT Criteria #1 above). Additionally, the Maine, New York, Delaware, and PRFC quotas would be more than 10,000 pounds above its 2010 harvest and therefore would be reduced accordingly (PDT criteria #2 above). Lastly, the Maryland and North Carolina quotas represents an 17% and 18% reduction, respectively, and therefore would be increased accordingly (PDT Criteria #3 above). **The resulting quota would then be set annually at 946,726 pounds. This represents a 3.2% decrease from 2010 landings coastwide**.

Sub-Option 3b: 10% Reduction

Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and allocation based on the average of the three highest landing values from 2002 – 2012. Under this sub-option, the annual quota would originally be set at 880,203 pounds (2010 landings with a 10% reduction, Table 6).

After allocation of the quota, New Hampshire, South Carolina, and Georgia qualify for the 2,000 pound allowance (PDT Criteria #1 above). Additionally, the Maine, New York, Delaware, and PRFC quotas would be more than 10,000 pounds above its 2010 harvest and therefore would be reduced accordingly (PDT criteria #2 above). Lastly, the Rhode Island, Maryland, and North Carolina quotas represents a 16%, 25%, and 27% reduction, respectively, and therefore would be increased accordingly (PDT Criteria #3 above). **The resulting quota would be set annually at 924,777 pounds. The resulting quota represents an actual 4.1% decrease from 2010 landings coastwide.**

Sub-Option 3c: 20 % Reduction

Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and allocation based on the average of the three highest landing values from 2002 – 2012. Under this sub-option, the annual

quota would originally be set at 782,403 pounds (2010 landings with a 20% reduction, Table 6).

After allocation of the quota, New Hampshire, South Carolina and Georgia qualify for the 2,000 pound allowance (PDT Criteria #1 above). Additionally, the New York, Delaware, and PRFC quotas would be more than 10,000 pounds above its 2010 harvest and therefore would be reduced accordingly (PDT criteria #2 above). Lastly, the Rhode Island, Maryland, and North Carolina quotas represents a 26%, 34%, and 35% reduction, respectively, and therefore would be increased accordingly (PDT Criteria #3 above). **The resulting quota would be set annually at 902,605 pounds. The resulting quota represents an actual 7.7% decrease from 2010 landings coastwide.**

Table 6. Quota options under the no reduction, 10% reduction and 20% reduction scenarios, with the total quota based on landings from 2010 and allocation based on the average of the three highest landing values from 2002 – 2012. Gray boxes represent states which qualified for Criteria #2. Black boxes represent states which qualifies for Criteria #3. **This Table was revised on June 20, 2014.**

	2010 Landings	Allocation	Option 3a: Average Landings	Option 3b: 10% Reduction	Option 3c: 20% Reduction
Maine	2,624	1.54%	**12,624**	**12,624**	12,036
New Hampshire	80	0.01%	2,000	2,000	2,000
Massachusetts	277	0.37%	3,620	3,258	2,896
Rhode Island	4642	0.44%	4,310	3,946	3,946
Connecticut	164	0.32%	3,118	2,806	2,494
New York	13,220	3.18%	**23,220**	**23,220**	**23,220**
New Jersey	107,803	11.31%	110,642	99,578	88,514
Delaware	68,666	10.28%	**78,666**	**78,666**	**78,666**
Maryland	511,201	43.43%	434,521	434,521	434,521
PRFC	57,755	8.84%	**67,755**	**67,755**	**67,755**
Virginia	78,076	8.79%	86,006	77,405	68,805
North Carolina	122,104	10.15%	103,788	103,788	103,788
South Carolina	2	0.01%	2,000	2,000	2,000
Georgia	103	0.05%	2,000	2,000	2,000
Florida	11,287	1.27%	12,457	11,211	9,965
Total	978,004	100.00%	946,726	924,777	902,605

Option 4 - Yellow Eel Quota based on 2010 Landings

The use of quotas will provide a flexible management system that will be able to respond to fluctuations in market conditions while providing a quantifiable conservation benefit to the species. Under this option yellow eel harvest for states and jurisdictions with a yellow eel fishery will be regulated annually through a quota system. The coastwide quota is set at the 2010 harvest levels. This year was chosen as the baseline as it represents the last year of data that was included in the benchmark stock assessment and the assessment recommends reducing mortality from this level. Allocation is based on the average of the three highest landing values from 2002 – 2012. States are allocated a minimum quota fixed at 2,000

pounds in order to provide a quota level sufficient to cover any directed or bycatch landings without creating an administrative burden. The 2,000 pounds quota is not expected to promote a notable increase in effort in the fishery. The PDT cautions that recent research by Carruthers et al (2013) has found that methods to set catch limits at or above the average of recent catches has led to some of the highest probabilities of overfishing. Additionally, the TC does not recommend implementing a coastwide quota above the 1998-2010 average harvest (907,671 pounds, Table 2). States or jurisdictions will need to ensure that their monitoring and reporting requirements are sufficient to prevent repeated overages. The Board has the ability to re-visit quota allocation through subsequent addenda

The following sub-options detail the proposed quota allocations:

Sub – Option 4a: No Reduction
Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and allocation based on the average of the three highest landing values from 2002 – 2012. Under this sub-option, the annual quota will be set at 978,004 pounds (2010 landings, Table 7).

After allocation of the quota, New Hampshire, South Carolina, and Georgia qualify for the 2,000 pound allowance. **The resulting quota would then be set annually at 983,260 pounds, which represents a 0.5% increase from 2010 landings coastwide**.

Sub-Option 4b: 10% Reduction
Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and allocation based on the average of the three highest landing values from 2002 – 2012. Under this sub-option, the annual quota would originally be set at 880,203 pounds (2010 landings with a 10% reduction, Table 7).

After allocation of the quota, New Hampshire, South Carolina, and Georgia qualify for the 2,000 pound allowance. **The resulting quota would be set annually at 885,534 pounds, which represents an actual 9.5% decrease from 2010 landings coastwide.**

Sub-Option 4c: 20 % Reduction
Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and allocation based on the average of the three highest landing values from 2002 – 2012. Under this sub-option, the annual quota would originally be set at 782,403 pounds (2010 landings with a 20% reduction, Table 7).

After allocation of the quota, New Hampshire, South Carolina and Georgia qualify for the 2,000 pound allowance. **The resulting quota would be set annually at 787,808 pounds, which represents an actual 19.4% decrease from 2010 landings coastwide.**

Table 7. Quota options under the no reduction, 10% reduction and 20% reduction scenarios, with the total quota based on landings from 2010 and allocation based on the average of the three highest landing values from 2002 – 2012. **This Table was revised on June 20, 2014.**

	2010 Landings	Allocation	Option 4a: Average Landings	Option 4b: 10% Reduction	Option 4c: 20% Reduction
Maine	2,624	1.54%	15,045	13,541	12,036
New Hampshire	80	0.01%	2,000	2,000	2,000
Massachusetts	277	0.37%	3,620	3,258	2,896
Rhode Island	4642	0.44%	4,310	3,879	3,448
Connecticut	164	0.32%	3,118	2,806	2,494
New York	13,220	3.18%	31,083	27,975	24,866
New Jersey	107,803	11.31%	110,642	99,578	88,514
Delaware	68,666	10.28%	100,543	90,489	80,435
Maryland	511,201	43.43%	424,712	382,240	339,769
PRFC	57,755	8.84%	86,427	77,784	69,141
Virginia	78,076	8.79%	86,006	77,405	68,805
North Carolina	122,104	10.15%	99,298	89,368	79,438
South Carolina	2	0.01%	2,000	2,000	2,000
Georgia	103	0.05%	2,000	2,000	2,000
Florida	11,287	1.27%	12,457	11,211	9,965
Total	978,004		983,260	885,534	787,808

Option 5 – Weighted Yellow Eel Quota

The use of quotas will provide a flexible management system that will be able to respond to fluctuations in market conditions while providing a quantifiable conservation benefit to the species. Under this option yellow eel harvest for states and jurisdictions with a yellow eel fishery will be regulated annually through a quota system. The coastwide quota is set at the 2010 harvest levels. This year was chosen as the baseline as it represents the last year of data that was included in the benchmark stock assessment. Allocation to states and jurisdictions is based on a weighted distribution. The three highest landings from the period 2004 – 2013 were averaged and then weighted at 30%. This was combined with the average landings from 2011 – 2013, which was weighted at 70%. The 2004 - 2013 period takes into account the most current distribution on fishing effort as well as captures a more productive time in the fishery in some regions and incorporates the potential that each state's eel fishery had demonstrated over the past decade. The PDT cautions that recent research by Carruthers et al (2013) has found that methods to set catch limits at or above the average of recent catches has led to some of the highest probabilities of overfishing. Additionally, the TC does not recommend implementing a coastwide quota above the 1998-2010 harvest average (907,671 pounds, Table 2). States or jurisdictions will need to ensure that their monitoring and reporting requirements are sufficient to prevent repeated overages. The Board has the ability to re-visit quota allocation through subsequent addenda.

Sub – Option 5a: No Reduction Weighted Quota

Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and the allocation to states based on a weighted average (70% to the average landings from 2011 – 2013 and 30% to the average of the three highest landings in the period 2004 – 2013). Under this sub-option, the annual quota would originally be set at 978,004 pounds (2010 landings, Table 8). States would be allocated a minimum quota fixed at 2,000 pounds in order to provide all state's a quota level sufficient to cover any directed or bycatch landings. **The resulting quota would then be set annually at 983,419 pounds. This represents a 0.55% decrease from 2010 landings coastwide.**

Sub – Option 5b: 10 % Reduction from Weighted Quota

Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and the allocation to states based on a weighted average (70% to the average landings from 2011 – 2013 and 30% to the average of the three highest landings in the period 2004 – 2013). Under this sub-option, the annual quota would originally be set at 880,203 pounds (2010 landings with a 10% reduction, Table 8). States would be allocated a minimum quota fixed at 2,000 pounds in order to provide all state's a quota level sufficient to cover any directed or bycatch landings. **The resulting quota would then be set annually at 885,877 pounds. This represents a 9.4% decrease from 2010 landings coastwide.**

Sub – Option 5c: 20 % Reduction from Weighted Quota

Under this sub-option, yellow eel landings will be managed through a quota system, with the total quota based on landings from 2010 and the allocation to states based on a weighted average (70% to the average landings from 2011 – 2013 and 30% to the average of the three highest landings in the period 2004 – 2013). Under this sub-option, the annual quota would originally be set at 782,402 pounds (2010 landings with a 20% reduction, Table 8). States would be allocated a minimum quota fixed at 2,000 pounds in order to provide all state's a quota level sufficient to cover any directed or bycatch landings. **The resulting quota would then be set annually at 788,515 pounds. This represents a 19.4% decrease from 2010 landings coastwide.**

Option 6 – Quota Overages

This option is applicable only if quota management (Options 2 -5 of this section) is chosen.

If a quota system is implemented, the Board may choose to implement a mechanism to address quota overages. If overages occur, the state will be required to reduce their following year's quota by the same amount the quota was exceeded, pound for pound. For states that qualify for the automatic 2,000 pound quota, any overages would be deducted from the 2,000 pound allocation. The PDT strongly recommends implementation of a payback mechanism if quota management is approved.

Table 8. Quota options under the no reduction, 10% reduction and 20% reduction scenarios based on weighted landings.

	2010 Landings	Allocation	Option 5a: No Reduction	Option 5b: 10% Reduction	Option 5c: 20% Reduction
Maine	2,624	0.9%	8,314	7,483	6,651
New Hampshire	80	0.01%	2,000	2,000	2,000
Mass	277	0.2%	2,000	2,000	2,000
Rhode Island	4642	0.3%	2,549	2,294	2,040
Connecticut	164	0.2%	2,292	2,063	2,000
New York	13,220	3.9%	38,360	34,524	30,688
New Jersey	107,803	10.6%	103,423	93,081	82,739
Delaware	68,666	8.1%	79,546	71,591	63,637
Maryland	511,201	52.2%	510,264	459,238	408,211
PRFC	57,755	5.9%	57,997	52,197	46,398
Virginia	78,076	9.3%	90,819	81,737	72,655
North Carolina	122,104	6.8%	66,337	59,703	53,069
South Carolina	2	0.01%	2,000	2,000	2,000
Georgia	103	0.1%	2,000	2,000	2,000
Florida	11,287	1.6%	15,498	13,949	12,399
Total	978,004	100.00%	983,399	885,859	788,486

Option 7 – Quota Transfers
This option is applicable only if quota management (Options 2 -5 of this section) is chosen.

Under this option any state or jurisdiction implementing a commercial quota for American eel may request approval from the Board Chair or Commission Chair to transfer all or part of its annual quota to one or more states. States that receive the automatic 2,000 pound quota are eligible to participate in the transfer management measures. The TC does not recommend allowing quota transfers for a "depleted" species. If the harvest is less than the quota, then the TC recommends the reminder benefit conservation efforts and not be transferred.

Requests for transfers must be made by individual or joint letters signed by the principal state official with marine fishery management authority for each state involved. The Chair will notify the requesting states within ten working days of the disposition of the request. In evaluating the request, the Chair will consider: if the transfer would preclude the overall annual quota from being harvested, the transfer addresses an unforeseen variation or contingency in the fishery, and if the transfer is consistent with the objects of the FMP. Transfer requests for the current fishing year must be submitted by December 31 of that fishing year.

The transfer of quota would be valid for only the calendar year in which the request is made. These transfers do not permanently affect the state-specific shares of the quota, i.e., the state-

specific shares remain fixed. Once quota has been transferred to a state, the state receiving quota becomes responsible for any overages of transferred quota.

Option 8 – Catch Cap

Under this option the commercial yellow eel fishery would be managed under a catch cap. The coastwide catch cap is based off the 2010 harvest levels. This year was chosen as the baseline as it represents the last year of data that was included in the benchmark stock assessment and the assessment recommends reducing mortality from this level. States and jurisdictions would be allowed to fish until the cap is reached. Once the cap or threshold is reached, all states and jurisdictions would be required to close all directed fisheries and prohibit landings. The TC does not recommend implementing a catch cap above the 1998-2010 harvest (907,671 pounds).

One of the benefits of a catch cap could be that it reduces the administrative and legislative burden of implementing a state specific quota system (as described in Option 2 above) while still controlling the total amount of fishing mortality that is occurring annually. Additionally, a coastwide catch cap does not require a specific allocation by state or jurisdiction, which can be problematic due to the fluctuations in landings as a result of environmental and market conditions. However, the PDT notes that under this system states and jurisdiction would still need timely reporting, most likely daily, in place to ensure that that the cap was not exceeded. Additionally, if the cap was exceeded then the only payback mechanism (i.e. reducing the total coastwide cap in the subsequent year) would equally impact all states involved in the fishery even if the overage was largely the result of one state (e.g. possibly due to late reporting or not closing the fishery in a timely manner). A mortality cap may promote a derby style fishery, which could possibly flood the market and drive down prices. Lastly, implementation of a mortality cap could result in early coastwide closures and eventual elimination of historic and profitable fisheries that are prosecuted later in the year (i.e. in the winter months, Figure 5).

Sub-option 8a – 2010 harvest level

Under this option the mortality cap would be set at 978,004 pounds (2010 landings). States and jurisdictions will be required to close their directed fisheries and prohibit landings once 95% of the cap is reached. The PDT notes that this represents an increase from 2013 landings and may not contribute to reducing mortality at all life stages. If the cap is exceeded in the fishing year, then the cap will be reduced the following year by the same amount the quota was exceeded, pound for pound.

Sub-option 8b – 10% reduction

Under this option the mortality cap would be set at 880,203 pounds, which is a 10% reduction from 2010 landings. This represents a 0.3% decrease from 2013 landings. If the cap is exceeded in the fishing year, then the cap will be reduced the following year by the same amount the quota was exceeded, pound for pound.

Sub-option 8c – 20% reduction

Under this option the mortality cap would be set at 782,403 pounds, which is a 20% reduction from 2010 landings. This represents an 11% decrease from 2013 landings. If the cap is exceeded in the fishing year, then the cap will be reduced the following year by the same amount the quota was exceeded, pound for pound.

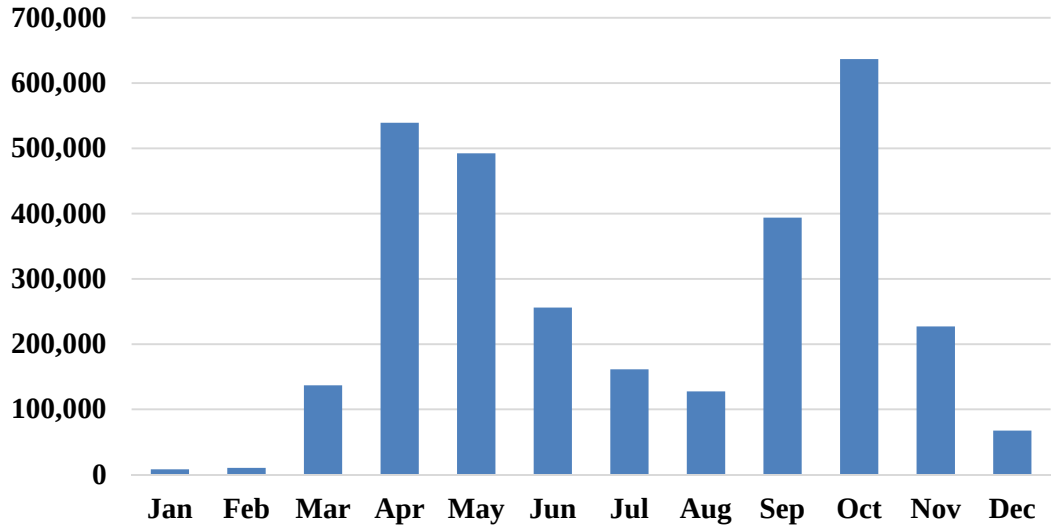


Figure 5. Average (2010 – 2012) commercial yellow eel landings (in pounds) by month coastwide.

3.1.3. SILVER EEL FISHERIES

The following proposed measures apply only to the commercial weir fishery in the New York portion of the Delaware River and its' tributaries. New York was granted a one year extension from the requirements as specified under Section 4.1.3 of Addendum III:

> *Section 4.1.3: States and jurisdictions are required to implement no take of eels from September 1st through December 31st from any gear type other than baited traps/pots or spears (e.g. fyke nets, pound nets, and weirs). These gears may still be fished, however retention of eels is prohibited. A state or jurisdiction may request an alternative time frame for the closure if it can demonstrate the proposed closure dates encompass the silver eel outmigration period. Any requests will be reviewed by the TC and submitted to the Board for approval.*

The American Eel Benchmark Stock assessment found that "fishing on … out-migrating silver eels could be particularly detrimental to the stock, especially if other sources of mortality (e.g., turbine mortality, changing oceanographic conditions) cannot be readily controlled." Conservation efforts on earlier life stages will only delay mortality and provide limited additional benefit to stock health if harvest occurs at later stages.

Option 1 – Status Quo

Under this option the current regulations will remain in place and the one year extension granted to New York would expire at midnight on December 31, 2014. At that time the regulations as specified under Section 4.1.3 in Addendum III would go into effect.

Option 2 – Extension of the Sunset Provision
Under this option the sunset provision could be extended by a timeframe as specified by the Board.

Option 3 – Effort Reduction / Time Closure
Under this option the state of New York would be required to implement no take of eels in the Delaware River and its tributaries within New York from August 15th through September 30th from any gear type other than baited traps/pots, or spears and weirs (e.g. fyke nets and pound nets). Refer to Table 9 for a summary of the average landings (2003 – 2012) of American eel by month from the weir fishery in the Delaware River and its tributaries.

Table 9. Average American eel landings (2003 – 2012) by month (in pounds) from the weir fishery in NY's Delaware River and tributaries.

Month	Average Landings (pounds)
July	139
August	1,005
September	2,574
October	1,653
November	2

Option 4 – License Cap
Under this option, the Delaware River weir fishery would be limited to those permitted New York participants that fished and reported landings anytime during the period from 2010 – 2013. Refer to Figure 6 for the number of licenses issued annually and the number of active participants in the fishery.

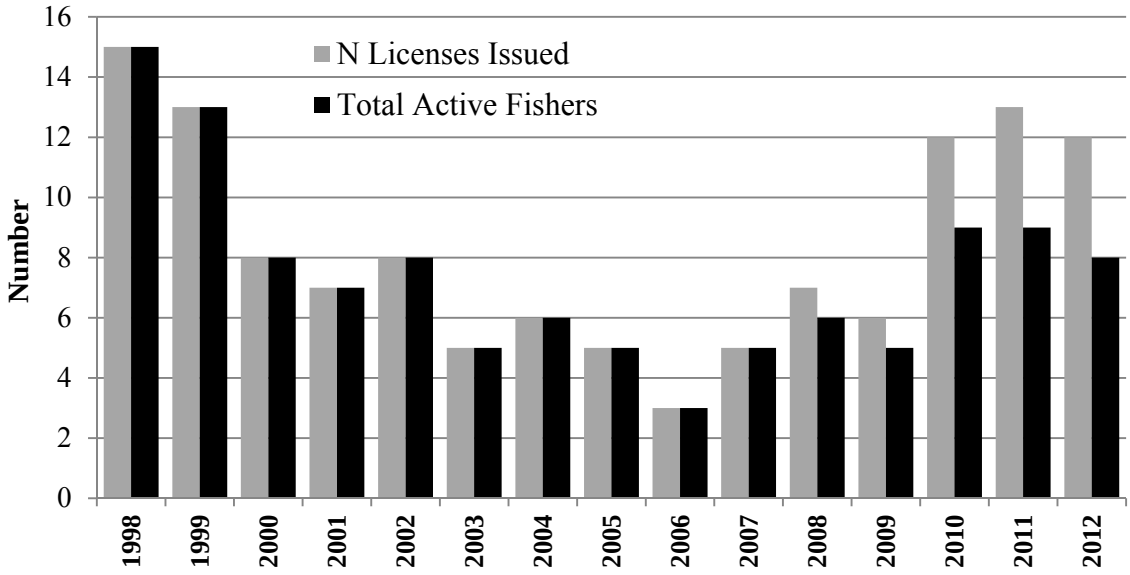


Figure 6. The number of licenses and active or reporting fishermen in the American eel weir fishery in the Delaware River and its tributaries from 1998 – 2012.

3.1.4. STATE SPECIFIC SUSTAINABLE FISHERY MANAGEMENT PLANS FOR AMERICAN EEL

Under this option states or jurisdictions may petition the Board to allow for a state specific Sustainable Fishery Management Plan (Plan) for American Eel. The basis for this program is the American Shad and River Herring Sustainable Fishery Management Plans as specified in Amendments 2 and 3 to the Shad & River Herring FMP. This approach has also been used to manage eel fisheries by river basin in Europe. However, the TC cautions that the American shad and river herring plans, as well as the European eel management plans were initiated recently and it is difficult to evaluate the effect of their implementation at this time. The preferred Plan for eel would have the same supporting eel population information as the life cycle surveys proposed in Option 10 of Glass Fisheries.

Currently, states and jurisdictions are allowed to petition the Board for an alternative management program, per Section 4.4 of the FMP. This option is not meant to replace Section 4.4 of the FMP, rather it provides guidance on specific types of alternative management that the states would be allowed to request.

The objective of this program would be to allow states and jurisdictions the ability to manage their American eel fishery (glass, yellow, or silver) to both meet the needs of their current fishermen while providing conservation benefit for the American eel population. Three types of Plans (Fishing Mortality Based Plan, Transfer Plan, and Aquaculture Plan) are presented below.

Fishing Mortality Based Plan
Under this scenario, states and jurisdictions would be allowed to petition the Board for alternative management based on the current level of mortality that is occurring on their population. This Plan shall:

1. Require states or jurisdictions to assess, with some level of confidence, the status of eel abundance and current level of mortality (e.g. fisheries, natural, and other man-made) that is occurring on the American eel populations within their jurisdiction.
2. Once adequately documented, states or jurisdictions will be allowed to allocate their fishing mortality to any American eel fishery (glass, yellow, or silver) even if the state does not currently participate in that fishery (i.e. a state would be allowed to open up a glass eel fishery if they did not currently have one due to the restrictions of the FMP). This could be applied for commercial, recreational, aquaculture industries and/or research set-aside purposes.
3. States would be allowed to increase the fishing mortality rate provided it is offset by decreases in other mortality (e.g. though habitat improvements, increased fish passage, reduced turbine mortality, etc.) and there is an overall net gain to conservation (i.e. overall mortality is reduced, spawner escapement increases, etc...).

The format of the Plan is as follows:

1. Current regulations
2. Proposed change to regulations (e.g. request for fishery, fish passage restrictions, water quality improvements, etc...)
3. Description of fishing monitoring and enforcement capabilities

4. Description and supporting information on eel abundance and current mortality within state or jurisdiction
    a. Fishing mortality (including but not limited to commercial, recreational, sustenance, and bycatch)
    b. Natural mortality (including but not limited to predation and disease),
    c. Other man-made mortality (including but not limited to fish passage, turbines, habitat degradation, and pollution)
    d. Indices of abundance, age and size structure, and life cycle population metrics
5. Timeline for implementation of regulations, monitoring programs, or other activities
6. Description of conservation benefits of proposed regulatory changes or habitat improvements
7. Description of adaptive management program to evaluate success of proposed regulatory changes or habitat improvements

Transfer Plan

If states or jurisdictions are unable to assess the current level of mortality and abundance with certainty, and the state or jurisdiction implements quota management for at least one fishery, then a state would be allowed to develop a Plan to request a transfer of quota from one fishery to another (e.g. from yellow to glass) based on the life history characteristic inherent to that area (e.g. state, river, or drainage). The request shall include: description of quota allocation by fishery; scientific analysis that the transfer will not increase overall eel fishing mortality, overall mortality, or reduce spawner escapement, with some level of confidence; description of monitoring program to ensure quota is not exceeded; and adequate enforcement capabilities penalties for violations.

Aquaculture Plan

States and jurisdictions shall have an option to develop a Plan for aquaculture purposes. Under this scenario, states and jurisdictions would be allowed to harvest a maximum of 200 pounds of glass eel annually from within their waters for use in domestic aquaculture facilities provided they can objectively show that the harvest will occur from a watershed that minimally contributes to the spawning stock of American eel. The request shall include: pounds requested; location, method, and dates of harvest; prior approval of any applicable permits; description of the facility, including the capacity of the facility the glass eels will be held, and husbandry methods; description of the markets the eels will be distributed to; monitoring program to ensure harvest is not exceeded; and adequate enforcement capabilities penalties for violations. Approval of a request does not guarantee approval of a request in future years. Eels harvested under an approved Aquaculture Plan may not be sold until they reach the legal size in the jurisdiction of operations, unless otherwise specified.

All Plans are subject to TC and LEC review and Board approval. It is recommended that the Fishing Mortality Based Plans be submitted by June 1st of the preceding fishing year in order to provide enough time for review for the upcoming fishing season. Transfer and Aquaculture Plans must be submitted by June 1st of the preceding fishing year and approval will be determined by the Board by September 1st. Plans will initially be valid for only one year. After the first year of implementation the TC will evaluate the program and provide recommendations to the Board on the overall impact of and adherence to the plan. If the

proposed regulatory changes, habitat improvements, or harvest impact cannot be assessed one year post-implementation, then a secondary review must occur within three to five years post-implementation.

If states use habitat improvements and changes to that habitat occurs in subsequent years, the Commission must be notified through the annual compliance report and a review of the Plan may be initiated. The PDT recommends that the Board set a date after which states or jurisdictions may apply conservation measures for mortality offset purposes in Fishing Mortality Based Plans. Any requests that include a stocking provision would have to ensure stocked eels were certified disease free according to standards developed by the TC and approved by the Board.

4. LAW ENFORCEMENT RECOMMENDATIONS

The ASMFC Law Enforcement Committee has previously weighted in on the enforceability of proposed American eel management options based on the *Guidelines for Resource Managers on the Enforceability of Fishery Management Measures (July 2009).* These Guidelines rated management strategies using standard terms as follows, from least to most enforceable: Impossible, Impractical, Difficult and Reasonable.

The LEC concluded that status quo measures for all eel fisheries is impractical for enforcement, specifically for the glass eel fishery given the enforcement challenges associated with the prosecution of the glass eel fishery in those states currently closed to harvest of glass eels. A significant amount of illegal harvest of glass eels continues outside the two states where harvest is currently allowed, and illegally harvested eels are being possessed and shipped via those two states. State and federal enforcement agencies are tasked to thwart the illegal harvest and export with reduced staff and resources. Given the monetary value of glass eels and the ability to move illegally harvested eels via legal shipments, enforcement agencies do not have, and are unlikely to obtain the resources necessary to effectively monitor and control a limited glass eel harvest.

The LEC finds that a quota system would be difficult to enforce because of the variety of management strategies associated with quota implementation, enforceability depends largely on how quota systems are managed. Increased complexity of quota systems will generally reduce enforceability. The enforcement of time/area closures for the silver eel fishery is considered reasonable.

The LEC reports continuing illegal harvest of glass eels or elvers in the two states where some legal harvest is permitted, and in a number of states where any harvest of eels below a minimum size is prohibited. This is not unexpected given the high dollar value associated with the fishery. Enforcement agencies are dedicating resources to monitor and enforce regulations through stepped up patrols, coordination with local enforcement authorities, and by communicating the importance of glass eel cases to judiciary officials. Specific changes to regulations or statutes that would enhance field enforcement and/or penalties are encouraged, and those that have been implemented (in Maine, for example) have improved the outcome of arrests and convictions. Because of the cross-state nature of illegal glass eel harvest,

strengthening of extradition or bail provisions for criminal violations would enhance the deterrent effect of enforcement actions.

5. COMPLIANCE

States must implement the provisions of this Addendum not later than the following dates:

XX-XX-XXXX: States must submit detailed plans to implement this Addendum for approval by the American Eel Technical Committee (TC).

XX-XX-XXXX: The Technical Committee presents their findings regarding the implementation plans to the Management Board.

XX-XX-XXXX: States with approved management programs shall begin implementing Addendum.

6. LITERATURE CITED

ASMFC, 2012. American Eel benchmark Stock Assessment. Stock Assessment Report 12-01 of the Atlantic States Marine Fisheries Commission. 342 pp.

Cairns, D.K., G. Chaput, L.A. Poirier, T.S. Avery, M. Castonguay, A. Mathers, J.M. Casselman, R.G. Bradford, T. Pratt, G. Verreault, K. Clarke, G. Veinnot, and L. Bernatchez. 2014. Recovery Potential Assessment for the American Eel (*Anguilla rostrata*) for eastern Canada: life history, distribution, reported landings, status indicators, and demographic parameters. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/134. viii + 138 p.

Carruthers, T.R., A. Punt, C. Walters, A. MacCall, M.K. McAllister, E.J. Dick, and J. Cope. 2014. Evaluating methods for setting catch limits in data-limited fisheries. Fisheries Research. 153: 48-68.

COSEWIC. 2012. COSEWIC assessment and status report on the American Eel *Anguilla rostrata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 109 pp.

DFO. 2010. Status of American Eel and progress on achieving management goals. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2010/062.

Goodwin, K.R., and P.L. Angermeier. 2003. Demographic characteristics of American eel in the Potomac River drainage, Virginia. Transactions of the American Fisheries Society 132(3):524–535.

ICES. 2013a. Report of the Joint EIFAAC/ICES Working Group on Eels (WGEEL), 18–22 March 2013 in Sukarietta, Spain, 4–10 September 2013 in Copenhagen, Denmark. ICES CM 2013/ACOM:18. 851 pp.

ICES. 2013b. ICES Advice 2013, Book 9. Ecoregion: Widely Distributed and Migratory Stocks. Stock: European Eel. Accessed online on April 29, 2014. http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/EU_eel%20management%20plan.pdf

ANDREW J. LOFTUS

3116 Munz Drive ♦ Suite A ♦ Annapolis, MD 21403 ♦ 410-295-5997 ♦

July 3, 2014

MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

Dear Ms. Taylor:

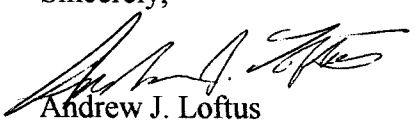
I have been asked to look into and comment on the potential application and role of aquaculture in the "Draft Addendum IV to the Fishery Management Plan for American Eel," specifically Option 3.1.4 regarding aquaculture in State Specific Management Plans.

While the value of aquaculture for enhancing coastwide populations of marine species is tenuous, we have seen multiple instances where stock supplementation has significantly contributed to localized stocks. The Atlantic striped bass enhancement efforts of the 1980's-90's contributed minimally to the overall coastal population but had significant implications for stocks in specific river systems such as the Patuxent River. Likewise, red drum stocking in the Gulf of Mexico has produced substantial benefits to local stocks while still contributing to overall coastal populations at lower levels. However, I understand that European countries have had some success developing eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans and the U.S. fisheries could perhaps benefit likewise.

In my opinion, stock supplementation through aquaculture of marine species is most valuable for contributing to stock assessment and life history research. Again, the Atlantic striped bass enhancement efforts proved invaluable for filling in gaps in knowledge of species migration patterns and rates, mortality estimates, and other stock assessment parameters. Further, a 2009 blue ribbon panel commissioned by the Maryland Department of Natural Resources to evaluate the efficacy of blue crab aquaculture efforts concluded that the benefits to "stock supplementation" were uncertain, but that the research aspects providing information on migration and life history provided invaluable information that could not be obtained without the aquaculture program with targeted stocking in the Chesapeake Bay.

Therefore, I support option 3.1.4, "State Specific Sustainable Fishery Management Plans For American Eel," specifically the aquaculture provisions allowing the "harvest a maximum of 200 pounds of glass eel annually from within their waters for use in domestic aquaculture facilities." The research that could be gleaned from properly conducted aquaculture operations could prove extremely valuable for developing future recovery options and solutions. Management plans should make every effort to facilitate, not impede, these efforts.

Sincerely,



Andrew J. Loftus

cc: Bill Goldsborough, CBF
Sheila Eyler, FWS

From: Barrie Robbins-Pianka [barrettrp@gmail.com]
Sent: Sunday, July 13, 2014 2:36 PM
To: Comments
Subject: American Eel , attn. Kate Taylor

Thank you for the opportunity to comment on a Draft Amendment IV and for holding the Public Hearing in Rocky Hill, CT.

I hold a conservative position on the harvest of glass eels. I believe there is enough data to support a moratorium on the taking of glass els, now. Therefore, I support Option 3a "Closure of the glass eel fishery immediately."

At present, the majority of aquaculture relies on wild caught eels for stock. I do not support this unsustainable practice.

From the complex Yellow Eel options, I support the Catch Cap, 8c. The life history of the eel is known but the data concerning the effect of taking at this life stage appears difficult to collect. Again, I support an action to increase the likely survival to adulthood. This is what so much effort has been directed toward.

American Eel

As I will be in Sweden during the month of June I will unfortunately not be able to attend this meeting. Below is a plan for how to save the eel population.

We continue to get reports like:

"Substantial decline in numbers and fishery landings of American eels over their range in eastern Canada and the US was noted, raising concerns over the status of this. The number of juvenile eels in the Lake Ontario area decreased from 935,000 in 1985 to about 8,000 in 1993 and was approaching zero levels in 2001. Rapid declines were also recorded in Virginia, as well as in New Brunswick and Prince Edward Island in Canada. Construction of dams and other irrigation facilities seriously decreases habitat availability and diversity for the eels."

Fish ladders

We spend considerable time, effort and money to build fish ladders but these fish ladders are in many cases not very eel friendly and they have, in my opinion, a limited impact on the migration of eels.

Eel-evator

An"eel-evator", like the one used in Harwich MA, seems to be working fine and the cost for such a solution is only a fraction of the cost of most fish ladders.

http://www.youtube.com/watch?v=_GoRBjF3rHQ

Challenges

The challenge is that when we work with eel migration issues we many times run into huge challenges to get different solutions approved. Below is one example of the difficulties we run into:

"It would require a permit from the wetland commission. You would be required to submit an engineered plan including elevations, short and long term erosion control plan, and long term maintenance plan for the pipe. Furthermore, the commission would only approve this activity if Steve Gephard or another qualified biologist supports the design and affirms that it is necessary for eel access and that it will be effective without impacting the functioning of the fishway. You would also need the full backing of the Parks and Open space Authority and approval from the Town engineer.

Attached is a short video showing eels coming thousands of miles away only to be stopped by a dam 3 feet from the final destination. A simple net solved the situation temporarily in this case and most eels trapped under the dam migrated over the final obstacle during the following night (See 2nd attached short video)."

Solutions

An information package needs to be developed to educate, inform and make people enthusiastic about eels. With the correct approach to this challenge, a “Save the Eels” program could be bigger than “Saving Nemo”. Schools, kids and adult volunteers could have a tremendous impact on the eel population if we provide them with the correct tools.

They need a short informational video about the migration of eels and the challenges these small juvenile eels are facing. They need to have access to different techniques and ways to practically solve the problems the eels are facing when, for example, stopped by a dam.

Funding to solve these issues should be available and, in most cases, the funding required is a fraction of the cost for most fish ladders. They need help to overcome the bureaucratic challenges they will face when they get involved in an eel project. They will need:

- A simple document outlining where to purchase the equipment they will need
- Different proposed solutions for different challenges, and
- Phone numbers and e-mail addresses to people who they can reach out to in order to get help.

The best solution would be if the State could assign a specific eel “ombudsman “who can assist and help them with this specific task.
(See NY Projects http://www.dec.ny.gov/lands/49580.html)

Economic Impacts

Glass eels have become a delicacy in Asia, and as such there is a large demand for harvested glass eels. Some states have restrictions and bans to protect American eels (USFWS 2006b). The annual harvest of American eels, although declining, has a value on the order of $5 million (ASMFC 2000).

Conclusion

- Saving the eels is a project which will require very little funding but will have great educational and environmental values and a huge long term economic impact on the commercial fishing of eels. While the economic value of the commercial eel fishery in the U.S. is poorly documented, it is nonetheless considered important to various multi-species fisheries as well as to full-time and casual fishers. Declines in eel numbers would also be expected to have some impact on the range of non-human species that require them as a food source component, such as other fish and aquatic birds.

Bengt Kjellberg

William N. Clayton
Marine Bait Wholesale
654 East Main St.
Middletown, CT 06457
(860) 918-1514

Ms. Kate Taylor
Senior Fishery Management Plan Coordinator
1050 N. Highland St.
Suite 200 A-N
Arlington, VA 22201

VIA EMAIL: comments@asmfc.org

Dear Ms. Taylor,
Please accept and enter into the record, my comments on Draft Addendum IV to the Fishery Management Plan for American Eel. These comments should be taken in addition to my oral comments given at the Connecticut Public Hearing held on 24 June 2014.

I am in favor of glass eels being available to all eel farms in this country that are operational in 2014.

I also request that the Commission ensure that the rules that are implemented do not adversely affect bait eel sales in the U.S. Bait eel sales are not reflected in the landings. I bought 100 tons of eels last year; 70% of which were small, bait size eels. I have documented this with the state of Connecticut through my importation permits. Many small boat fishermen depend on me for their livelihood. As a wholesaler I supply bait eels to over 34 million end users. I supply other wholesalers from Florida to Massachusetts, who in turn supply bait and tackle shops, which sell to recreational anglers. The recreational anglers fish for striped bass, cobia, and catfish. Demand for bait eels for the cobia and catfish markets occurs at times when the striped bass market is slow/nonexistent. This helps level out the catches. I also supply eels to the domestic and foreign food market. The current proposed regulations will decimate the artisanal fishery in the United States and force all eels destined for the bait market to be imported from Canada or Haiti.

I remind the Commission that there have been regulation changes on the ability to utilize horseshoe crabs as bait. In conjunction with an outright ban in some jurisdictions and the inability to obtain horseshoe crabs because of monopolistic Chinese conch buyers, horseshoe crabs are generally no longer widely used. Many baymen have exited the fishery as a result of their inability to source cost effective bait, resulting in less effort than 20 years ago. Those eel fishermen that remain are forced to utilize less palatable/less effective species such as bunker (Menhaden), razor clams, clam bellies, and even blue crabs. Catch rates have been reduced 10-fold per pot with the use of other species as bait. The few that have sourced their own horseshoe crabs still catch significant volume per pot. These bait changes result in declining catch rates and changes in size classes, mimicking a population decline.

As time passes and eels become accustomed to encountering these new bait species in the traps, catch rates and size distribution should follow. As evidence of this, the catch rates of my small boat fishermen have increased yearly for the past 7 years, even though they are using less effective/desirable bait. The average size eel during the spring run is also increasing from ¼ lb average to over a 1/2 pound. All size classes are still present, from small bait eels to large eating eels.

Regional shortages of American eels in some jurisdictions are the result of illegal harvesting of glass eels by journeymen from legal jurisdictions. This illegal harvesting has led to a dearth of adult eels which mirrors a population decline because they are on the extremity of their range. With that being said, I am still in favor of a legal glass eel harvest but there has to be a concerted effort to weed out the illegal harvesters, especially those that have been caught in the past.

I want to remind the Commission that there has been a reduction in the harvest of glass eels in Maine (on page 12 of the Addendum you say 35% reduction from 2012 landings, hard quota of 11,749 lbs). The reductions that Maine has implemented should be allowed to propagate through. Delaware Department of Natural Resources research reports the average age of eels recruited to gear in Delaware is 2-5 years whether the eel is 1 oz or 1 lb.

As an operational farm with animals in stock ready for harvest in two weeks, I am against the proposed rules as they would not allow me utilize smaller size eels (9-12 inches, not glass eels) for farming, which is more cost effective.

Sincerely,
William Clayton
Owner, Marine Bait Wholesale

Mayflower International Ltd.

5 Yeamans Road
Charleston, SC 29407

Tel: +1 857 222 6664
Email: mayflower@mindspring.com

June 13, 2014

Atlantic States Marine Fisheries Commission
1050 N. Highland St., suite 200A-N
Arlington, VA 22201

ATN: Kate Taylor

RE: American Eel – Amendment 4 – Comments

Dear Kate:

Thank you for the good presentation at the public meeting in Charleston SC this week. While considering the many options set forth for eel management , it is important to know that there is precident for management regulations to vary from state to state. Having worked only in the glass eel fishery, comments here are not for Yellow or Silver eel.

This year Maine took it upon themselves to institute quota limits and a strong monitoring system. SC continued to limit harvests to the Cooper River and mandated that any pigmented eels (95 pct of the catch at this location) be returned to the river. Today a commercial glass eel fishery in SC is not economically viable and a request for aquaculture in NC was not supported.

ASMFC needs to allow states more flexibility to deal with their eel resource. Current catches are insufficient to have an accurate stock assessment. We have a habitat issue and must seriously question the validity of an endangered species listing. Exports from Haiti's first season of fishing rostrata glass eel far exceeded all of USA. ASMFC is not allowing an industry to function here.

Before mandating additional conditions for eel management, I encourage managers to understand the situation with the Anguilla Japonica and Anguilla Anguilla fisheries. Please take a lesson from the EU system, know that daily reporting is very easy and an eel fishery can be closed overnight. States have many tools for limiting effort. Closing a fishery is not an effective way to monitor or manage a resource.

Sincerely,

William C. Quinby

From: Brian Morgan [hmerkor@gmail.com]
Sent: Monday, June 30, 2014 7:24 PM
To: Comments
Subject: Eel addendum

I'm located in Potomac river above the 301 bridge and below Quantico. As a commercial fisherman I would like to see the American eels protected but a quota based system isn't the answer! The percentage of the small eels that are caught by us is basically the very el we need to protect. Please come up with other measures to help the fisherman continue to make a living in the waterways we have. Add cull patches where they're not required.

Thanks,
Brian Morgan

June 08 2014

two Kate taylor
please Don't take any more
of my nampie
and papa's elver fishing away

Thank you

Cameron Keene
age 7

From: mom2chase831@yahoo.com [mom2chase831@yahoo.com]
Sent: Thursday, July 17, 2014 4:33 PM
To: Comments
Subject: American eels

To whom it may concern:

I feel quotas are the wrong way to go about this. Limiting the number caught is not going to protect the number of eels caught. I feel there are other alternatives that would be more effective. For example, cull patches. This would release the smaller size eels. I feel that would be a more practical route it preserving the eel population. Again I feel there should not be a quota put on the eel fisheries.

Thank you,

Charles Bourne jr.

Dear Atlantic Marine Fisheries Commission,

There is nothing quite more fascinating than watching Nature and it's amazing creatures go about their journeys and daily routines. The interdependence of these creatures in the food chain rely on a delicate balance to maintain each specie's behavioral pattern.
Our American eel is one of the most underestimated and important animals living in our fresh and salt estuaries. It is a critical part of the network of life in our rivers, lakes and ponds. Eel's stages are miraculous as they morph from one adaptation to the next.
We had to (and need to continue) to do whatever it takes to preserve the American eel's passageways to and from the sea.

The analogy has been clear: save this creature's pathways and preserve a network of marine life.

Once we began conservation efforts that re-opened their safe passage between our bodies of salt and fresh water, an important transition occurred, but we cannot stop there.

Now, the beautiful glass eel needs protection from collection.

This delicate creature is formidable in its determination to complete its life cycle and it directly impacts the food chain in our region. We need to be as determined to allow it to complete the journey.

We cannot allow overfishing of another species, that is so unique, important and vulnerable. I know better and so do you.
Please know that the public outcry will be fierce from citizens like me, who understand the importance of every creature, and don't care what the demand might be for it on the commodity market.

Create a protective plan that ensures the safety of the American eel in any part of its development - but most critically, at this time: the glass stage.
Thank you for doing your job. It is an important one, that will be greatly respected and appreciated when you protect the juvenile American eel.

Sincerely,

Christine Sweeney
45 Glenville Rd
Greenwich, CT 06831

June 30, 2014

Kate Taylor
Senior FMP Coordinator
1050 North Highland St.
Suite 200A-N
Arlington, Virginia 22201

Subject: American Eel

Attn: American Eel Board

We are writing to you in concerns of the Addendum IV. We support Status Quo with Option 2 the 2014 Management Plan. We have been fishing for twenty (20) and ten (10) years. In the years we have not seen a lack of glass eels. The price has not always been there. But the eels have been. We know Maine has been working hard to open up habitat. And we do believe that they have opened up over 1.5 million acres of habitat. The Hydro dams are our problem. We let the eels go and grow up. Then the turbines chews them up. We feel that the State of Maine has done well for the fishery. We have given up the Silver Eel Fishery. And the pigment eels. This season seem to work well. Although we didn't get to fish the whole season. We had fished when the season opened. Caught a few pounds. The season started out slow with the cold weather. Then it started to warm up. We filled the rest of our quota in one night. Caught a little over 50 (fifty) pounds. We had a little over Forty pounds left to our quota. So we had to dump 10 pounds back into the river. We was done fishing on the 19th of May. Still had two weeks left to fish the season. To bad we was on a quota.

We do not support Option 7. We don't think it is fair for someone to start up a aquaculture and take away from our small quota. They can buy our glass eels or take away from their yellow eel fishery to get their own glass eels. Thank you.

Sincerely,

Darrell and Angela Young (Fishermen)
105 Spurling Rd.
Eastbrook, ME 04634

9 Hale St
Exeter, NH 03833
dohearn@wtgnh.com
mountaingobbler @comcast.net

Dear Ms. Taylor,
I am writing to you to comment on the Eel Draft Addendum. I am a recreational eel trapper from the state of NH.

I propose we continue the 25 per day limit with unlimited possession for recreational trappers only.

I propose closing the commercial season during the months of May, June in New England as this is the time the horseshoe crabs breed.

My experience comes from many years as a NH recreational eel trapper which I use for striped bass bait. The eels seem to show up and work the traps much better during the horseshoe crab breeding season.

A not for sale recreational eel fishery is my recommendation. Commercial harvesters are the ones hurting the resource.

Very sincerely yours,
David O'Hearn
NH recreational eel trapper.

David Whitten, Palmyra Maine

207-938-4159

There is no successful downstream passage in the rivers that I fish. The fish that I catch will never make it out to the ocean. They are getting chopped up. I've been working on research projects, electric pulses to divert eels from intake facilities. And also a downstream cyphon, that's my idea, eels are so suscptilbe to downstram flow. If they are successful then there is no more money for research. Im 66, not going to be fishing much longer. I'm telling you they have taken out two dams, in Augusta and in Winslow, on those two exisiting hydro dams still in they put in upstream passage for the elvers. A piece of water is just lijke a piece of land. You can only support so many fish just like you can only grow so much crop. Since they put the upstream passage in and removed the upstream dams, my average eel used to be 3 or 3.5 pounds. Now they average 2 pounds. I've caught eels that wight 10.5 pounds. The most I ever caught was 4,000 pounds in a year.

I sold eels to Mitch for eels. He never buys them when he is coming down. He bought all the eel dealers out on the east coast. He's got a monopoly. I've sold him my excess ones. Picked them up on the way back thru. He smuggled them across the border. He doesn't tell them he's brining eels in. the Canadian government subsidizes him. He writes them as caught in Canada. I sent Gail my catch records. Now it's Mary. Mitch is crooked.

My father has a weir and I've fished them on and off for 25 years. We had 6 weirs at one time. Bought the rights for one more. A couple years ago I was approached ot be hired on a research project on the CT river. I had my weirs in so I couldn't go down there. So I helped them on the phone. They wanted to use fyke nets. When the eels should have been running, they said the water was too high.

Ms. Taylor,

I am writing you regarding a concern of mine with the Maine American Eel fishery. I manage a small alewife restoration project in Bremen, Me., and have been doing so since 2002. The installation of 2 culverts at 2 separate state road crossings extirpated this local river herring recourse in a lobstering community back in the ~60's. With funding and support from NOAA, American Rivers, Gulf of Maine Council, MEDMR and TU, (among others) we have been able to replace the most problematic culvert (last summer) with a bridge. The north culvert is scheduled for replacement this summer with a similar style bridge. These 2 projects alone cost nearly 1 million dollars.

I have built 4 different fish ladders over the years and carried many live alewife over the roads to ensure reproduction for this day and this season when they can spawn at will. My commitment to this cause has not wavered and my hours invested uncountable. Locals and those who provided funding are asking this spring "where are the alewives?"

Words cannot express how frustrating it is each May (since 07") to see our 6' wide brook blocked with a legally placed ~20' wide elver fyke net. This particular site is not unique on the coast of Maine.

Typically our alewives approach the brook from the bay as the tide nears high (each May) when the fyke net is floating. In June, (after elver season) those that have yet to enter retreat to the bay about an hour after high tide and wait for another day. Those fish that find their way around the net in May cue up and wait their turn to enter the first fresh water pool. If they cannot enter at that tide, and are then on the back side of the net, they become trapped and lose the ability to back out to the sea. Some of those that have spawned and are returning out to sea also become trapped on the upstream side of the net. (Sometimes they won't enter if there are elver fishermen at the brook netting also.) We lose about 50-200 fish per tide to a single legally placed net confounding this restoration project.

I am hoping to see fyke net elver fishing be forbidden in Maine (at least in May when river herring may be present).

Please see attached photos. I appreciate any help. Don't hesitate to contact me with any questions.

Regards,

David Wilkins

Bremen Alewife Restoration

Bremen, ME

Desten Keene 476 County Rd
Ruber, Me 046

I've been fishing since 1993. I've been a fisherman all my life and I've seen more elvers in the recent years than ever before. If I had not been put on a quota system, I could have caught more elvers this year than I've ever caught before. Fishing with less gear and no more effort than in previous years. This industry is

already self-regulated by license limits, closures, and mother natures weather events.

This past years influx of native-American fishermen has destroyed years of license reductions and tainted an otherwise quiet fishery.

It is my firm belief that the State and Federal government is against hard-working people trying to make

an honest living. If we don't have a hand out, you people don't have control over us. I consider this to be a waste of the fisherman's time and resource to write letters and go to meetings because you are already predisposed in your opinions and rulings to close this fishery. All you are doing is making it look good on paper. The decisions

have already been made, and when this fishery is closed, I expect a generous bailout.

Dusty Keene
Quilcene

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

July 1, 2014

From: Lt/Colonel Richard Hurley USAF (Retired)
623 Hawick Road
Raleigh, NC 27615

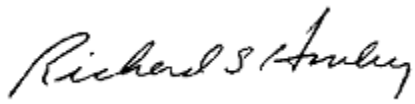
As a resident of North Carolina, I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a big importer of processed eel product. The American Eel Farm (AEF), a local North Carolina small business located in Trenton, working with the State of North Carolina, is a state-of-the-art facility that has the capability and could demonstrate the feasibility of raising disease free, sushi grade American eel in North Carolina to supply American markets that now depend mostly on imported product. Other states need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels for aquaculture at the AEF will be a good opportunity to assess in NC the annual recruitment of each year's cohort which is unknown. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV would be met and provide eel fishery information which is needed for this data poor fishery. The sampling/collection protocol would be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the NC Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. The AEF has a history of working with the NC State Cooperative Extension Service. A NCSU Area Aquaculture Agent, and other university scientists and students would have an opportunity to work on collecting data concerning the production side of the AEF and the potential for stocking farm raised eels at a to-be-determined size to increase populations of yellow eels in NC and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. A production/research facility such as the AEF can contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow this facility and others in coastal states to get started.

cc: Garry Wright



To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Dick Stone, Southport, NC 28461

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a major importer of processed eel product. I do know that in North Carolina, there is a state-of-the-art facility that has the capacity to support eel aquaculture on a commercial scale and has successfully done so in the past. This facility and facilities in other states should be given the opportunity to demonstrate the feasibility of raising disease free, sushi grade American eel to supply American markets that now depend mostly on imported product. The science for raising this species is well established in other countries. American eel aquaculture in the United States has the potential to quickly become a high quality, value added seafood aquaculture product.

There is precedent for Option 3.1.4 in the 2000 ASMFC American Eel Fisheries Management Plan (FMP) which states: "New York, Rhode Island, Delaware, Maryland, PRFC and North Carolina have only recently (1992-1995) imposed a minimum length of 15 cm so as to protect elvers/glass eels for local aquaculture development…." An aquaculture allowance should be available since it would be consistent with the intentions of the states as noted in the American Eel FMP. Mentioned in the FMP is the fact that Virginia issued, in 1996, two permits to fish a total of about 800 kg of elvers/glass eels for local aquaculture. Also, there was reference to stocking. It reads "When the cultured elvers have been reared to sale size, 10% must be returned to the state for release in the wild".

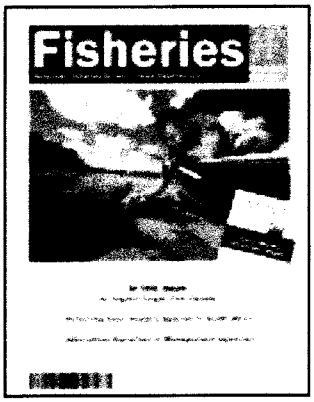
I believe there should be further investigations into the potential for stock enhancement provisions similar to those found in European Union eel recovery plans. These plans include aquaculture production as well as stock enhancement by the trans-location and stocking of eels as a major part of their strategy. Information from the European Union indicates that trans-

located and stocked eels can contribute positively to increases in yellow eel production – this could be beneficial to local yellow eel fishermen. Reports from Europe also document stocked eels exiting river systems as silver eels. This shows the possibility for increasing spawning potential through trans-location and/or stocking.

The collection of local glass eels in state waters for aquaculture would be a good opportunity to help assess the annual recruitment of each year's cohort for which there are now limited data. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV would have to be met and that would provide additional eel fishery information which is needed for this data poor fishery. The sampling/collection protocol could be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the State Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. Eel aquaculture facility personnel working with the state Cooperative Extension Service, Area Aquaculture Agents, and other university scientists and students would have an opportunity to collect data concerning the production side of the aquaculture facility. In addition, they could investigate the potential for stocking, disease and parasite free, farm raised eels at a to-be-determined size to increase populations of yellow eels and possibly enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in the American Eel FMP, ICES Reports and EU Eel Recovery Plans. Production/research eel aquaculture facilities in the US could contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow these facilities to get started under strict guidelines.

Thank you.



Fisheries
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/ufsh20

A Case for Accelerated Reestablishment of American Eel in the Lake Ontario and Champlain Watersheds

Wolf-Dieter N. Busch[a] & David P. Braun[b]
[a] Ecosystem Initiatives Advisory Services, 1705 Angelina Ct., Crownsville, MD 21032-1935. E-mail:
[b] Sound Science, LLC, New York, NY
Published online: 07 Jul 2014.

To cite this article: Wolf-Dieter N. Busch & David P. Braun (2014) A Case for Accelerated Reestablishment of American Eel in the Lake Ontario and Champlain Watersheds, Fisheries, 39:7, 298-304, DOI: 10.1080/03632415.2014.923769

To link to this article: http://dx.doi.org/10.1080/03632415.2014.923769

A Case for Accelerated Reestablishment of American Eel in the Lake Ontario and Champlain Watersheds

Wolf-Dieter N. Busch*

Ecosystem Initiatives Advisory Services, 1705 Angelina Ct., Crownsville, MD 21032-1935. E-mail: wolfnbusch@gmail.com

David P. Braun

Sound Science, LLC, New York, NY

ABSTRACT: *The catadromous, panmictic American Eel (*Anguilla rostrata*) historically comprised nearly 25% of fish biomass in Atlantic coastal streams, supporting sizeable fisheries for centuries. However, the population has collapsed in its primary range. It is now proposed or listed as "endangered" by various North American governments, with its fisheries declared "depleted" along the U.S. Atlantic coast. The causes of decline include fragmented governance, loss of physical access to and/or degraded quality of freshwater habitats, lethal entrainment in hydroelectric turbines, changes in marine currents, and excessive harvest. Large gaps exist in knowledge of species biology and the effectiveness of management approaches. Prior to the collapse of eel production, the Lake Ontario and Champlain watersheds of the St. Lawrence River basin produced abundant, large, highly fecund female eels that contributed disproportionately to species-wide reproduction. Abatement of key threats specifically across these two particular watersheds therefore could contribute significantly to range-wide recovery from Greenland to Venezuela.*

Un caso de restablecimiento acelerado de la anguila americana (*Anguilla rostrata*) en el Lago Ontario y en la cuenca hidrográfica Champlain

RESUMEN: *la anguila americana (*Anguilla rostrata*) se considera una especie catádroma y panmíctica e históricamente ha constituido cerca del 25% de la biomasa de peces en los ríos costeros de Norte América, soportando durante siglos importantes pesquerías. Sin embargo, la población ha colapsado a lo largo de su rango principal de distribución. Actualmente, la especie se ha propuesto o bien listado como "en peligro" por varios gobiernos de Norte América, cuyas pesquerías se han declarado agotadas a lo largo de la costa atlántica de los EEUU. Las causas de la reducción incluyen la fragmentación de la gobernanza, pérdida del acceso físico hacia y/o degradación de la calidad de los hábitats dulceacuícolas, arrastre letal hacia turbinas hidroeléctricas, cambios en las corrientes marinas y extracción excesiva. Existen grandes huecos de conocimiento en cuanto a la biología de la especie y la efectividad de los enfoques de manejo. Antes del colapso en la producción de anguila, en el lago Ontario y en la cuenca hidrológica Champlain del río San Lorenzo se producían cantidad de hembras de anguila grandes y fecundas que contribuían de forma desproporcionada a la reproducción de la especie en todo su rango. Por lo tanto, la disminución de amenazas clave en estas dos cuencas en particular, puede contribuir importantemente a la recuperación de la especie en todo su rango de distribución, desde Groenlandia hasta Venezuela.*

INTRODUCTION

The American Eel (*Anguilla rostrata*), a catadromous species, spawns in the Sargasso Sea but spends most of its life in freshwater or estuaries. It has suffered large population declines along the North American coast, the most productive grow-out area within its historic range from Greenland to Venezuela. Historically, it comprised as much as 25% of the fish biomass in coastal streams (Atlantic States Marine Fisheries Commission [ASMFC] 2000) but now comprises <1% with recruitment <1% of pre-1980 levels (ASMFC 2012; Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2012; MacGregor et al. 2014). This decline parallels that of the European Eel (*Anguilla anguilla*) with its current recruitment at 1%–5% of pre-1980 levels (ICES 2013). These declines threaten vast culturally and economically important fisheries in Canada, the United States, and Europe (Ringuet et al. 2002; Astrom and Dekker 2007; MacGregor et al. 2009, 2014; Engler-Palma et al. 2013).

Protection and restoration of the American Eel require urgent action on several fronts. Its large range includes 10,000 km of mainland shoreline spanning many jurisdictions. Greater institutional cooperation and improved governance therefore are crucial to abating threats within freshwaters and coastal zones (Engler-Palma et al. 2013; MacGregor et al. 2014). These threats include artificial barriers to upstream passage in river systems where eels historically reside most of their lives, chemical pollution of river systems and nearshore waters, disease, overharvest, and high mortality rates during downstream migration through hydroelectric turbines (Ontario Ministry of Natural Resources [OMNR] 2007; Council for Endangered Species Act Reliability 2010; U.S. Fish and Wildlife Service 2011;

* Former Chief of Lower Great Lakes (Erie and Ontario) Fisheries Program, Fish and Wildlife Service, U.S. Department of the Interior and former Director of the Interstate Fisheries Management Program, Atlantic States Marine Fisheries Commission, Washington, D.C.

ASMFC 2012; COSEWIC 2012; Hitt et al. 2012; MacGregor et al. 2014).

Additional emerging challenges include changes in ocean circulation (e.g., Knights 2003; Bonhommeau et al. 2008; Baltazar-Soares et al. 2013); a lack of identification and protection of marine migration routes and spawning habitat (e.g., Trott et al. 2010; Engler-Palma et al. 2013); changes in watershed discharge and temperature regimes (e.g., Boyer et al. 2010; de Lafontaine et al. 2010; Verreault et al. 2012); and altered predation by other species (Engler-Palma et al. 2013). These emerging concerns are outside the scope of this article.

We focus on two critically important management actions: (1) restoration of the eel population to the Lake Ontario and Lake Champlain (LO, LC) watersheds, part of the St. Lawrence River (SLR) basin of Canada and the United States; and (2) the closure of all American Eel fisheries. The LO and LC watersheds historically constituted "the single largest freshwater rearing habitats for the American Eel within its geographic range" (COSEWIC 2012, p. 14). They grew very large, highly fecund female eels that contributed 26%–49% of the entire American Eel egg production (COSEWIC 2012). This contribution has collapsed by 93%–98% since 1980 (COSEWIC 2012). Given their historic contributions, reestablishing American Eel in these watersheds could contribute significantly to species recovery overall (MacGregor et al. 2014).

We briefly review the state of knowledge concerning American Eel in general, the reasons for its decline in the LO and LC watersheds, and the potential challenges of reestablishing the species in these two watersheds. We cite only a small fraction of the deep literature on these topics. Dittman et al. (2010a, 2010b), ASMFC (2012), COSEWIC (2012), MacGregor et al. (2014), and Engler-Palma et al. (2013) provide detailed bibliographies. Our purpose is not merely to review the situation but to advocate for an aggressive approach to reestablishment, because it will take decades to improve governance and for closure of the fisheries and other key conservation actions to produce their intended benefits.

AMERICAN EEL LIFE HISTORY, THREATS, AND STATUS

American and European Eels spawn in adjacent areas of the Sargasso Sea, western North Atlantic, and are panmictic; that is, spawners from across the entire range of each species mix together (Als et al. 2011; Côte et al. 2013). Different ocean currents carry their transparent larvae ("leptocephali") west and east to their respective continental shelves (COSEWIC 2012; Baltazar-Soares et al. 2013). The U.S. southeastern Atlantic coast may be the historic geographic center of landfall for the American Eel (MacGregor et al. 2008). Local density and other factors affect their sexual differentiation following landfall, resulting in much higher proportions of females, as high as 95%, across the northern part of their range (Oliviera 1999; COSEWIC 2012).

Numerous publications (e.g., ASMFC 2012; COSEWIC 2012) describe the life history of the American Eel. The leptocephali grow to 5–6 cm over the course of 6–12 months as they approach the coast and metamorphose into transparent "glass" eels. Entering brackish and fresh waters, they develop pigmentation at less than 10 cm and become "elvers," which in turn grow into "yellow" eels, usually by age 2 at 10–13 cm. Most yellow eels then migrate further into estuaries and upstream into freshwater systems as far as natural and artificial barriers allow. This upstream movement may take several years, averaging 6 years to reach the upper SLR (COSEWIC 2012). Yellow eels occupy a wide range of habitats, including rivers, streams, lakes, and wetlands to depths of ~10 m (e.g., COSEWIC 2012). They burrow and forage in the substrate and consume aquatic insects, crayfish, and small fish—apparently opportunistically, although they may select among insect prey (e.g., Facey and Van Avyle 1987; Denoncourt and Stauffer 1993). Over the next 7–20 years they grow to over 1 m in length (females larger) and gain more than 1.5 kg (Casselman 2003; COSEWIC 2012). At maturity they become "silver" eels, changing several aspects of coloration and morphology; migrate back downstream; and follow ocean currents back to the Sargasso Sea to spawn and die (ASMFC 2012; COSEWIC 2012).

Their complex life cycle and vast geographic range make eels susceptible to numerous stresses. Smaller (<10 cm) American Eels are competent, tenacious climbers on damp surfaces (e.g., Facey and Van Den Avyle 1987; Haro et al. 2000; Verdon et al. 2003; Schmidt et al. 2009), but dams nevertheless hinder their reaching an estimated 84% of their historic North American freshwater habitats (ASMFC 2000). Dams > 2.5 m are thought to pose significant barriers to upstream movement (e.g., Verreault et al. 2004). Hydroelectric dams can present a double threat, blocking upstream passage and causing mortality during downstream migration (ASMFC 2012; COSEWIC 2012; Haro 2013; MacGregor et al. 2014).

Infection by an exotic East Asian swimbladder nematode, *Anguillicola crassus* (aka *Anguillicoloides crassus*), poses an increasing threat (e.g., COSEWIC 2012). Infections by *A. crassus* can occur in most life stages including glass eels (Nimeth et al. 2000), impairing swim bladder function, buoyancy, growth, and overall health (Sokolwski and Dove 2006; Kennedy 2007). Infected eels have appeared as far north as LO, likely from stocking of infected individuals (S. LaPan, New York State Department of Environmental Conservation, personal communication, 2011; OMNR 2012). Exposure to chemical contaminants also may lower survival (Couillard et al. 1997; Belpaire et al. 1999; Dittman et al. 2010a, 2010b; COSEWIC 2012).

American Eel abundance has declined range-wide (Department of Fisheries and Oceans, Canada [DFO] 2010; Dittman et al. 2010a, 2010b; ASMFC 2012; COSEWIC 2012; MacGregor et al. 2014). After fluctuating widely during the first two-thirds of the 20th century, landings rose into the late 1970s before declining consistently and severely to the present. Landing rates reflect not only abundance but market demand and other factors. However, direct measurements of eel demography, crucial

to evaluating the effects of specific stresses and management actions, face unique challenges (de Lafontaine et al. 2010; Engler-Palma et al. 2013; Zhu et al. 2013). ASMFC (2012) and COSEWIC (2012) use several types of data from numerous locations and apply several standardization methods to present the most complete demographic summaries available.

The post-1980 decline in American Eel abundance has prompted repeated petitions for the United States to list it as "threatened or endangered" nationally (U.S. Fish and Wildlife Service 2011), but no decision has been released. Canada is considering classifying it as "threatened" nationally (COSEWIC 2012); and the Provinces of Ontario, Quebec, Newfoundland, and Labrador have classified or are considering classifying it as threatened, vulnerable, or endangered under provincial law (Engler-Palma et al. 2013). Canada has set a goal to reduce eel mortality from all sources by 50% relative to the 1997–2002 average, as a first step toward rebuilding overall abundance (DFO 2010). The United States has not yet set goals for restoration but has implemented measures to reduce harvest of elvers, yellow, and silver eels (ASMFC 2013; Engler-Palma et al. 2013). Concurrently, demand and market prices for glass eels for export have reached all-time highs, and market prices for yellow and silver eel are similarly high (ASMFC 2012; COSEWIC 2012).

AMERICAN EEL IN THE LAKE ONTARIO AND CHAMPLAIN WATERSHEDS

The single strongest factor in the 93%–98% decline in escapement from the LO and LC watersheds appears to be dams that block or limit yellow eel migration to large portions of their historic habitat, some of which also cause mortality among silver eel as they attempt to migrate back to the ocean (ASMFC 2012; COSEWIC 2012; MacGregor et al. 2014). A radical decline in the numbers of yellow eel even attempting to migrate upstream into these watersheds in recent decades (see below) appears to be due to poor recruitment of spawning adults across the entire species range but not a cause of the post-1980 decline in escapements from these watersheds (de Lafontaine et al. 2010).

Reports on the effects of dams on eel distributions in the LO and LC watersheds differ between Canada and the United States in the ways these effects are calculated but present the same general picture. Figure 1 presents the locations of dams >15 m high on the U.S. tributaries to LO and LC and adjacent portions of the SLR basin (Dittman et al. 2010a, 2010b). Dittman et al. (2010a, 2010b) estimate that dams have reduced the overall extent of accessible tributary habitat in the U.S. portions of the LO and LC watersheds by nearly 77% and 40%, respectively. Eel habitat in the Province of Ontario historically consisted largely of the watersheds of LO and the Ottawa River. Maps presented by MacGregor et al. (2010) show an approximately 70% reduction in the total extent of eel distribution across the Province and an approximately 80% reduction in tributary extent (excluding Lake Ontario). These maps also show a much greater density of dams in the LO watershed within the province, suggesting that its losses may be proportionally greater. (These maps address losses in terms of watershed area, within which only water <10 m deep would have provided actual habitat; Verreault et al. 2004, 2012.)

Eel abundance in the LO watershed declined as tributary dams proliferated during the nineteenth to mid-twentieth century (Dittman et al. 2010b; MacGregor et al. 2010, 2014; COSEWIC 2012). However, the largest decline appears to have followed changes at two sites on the SLR downstream from LO: modifications to the hydroelectric station at Beauharnois, Quebec, first completed in 1932, and completion of the Moses-Saunders Power Dam in 1958 at Cornwall, Ontario, and Massena, New York (de Lafontaine et al. 2010; Dittman et al. 2010b; MacGregor et al. 2010; COSEWIC 2012).

Eel ladders have operated on the Canadian side of Moses-Saunders since 1974, on the U.S. side since 2006, and at Beauharnois since 1998 (Dittman et al. 2010b; MacGregor et al. 2010). Nevertheless, counts of upstream passage remain extremely low. COSEWIC (2012) estimates that, even with the additional ladder on the U.S. side, upstream movement past Moses-Saunders remains at only ~3% the rate observed in the early 1980s.

The LC watershed flows into the SLR through the Richelieu River, site of a historically robust eel fishery (Verdon et al. 2003). The decline of this fishery also followed proliferation of tributary dams during the nineteenth to mid-twentieth century (Verdon and Caumartin 2006; Dittman et al. 2010a). However, modifications to the Saint-Ours and Chambly dams on the Richelieu River between 1965 and 1969 blocked further upstream migration into the entire watershed. Eels that had migrated upstream prior to that date continued to mature and depart, sustaining the Richelieu silver eel fishery even after the changes to the dams, but landings began to decline in the 1980s and the fishery closed in 1998 (Axelson 1997; Verdon et al. 2003; Dittman et al. 2010a). Eel ladders were added to Chambly in 1998 and to Saint-Ours in 2001 (Dittman et al. 2010a). However, their benefits have resisted quantification. A significant fraction of the eels passing up the ladders have been individuals previously stocked upstream that had moved downstream through the facilities before heading back up again (DFO 2010). Neither dam generates hydroelectric power (Verdon and Caumartin 2006) and so lack turbines to harm silver eels migrating downstream.

Experimental programs stocked nearly 3 million elvers above Chambly and Saint-Ours during 2005–2008 and roughly 4 million into LO during 2006–2010 (COSEWIC 2012). Although screened for *A. crassus*, some infected individuals escaped detection (S. LaPan, New York State Department of Environmental Conservation, personal communication, 2011; OMNR 2012). Both programs are now suspended, for reasons we discuss further below.

Both watersheds have numerous hydroelectric dams, including Moses-Saunders and Beauharnois (Figure 1; Dittman et al. 2010a, 2010b; MacGregor et al. 2010). Silver eels experience significant injury and mortality during downstream passage through hydroelectric turbines (Figure 2), with annual mortality typically 10%–60% per dam but approaching 100% at some dams (Durif et al. 2003; Verreault et al. 2004; DFO

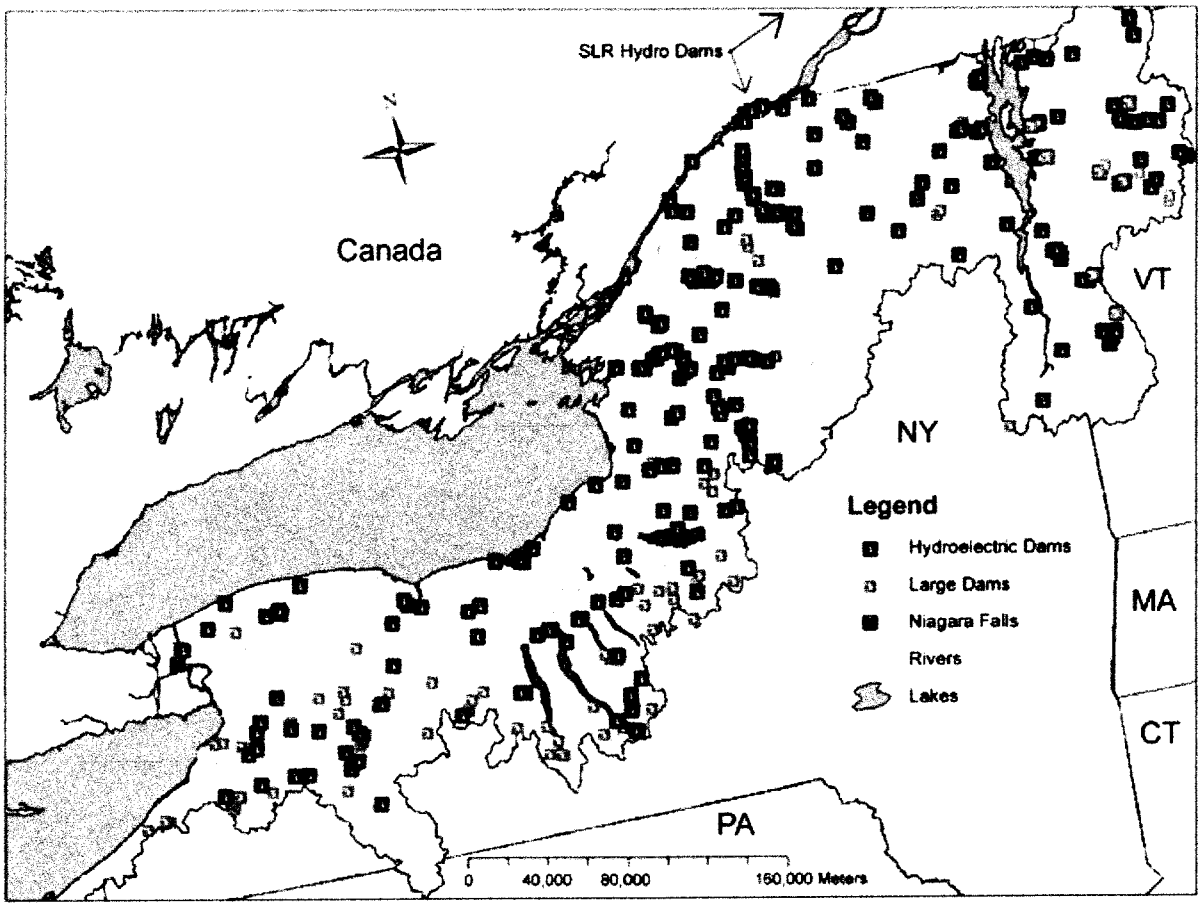


Figure 1. Hydroelectric power and other large (>15 m) dams on the U.S. tributaries of Lakes Ontario and Champlain. Map provided by D. Dittman and M. Chalupnicki, United States Geological Survey.

2010; ASMFC 2012; COSEWIC 2012; MacGregor et al. 2014). Impacts are cumulative, with Moses-Saunders and Beauharnois affecting the escapement of the entire LO watershed. COSEWIC (2012) estimates that hydroelectric dams cause 75% of all anthropogenic eel mortality in Canadian waters and reduce silver eel escapement by at least 40%. Injury and mortality rates vary with water flow (Jansen et al. 2007) and size, type, and design features of hydro-production facility and are greater for larger eels (Calles et al. 2010; ASMFC 2012; COSEWIC 2012; MacGregor et al. 2014; Haro 2013). Improvements to some hydroelectric facilities have not alleviated the overall problem (Lake Ontario Committee, Great Lakes Fisheries Commission [LOC/GLFC] 2005; COSEWIC 2012).

REESTABLISHING AMERICAN EEL IN THE LAKE ONTARIO AND CHAMPLAIN WATERSHEDS

Reestablishing the historic contribution of silver eels from the LO and LC watersheds to the international American Eel population requires action on four fronts (in order of feasibility and likely benefits): (1) closure of the fisheries; (2) improved governance; (3) improved up- and downstream passage; and (4) expanded research on unique life history and inherited traits.

The precarious condition of the international American Eel population demands a precautionary approach to eel management, starting with the closure of the fisheries for all life stages in marine, coastal, and freshwaters. This action can be implemented regionally by the ASMFC for U.S. Atlantic coastal waters. U.S. governance and management would be strengthened by listing the species at least as "threatened" under the U.S. Endangered Species Act; this would also promote its inclusion in the Convention on International Trade in Endangered Species, Appendix II. Protections under Canadian and provincial law also need to be strengthened, along with Canada–U.S. binational cooperation in eel management (Engler-Palma et al. 2013). Completion of the above would parallel actions taken for the European Eel (International Council for the Exploration of the Sea ICES 2013). Protection of the Sargasso Sea under the United Nations Convention on the Law of the Sea, which the United States has not yet ratified, would also be beneficial (Trott et al. 2010).

Fisheries management agencies need to aggressively promote substantial improvements in fish passage past artificial barriers in both directions (e.g., Haro 2013). A model by Beak International (2001) indicated that effective upstream migration and improved downstream passage "could confer sub-

Figure 2. Eel mortality during downstream migration caused by hydroelectric turbines on the St. Lawrence River. Photo credit: K. Reid, Ontario Commercial Fisheries Association.

stantial benefits to egg production from LO and SLR eels" (p. 5.9). Improved up and downstream passage will amplify the benefits from closing the fishery. However, even an aggressive campaign to improve eel passage, coupled with closure of the fishery, will take decades to benefit range-wide eel abundance. Yellow eels able to reach suitable upstream habitat, which alone can take several years (COSEWIC 2012), require 7–20 years to mature and migrate back to the Sargasso Sea before they can spawn any new cohorts.

Stocking, a common enhancement tool, is not a desirable alternative to accelerate upstream reestablishment of the American Eel. Stocking may expand the range of *A. crassus*. Further, stocking can alter population genetics and sex ratios. Higher individual heterozygosity in American Eel has been associated with greater size attained during inland maturation (Pujolar et al. 2005; Laflamme et al. 2012). American Eels also have a "globally advantageous allele with spatially variable effects on fitness" (Als et al. 2011; Gagnaire et al. 2012, p. 734). The stocking of the SLR and LO with "bootlace" eels from Nova Scotia resulted in male dominance, as well as accelerated maturity (i.e., "petite matures"), historically atypical for this system (S. LaPan, New York State Department of Environmental Conservation, personal communication, 2011). Stocking could therefore potentially undermine the unique maturation process in the LO and LC watersheds and reduce natural selection during inland migration, introducing less fit eels into historic freshwater habitat and from there into spawning cohorts (COSEWIC 2012).

Finally, there is a pressing need to fill in crucial gaps in the approaches and knowledge that hamper management of the species. Dittman et al. (2010a, 2010b), ASMFC (2012), COSEWIC (2012), Engler-Palma et al. (2013), and Haro (2013) identify crucial research needs concerning eel biology, demography, geography, threats, and the effectiveness of methods to abate or mitigate threats. Haro (2013), for example, specifically addresses potential ways to improve eel up and downstream passage. The depth of existing knowledge, together with ongoing research, could support a rigorous program of adaptive management built on a detailed conceptual model of the American Eel lifecycle, as called for in ecosystem-based approaches to fisheries management (Busch et al. 2003; Curtin and Prellezo 2010). This program should seek to establish numerical abundance (not harvest) goals for eels at various life stages (i.e., glass, yellow, and silver) based on a specific historic reference period (e.g., 1940–1950 or 1970–1980) identified by consensus as having relatively healthy but not necessarily best "historic" levels (Busch et al. 2003). These goals would be the initial targets against which to evaluate and quantify the stresses that are hindering recovery and against which to measure periodic progress. More specific research should address the location of the spawning area and its specific chemical and physical parameters through radio tagging. If this location has identifiable "attractants" for silver eels, those might be used to help guide eels past hydroelectric facilities.

The research agenda should also address the effects that reestablishing American Eel in the LO and LC watersheds could have within their ecosystems. Losses of migratory species caused by river dams often have wide-ranging ecological consequences within the blocked freshwater systems (Freeman et al. 2003); reestablishing these species would likely also have significant ecological consequences. The current ecosystems in LO and LC and their watersheds are vastly different from their historic, native ecosystems (Mills et al. 2003; Marsden and Langdon 2012). Reestablishing native fishes such as the American Eel in these watersheds will result in further evolution of these ecosystems, not the restoration of previous systems. Adaptive management of this process requires research into the potential ecological impacts of their return, in order to provide options for fisheries managers (Marsden et al. 2010; Stewart et al. 2012; Marsden and Langdon 2012).

For example, as noted, yellow eel prey opportunistically on benthic fauna in shallow waters. At 25% of the historic fish biomass across their freshwater range, yellow eels as predators would have strongly shaped the overall freshwater food web wherever they occurred (Christie 1974). Reestablishing yellow eel therefore could affect numerous native and nonnative

benthic species and life stages. Species that prey on yellow eel (Facey and Van Den Avyle 1987; ASMFC 2012) will be affected as well. Finally, the American Eel is the primary larval host species for the Eastern Elliptio (*Elliptio complanata*), an abundant and ecologically important freshwater mussel native to the Atlantic coastal drainages of North America (Vaughn et al. 2008; Lellis et al. 2013). Reestablishing the American Eel in the LO and LC watersheds could therefore affect the abundance of the Eastern Elliptio in these watersheds, with additional cascading effects.

CONCLUSIONS

The life cycle of the American Eel is complex and spans a vast geographic range under many jurisdictions. Effective protection, restoration, and management of this species cannot be accomplished piecemeal (Engler-Palma et al. 2013). As a panmictic species, it requires a high level of coordinated jurisdictional protection throughout its range that currently does not exist.

Protecting eels from harvest by closure of the fisheries should increase the overall number of recruits to every life stage. This should increase the abundance of recruits specifically moving into the SLR basin and help reestablish the American Eel in the LO and LC watersheds. Based on historic records, the growth of large, highly fecund females in the LO and LC watersheds would enhance the egg supply for the entire species. Increasing freshwater habitat and the production of silver eels may also buffer population numbers from the effects of variation in ocean currents and in watershed hydrology in different parts of the species' range. However, it will take many decades to modify the dams and allow population dynamics to play out, even if all recommended actions are carried out with urgency. Similarly, Astrom and Dekker (2007) estimate that it will take 80 years after complete closure of its fisheries to restore European Eel abundance. The potential time lag between actions and full benefits in turn highlights a need for improved methods of American Eel population assessment, to better support adaptive management of the restoration process. At the same time, we caution against stocking as a rapid, high-volume approach for increasing upstream eel numbers and note that the return of the American Eel to its former habitat will likely result in a cascade of additional ecological effects that will also demand careful attention.

ACKNOWLEDGMENTS

We gratefully acknowledge the many helpful comments on drafts of this article received from J. Ellen Marsden (University of Vermont), Alastair Mathers (Ontario Ministry of Natural Resources), Steve LaPan (New York Department of Environmental Conservation), W. Paul Sullivan (Fisheries and Oceans Canada), and Tom Berry (Office of U.S. Senator Patrick Leahy, Vermont). We also appreciate the useful comments provided by two anonymous reviewers and the editor.

REFERENCES

Als, T. D., M. M. Hansen, G. E. Maes, M. Castonguay, L. Riemann, K. Aarestrup, P. Munk, H. Sparholt, R. Hanel, and L. Bernatchez. 2011. All roads lead home: panmixia of European Eel in the Sargasso Sea. Molecular Ecology 20(7):1333–1346.

ASMFC (Atlantic States Marine Fisheries Commission). 2000. Interstate fishery management plan for American Eel. Atlantic States Marine Fisheries Commission, Report 36, Washington, D.C.

———. 2012. American Eel benchmark stock assessment with terms of reference, advisory report, and assessment report. Atlantic States Marine Fisheries Commission, Washington D.C.

———. 2013. Addendum III to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission, Washington, D.C.

Astrom, M., and W. Dekker. 2007. When will the eel recover? A full life-cycle model. ICES Journal of Marine Science 64:1491–1498.

Axelsen, F. 1997. The status of the American Eel (*Anguilla rostrata*) in Quebec. Pages 121–133 *in* R. H. Peterson, editor, The American Eel in eastern Canada: stock status and management strategies. Canadian Technical Report of Fisheries and Aquatic Science No. 2196. Department of Fisheries and Oceans Canada..

Baltazar-Soares, M., A. Biastoch, C. Harrod, R. Hanel, L. Marohn, E. Prigge, D. Evans, K. Bodles, E. Behrens, C. W. Böning, and C. Eizaguirre. 2013. Recruitment collapse and population structure of the European Eel shaped by local ocean current dynamics. Current Biology 24(1):104–108.

Beak International. 2001. The decline of American Eel (*Anguilla rostrata*) in the Lake Ontario/St. Lawrence ecosystem: a modeling approach to identification of data gaps and research priorities. Available: http://www.glfc.org/lakecom/loc/eel.pdf. (April 2009).

Belpaire, C., G. Van Thuyne, S. Callaars, P. Roose, K. Cooreman, and P. Bossier. 1999. Spatial and temporal variation in organochlorine pesticide and polychlorinated biphenyl pollution in fresh water aquatic ecosystems in Flanders using the European Eel (*Anguilla anguilla* L.) as an indicator. International Council for Exploration of the Sea, Working Group on Eel, September 20–25, Silkeborg, Denmark.

Bonhommeau, S., E. Chassot, B. Planque, E. Rivot, A. H. Knap, and O. Le Pape. 2008. Impact of climate on eel populations of the Northern Hemisphere. Marine Ecology Progress Series 373:71–80.

Boyer, C., D. Chaumont, I. Chartier, and A. G. Roy. 2010. Impact of climate change on the hydrology of St. Lawrence tributaries. Journal of Hydrology 384:65–83.

Busch, W. D. N., B. L. Brown, and G. F. Mayer, editors. 2003. Strategic guidance for implementing an ecosystem-based approach to fisheries management. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, Maryland. Available: http://www.st.nmfs.noaa.gov/st7/documents/Guidance_Ecosystem_Approach_Task_Force.pdf. (April 2014).

Calles, O., I. C. Olsson, C. Comoglio, P. S. Kemp, L. Blunden, M. Schmitz, and L. A Greenberg. 2010. Size-dependent mortality of migratory silver eels at a hydropower plant, and implications for escapement to the sea. Freshwater Biology 55:2167–2180.

Casselman, J. M. 2003. Dynamics of resources of the American Eel, *Anguilla rostrata*: declining abundance in the 1990s. Pages 255–274 *in* K. Aida, K. Tsukamoto, and K. Yamauchi, editors. Eel biology. Springer-Verlag, Tokyo.

Christie, W. J. 1974. Changes in the fish species composition of the Great Lakes. Journal of the Fisheries Research Board of Canada 31:827–854.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2012. Assessment and status report on the American Eel *Anguilla rostrata* in Canada. Available: http://publications.gc.ca/collections/collection_2013/ec/CW69-14-458-2012-eng.pdf. (April 2014).

Côte, C. L., P.-A. Gagnaire, V. Bourret, G. Verreault, M. Castonguay, and L. Bernatchez. 2013. Population genetics of the American Eel (*Anguilla rostrata*): $F_{ST} = 0$ and North Atlantic Oscillation effects on demographic fluctuations of a panmictic species. Molecular Ecology 22:1763–1776.

Couillard, C. M., P. V. Hodson, and M. Castonguay. 1997. Correlations between pathological changes and chemical contamination in American Eels, *Anguilla rostrata*, from the St. Lawrence River. Canadian Journal of Fisheries and Aquatic Sciences 54:1916–1927.

Council for Endangered Species Act Reliability. 2010. Petition to list the American Eel (*Anguilla rostrata*) as a threatened species under the Endangered Species Act. Petition submitted to the U.S. Fish and Wildlife Service, Washington, D.C., and Sacramento Field Office, California.

Curtin, R., and R. Prellezo. 2010. Understanding marine ecosystem based management: a literature review. Marine Policy 34(5):821–830.

de Lafontaine, Y., P. Gagnon, and B. Côté. 2010. Abundance and individual size of American Eel (*Anguilla rostrata*) in the St. Lawrence River over the past four decades. Hydrobiologia 647:185–198.

Denoncourt, C. E., and J. R. Stauffer, Jr. 1993. Feeding selectivity of the American Eel Anguilla rostrata (LeSueur) in the Upper Delaware River. American Midland Naturalist 129(2):301–308

DFO (Department of Fisheries and Oceans, Canada). 2010. Status of American Eel and progress on achieving management goals. Science Advisory Report 2010/062. Available: http://www.dfo-mpo.gc.ca/CSAS/Csas/publications/sar-as/2010/2010_062_e.pdf. (April 2014).

Dittman, D. E., L. S. Machut, and J. H. Johnson. 2010a. American Eel history, status, and management options: Lake Champlain drainage. *In* Final report for C005548, comprehensive study of the American Eel, New York State Department of Environmental Conservation, State Wildlife Grant T-3, Albany.

———. 2010b. American Eel history, status, and management options: Lake Ontario/St.

Lawrence River drainage. *In* Final report for C005548, comprehensive study of the American Eel, New York State Department of Environmental Conservation, State Wildlife Grant T-3, Albany.

Durif, C., P. Elie, C. Gosset, J. Rivers, and F. Travade. 2003. Behavioral study of downstream migrating eels by radio-telemetry at a small hydroelectric power plant. Pages 343–356 *in* D. A. Dixon, editor. Biology, management, and protection of catadromous Eels. American Fisheries Society, Symposium 33, Bethesda, Maryland.

Engler-Palma, C., D. L. VanderZwaag, R. Apostle, M. Castonguay, J. J. Dodson, E. Feltes, C. Norchi, and R. White. 2013. Sustaining American Eels: a slippery species for science and governance. Journal of International Wildlife Law & Policy 16(2–3):128–169.

Facey, M. P., and M. J. Van Den Avyle. 1987. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (North America)—American Eel. U.S. Fish and Wildlife Service Biological Report 82(11. 74), U.S. Army Corps of Engineers, TR EL-82-4. US Fish and Wildlife Service, Slidell, Louisiana.

Freeman, M. C., C. M. Pringle, E. A. Greathouse, and B. J. Freeman. 2003. Ecosystem-level consequences of migratory faunal depletion caused by dams. American Fisheries Society Symposium 35:255–266.

Gagnaire, P. A., E. Normandeau, C. Côté, M. Moller Hansen, and L. Bernatchez. 2012. The genetic consequences of spatially varying selection in the panmictic American Eel (*Anguilla rostrata*). Genetics 190(2):725–736.

Haro, A., editor. 2013. Proceedings of a workshop on American Eel passage technologies convened by the Atlantic States Marine Fisheries Commission March 30–31, 2011, Gloucester, Massachusetts. Atlantic States Marine Fisheries Commission, Special Report No. 90, Arlington, Virginia. Available: http://www.asmfc.org/species/american-eel. (January 2014).

Haro, A., W. Richkus, K. Whalen, A. Hoar, W. D. Busch, S. Lary, T. Brush, and D. Dixon. 2000. Population decline of the American Eel: implications for research and management. Fisheries 25(9):7–16.

Hitt, N. P., S. Eyler, and J. E. B. Wofford. 2012. Dam removal increases American Eel abundance in distant headwater streams. Transactions of the American Fisheries Society 141:1171–1179.

ICES (International Council for the Exploration of the Sea). 2013. Widely distributed and migratory stocks, European Eel, advice for 2014. Available: http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/2013/eel-eur.pdf. (January 2014).

Jansen, H. M., H. V. Winter, M. C. M. Bruijs, and H. J. G. Polman. 2007. Just go with the flow? Route selection and mortality during downstream migration of silver eels in relation to river discharge. ICES Journal of Marine Science 64:1437–1443.

Kennedy, C. R. 2007. The pathogenic helminth parasites of eels. Journal of Fish Diseases 30(6):319–334.

Knights, B. 2003. A review of the possible impacts of long-term oceanic and climate changes and fishing mortality on recruitment of anguillid eels of the Northern Hemisphere. The Science of the Total Environment 310:237–244.

Laflamme, S., C. Côté, P. A. Gagnaire, M. Castonguay, and L. Bernatchez. 2012. RNA/DNA ratios in American Glass Eels (*Anguilla rostrata*): evidence for latitudinal variation in physiological status and constraints to oceanic migration? Ecology and Evolution 2:875–884.

Lellis, W. A., B. S. White, J. C. Cole, C. S. Johnson, J. L. Devers, E. V. S. Gray, and H. S. Galbraith. 2013. Newly documented host fishes for the Eastern Elliptio Mussel *Elliptio complanata*. Journal of Fish and Wildlife Management 4(1):75–85.

LOC/GLFC (Lake Ontario Committee, Great Lakes Fisheries Commission). 2005. Technical workshop aimed at investigating methods for providing safe downstream passage for the American Eel (*Anguilla rostrata*) past hydroelectric facilities on the St. Lawrence River. Great Lakes Fishery Commission, Ann Arbor, Michigan. Available: http://www.glfc.org/lakecom/loc/whp/workshopinfo.pdf. (March 2012).

MacGregor, R., J. M. Casselman, W. A. Allen, T. Haxton, J. M. Dettmers, A. Mathers, S. LaPan, T. C. Pratt, P. Thompson, M. Stanfield, L. Marcogliese, and J.-D. Dutil. 2009. Natural heritage, anthropogenic impacts, and biopolitical issues related to the status and sustainable management of American Eel: a retrospective analysis and management perspective at the population level. Pages 713–740 *in* A. Haro, K. L. Smith, R. A. Rulifson, C. M. Moffitt, R. J. Klauda, M. J. Dadswell, R. A. Cunjak, J. E. Cooper, K. L. Beal, and T. S. Avery, editors. Challenges for diadromous fishes in a dynamic global environment. American Fisheries Society, Symposium 69, Bethesda, Maryland.

MacGregor, R., J. Casselman, L. Greig, W. A. Allen, L. McDermott, and T. Haxton. 2010. DRAFT recovery strategy for the American Eel (*Anguilla rostrata*) in Ontario. Ontario Recovery Strategy Series. Prepared for Ontario Ministry of Natural Resources, Peterborough, Ontario.

MacGregor, R., T. Haxton, L. Greig, J. M. Casselman, J. M. Dettmers, W. A. Allen, D. G. Oliver, and L. McDermott. 2014. The demise of American Eel in the Upper St. Lawrence River, Lake Ontario, Ottawa River and associated watersheds: implications of regional cumulative effects. Pages 1–25 *in* N. Fisher, editor. Fish habitat management. American Fisheries Society, Symposium 78, Bethesda, Maryland.

MacGregor, R., A. Mathers, P. Thompson, J. H. Casselman, J. M. Dettmers, S. LaPan, T. C. Pratt, and B. Allen. 2008. Declines of American Eel in North America: complexities associated with bi-national management. Pages 357–381 *in* M. G. Schechter, W. W. Taylor, and N. J. Leonard, editors. International governance of fisheries ecosystems: learning from the past, finding solutions for the future. American Fisheries Society, Bethesda, Maryland.

Marsden, J. E., B. D. Chipman, B. Pientka, W. F. Schoch, and B. A. Young. 2010. Strategic plan for Lake Champlain fisheries. Great Lakes Fishery Commission Miscellaneous Publication 2010-03. Great Lakes Fishery Commission, Ann Arbor, Michigan.

Marsden, J. E., and R. W. Langdon. 2012. The history and future of Lake Champlain's fishes and fisheries. Journal of Great Lakes Research 38:19–34.

Mills, E. L., J. M. Casselman, R. Dermott, J. D. Fitzsimons, G. Gal, K. T. Holeck, J. A. Hoyle, O. E. Johannsson, B. F. Lantry, J. C. Makarewicz, E. S. Millard, I. F. Munawar, M. Munawar, R. O'Gorman, R. W. Owens, L. G. Rudstam, T. Schaner, and T. J. Stewart. 2003. Lake Ontario: food web dynamics in a changing ecosystem (1970–2000). Canadian Journal of Fisheries and Aquatic Sciences 60:471–490.

Nimeth, K., P. Zwerger, J. Wurtz, W. Salvenmoser, and B. Helster. 2000. Infection of the glass eel swimbladder with the nematode *Anguillicola crassus*. Parasitology 121:75–83.

Oliveira, K. 1999. Life history characteristics and strategies of the American Eel, *Anguilla rostrata*. Canadian Journal of Fisheries and Aquatic Sciences 56:795–802.

OMNR (Ontario Ministry of Natural Resources). 2007. American Eel in Ontario. Great Lakes Fishery Commission, Ann Arbor, Michigan.

———. 2012. Lake Ontario fish communities and fisheries: 2011. Annual report of the Lake Ontario Management Unit. Ontario Ministry of Natural Resources, Picton, Ontario, Canada.

Pujolar, J. M., G. E. Maes, C. Vancoillie, and F. A. Volckaert. 2005. Growth rate correlates to individual heterozygosity in the European Eel, *Anguilla anguilla* L. Evolution 59:189–199.

Ringuet, S., F. Muto, and C. Raymakers. 2002. Eels: their harvest and trade in Europe and Asia. TRAFFIC Bulletin 19(2):2–27.

Schmidt, R. E., C. M. O'Reilly, and D. Miller. 2009. Observations of American Eels using an upland passage facility and effects of passage on the population structure. North American Journal of Fisheries Management 29:715–720.

Sokolwski, M. S., and A. D. M. Dove. 2006. Histopathological examination of wild American Eels infected with *Anguillicola crassus*. Journal of Aquatic Animal Health 18:257–262.

Stewart, T. J., A. Todd, and S. LaPan. 2012. Fish community objectives for Lake Ontario. Public Consultation Draft. Great Lakes Fishery Commission, Special Publication. Great Lakes Fishery Commission, Ann Arbor, Michigan.

Trott, T. M., S. A. Mckenna, J. M. Pitt, A, Hemphill, F. W. Ming, P. Rouja, K. M. Gjerde, B. Causey, and S. A. Earle. 2010. Efforts to enhance protection of the Sargasso Sea. Pages 282–288 *in* Proceedings of the Gulf and Caribbean Fisheries Institute. Vol. 63. Gulf and Caribbean Fisheries Institute, Fort Pierce, Florida.

USFWS (U.S. Fish and Wildlife Service). 2011. 90-Day finding on a petition to list the American Eel as threatened. Federal Register 50:17. September 29, 2011, Volume 76, Number 189.

Vaughn, C. C., S. J. Nichols, and D. E. Spooner. 2008. Community and foodweb ecology of freshwater mussels. Journal of the North American Benthological Society 27:409–423.

Verdon, R., and J. Caumartin. 2006. Fish migration and river navigation—Chambly Dam, Canada. IEA Hydropower Implementing Agreement Annex VIII Hydropower Good Practices: environmental mitigation measures and benefits case study 03-04. New Energy Foundation, Japan.

Verdon, R., D. Desrochers, and P. Dumont. 2003. Recruitment of American Eels in the Richelieu River and Lake Champlain: provision of upstream passage as a regional-scale solution to a large-scale problem. Pages 125–138 *in* D. A. Dixon, editor. Biology, management, and protection of catadromous Eels. American Fisheries Society, Symposium 33, Bethesda, Maryland.

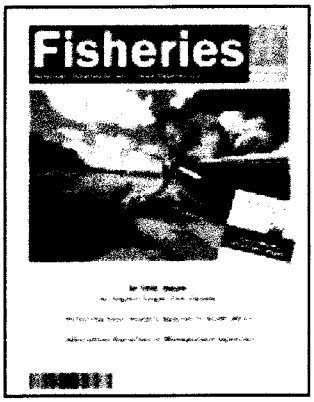
Verreault, G., P. Dumont, and Y. Mailhot. 2004. Habitat losses and anthropogenic barriers as a cause of population decline for American Eel (*Anguilla rostrata*) in the St. Lawrence watershed, Canada. International Council for Exploration of the Sea (ICES) CM 2004/S: 04, September 22–25, Vigo, Spain.

Verreault, G., M. Mingelbier, and P. Dumont. 2012. Spawning migration of American Eel *Anguilla rostrata* from pristine (1843–1872) to contemporary (1963–1990) periods in the St Lawrence Estuary, Canada. Journal of Fish Biology 81:387–407.

Zhu, X., Y. Zhao, A. Mathers, and L. D. Corkum. 2013. Length Frequency Age Estimations of American Eel Recruitment to the Upper St. Lawrence River and Lake Ontario. Transactions of the American Fisheries Society 142:333–344.

RELATED AFS POLICY:

AFS Policies #10 on "Protection of Threatened and Endangered Species," #15 on "Introductions of Aquatic Species," #19 on "Introduction of Threatened and Endangered Species," and #27 on "Conservation of Imperiled Species and Reauthorization of the Endangered Species Act." Although eels are not yet listed under the Endangered Species Act, our related policies do offer usual perspectives.



Fisheries
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/ufsh20

A Case for Accelerated Reestablishment of American Eel in the Lake Ontario and Champlain Watersheds

Wolf-Dieter N. Busch[a] & David P. Braun[b]
[a] Ecosystem Initiatives Advisory Services, 1705 Angelina Ct., Crownsville, MD 21032-1935. E-mail:
[b] Sound Science, LLC, New York, NY
Published online: 07 Jul 2014.

To cite this article: Wolf-Dieter N. Busch & David P. Braun (2014) A Case for Accelerated Reestablishment of American Eel in the Lake Ontario and Champlain Watersheds, Fisheries, 39:7, 298-304, DOI: 10.1080/03632415.2014.923769

To link to this article: http://dx.doi.org/10.1080/03632415.2014.923769

A Case for Accelerated Reestablishment of American Eel in the Lake Ontario and Champlain Watersheds

Wolf-Dieter N. Busch*

Ecosystem Initiatives Advisory Services, 1705 Angelina Ct., Crownsville, MD 21032-1935. E-mail: wolfnbusch@gmail.com

David P. Braun

Sound Science, LLC, New York, NY

ABSTRACT: *The catadromous, panmictic American Eel (*Anguilla rostrata*) historically comprised nearly 25% of fish biomass in Atlantic coastal streams, supporting sizeable fisheries for centuries. However, the population has collapsed in its primary range. It is now proposed or listed as "endangered" by various North American governments, with its fisheries declared "depleted" along the U.S. Atlantic coast. The causes of decline include fragmented governance, loss of physical access to and/or degraded quality of freshwater habitats, lethal entrainment in hydroelectric turbines, changes in marine currents, and excessive harvest. Large gaps exist in knowledge of species biology and the effectiveness of management approaches. Prior to the collapse of eel production, the Lake Ontario and Champlain watersheds of the St. Lawrence River basin produced abundant, large, highly fecund female eels that contributed disproportionately to species-wide reproduction. Abatement of key threats specifically across these two particular watersheds therefore could contribute significantly to range-wide recovery from Greenland to Venezuela.*

Un caso de restablecimiento acelerado de la anguila americana (*Anguilla rostrata*) en el Lago Ontario y en la cuenca hidrográfica Champlain

RESUMEN: *la anguila americana (*Anguilla rostrata*) se considera una especie catádroma y panmíctica e históricamente ha constituido cerca del 25% de la biomasa de peces en los ríos costeros de Norte América, soportando durante siglos importantes pesquerías. Sin embargo, la población ha colapsado a lo largo de su rango principal de distribución. Actualmente, la especie se ha propuesto o bien listado como "en peligro" por varios gobiernos de Norte América, cuyas pesquerías se han declarado agotadas a lo largo de la costa atlántica de los EEUU. Las causas de la reducción incluyen la fragmentación de la gobernanza, pérdida del acceso físico hacia y/o degradación de la calidad de los hábitats dulceacuícolas, arrastre letal hacia turbinas hidroeléctricas, cambios en las corrientes marinas y extracción excesiva. Existen grandes huecos de conocimiento en cuanto a la biología de la especie y la efectividad de los enfoques de manejo. Antes del colapso en la producción de anguila, en el lago Ontario y en la cuenca hidrológica Champlain del río San Lorenzo se producían cantidad de hembras de anguila grandes y fecundas que contribuían de forma desproporcionada a la reproducción de la especie en todo su rango. Por lo tanto, la disminución de amenazas clave en estas dos cuencas en particular, puede contribuir importantemente a la recuperación de la especie en todo su rango de distribución, desde Groenlandia hasta Venezuela.*

INTRODUCTION

The American Eel (*Anguilla rostrata*), a catadromous species, spawns in the Sargasso Sea but spends most of its life in freshwater or estuaries. It has suffered large population declines along the North American coast, the most productive grow-out area within its historic range from Greenland to Venezuela. Historically, it comprised as much as 25% of the fish biomass in coastal streams (Atlantic States Marine Fisheries Commission [ASMFC] 2000) but now comprises <1% with recruitment <1% of pre-1980 levels (ASMFC 2012; Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2012; MacGregor et al. 2014). This decline parallels that of the European Eel (*Anguilla anguilla*) with its current recruitment at 1%–5% of pre-1980 levels (ICES 2013). These declines threaten vast culturally and economically important fisheries in Canada, the United States, and Europe (Ringuet et al. 2002; Astrom and Dekker 2007; MacGregor et al. 2009, 2014; Engler-Palma et al. 2013).

Protection and restoration of the American Eel require urgent action on several fronts. Its large range includes 10,000 km of mainland shoreline spanning many jurisdictions. Greater institutional cooperation and improved governance therefore are crucial to abating threats within freshwaters and coastal zones (Engler-Palma et al. 2013; MacGregor et al. 2014). These threats include artificial barriers to upstream passage in river systems where eels historically reside most of their lives, chemical pollution of river systems and nearshore waters, disease, overharvest, and high mortality rates during downstream migration through hydroelectric turbines (Ontario Ministry of Natural Resources [OMNR] 2007; Council for Endangered Species Act Reliability 2010; U.S. Fish and Wildlife Service 2011;

* Former Chief of Lower Great Lakes (Erie and Ontario) Fisheries Program, Fish and Wildlife Service, U.S. Department of the Interior and former Director of the Interstate Fisheries Management Program, Atlantic States Marine Fisheries Commission, Washington, D.C.

ASMFC 2012; COSEWIC 2012; Hitt et al. 2012; MacGregor et al. 2014).

Additional emerging challenges include changes in ocean circulation (e.g., Knights 2003; Bonhommeau et al. 2008; Baltazar-Soares et al. 2013); a lack of identification and protection of marine migration routes and spawning habitat (e.g., Trott et al. 2010; Engler-Palma et al. 2013); changes in watershed discharge and temperature regimes (e.g., Boyer et al. 2010; de Lafontaine et al. 2010; Verreault et al. 2012); and altered predation by other species (Engler-Palma et al. 2013). These emerging concerns are outside the scope of this article.

We focus on two critically important management actions: (1) restoration of the eel population to the Lake Ontario and Lake Champlain (LO, LC) watersheds, part of the St. Lawrence River (SLR) basin of Canada and the United States; and (2) the closure of all American Eel fisheries. The LO and LC watersheds historically constituted "the single largest freshwater rearing habitats for the American Eel within its geographic range" (COSEWIC 2012, p. 14). They grew very large, highly fecund female eels that contributed 26%–49% of the entire American Eel egg production (COSEWIC 2012). This contribution has collapsed by 93%–98% since 1980 (COSEWIC 2012). Given their historic contributions, reestablishing American Eel in these watersheds could contribute significantly to species recovery overall (MacGregor et al. 2014).

We briefly review the state of knowledge concerning American Eel in general, the reasons for its decline in the LO and LC watersheds, and the potential challenges of reestablishing the species in these two watersheds. We cite only a small fraction of the deep literature on these topics. Dittman et al. (2010a, 2010b), ASMFC (2012), COSEWIC (2012), MacGregor et al. (2014), and Engler-Palma et al. (2013) provide detailed bibliographies. Our purpose is not merely to review the situation but to advocate for an aggressive approach to reestablishment, because it will take decades to improve governance and for closure of the fisheries and other key conservation actions to produce their intended benefits.

AMERICAN EEL LIFE HISTORY, THREATS, AND STATUS

American and European Eels spawn in adjacent areas of the Sargasso Sea, western North Atlantic, and are panmictic; that is, spawners from across the entire range of each species mix together (Als et al. 2011; Côte et al. 2013). Different ocean currents carry their transparent larvae ("leptocephali") west and east to their respective continental shelves (COSEWIC 2012; Baltazar-Soares et al. 2013). The U.S. southeastern Atlantic coast may be the historic geographic center of landfall for the American Eel (MacGregor et al. 2008). Local density and other factors affect their sexual differentiation following landfall, resulting in much higher proportions of females, as high as 95%, across the northern part of their range (Oliviera 1999; COSEWIC 2012).

Numerous publications (e.g., ASMFC 2012; COSEWIC 2012) describe the life history of the American Eel. The leptocephali grow to 5–6 cm over the course of 6–12 months as they approach the coast and metamorphose into transparent "glass" eels. Entering brackish and fresh waters, they develop pigmentation at less than 10 cm and become "elvers," which in turn grow into "yellow" eels, usually by age 2 at 10–13 cm. Most yellow eels then migrate further into estuaries and upstream into freshwater systems as far as natural and artificial barriers allow. This upstream movement may take several years, averaging 6 years to reach the upper SLR (COSEWIC 2012). Yellow eels occupy a wide range of habitats, including rivers, streams, lakes, and wetlands to depths of ~10 m (e.g., COSEWIC 2012). They burrow and forage in the substrate and consume aquatic insects, crayfish, and small fish—apparently opportunistically, although they may select among insect prey (e.g., Facey and Van Avyle 1987; Denoncourt and Stauffer 1993). Over the next 7–20 years they grow to over 1 m in length (females larger) and gain more than 1.5 kg (Casselman 2003; COSEWIC 2012). At maturity they become "silver" eels, changing several aspects of coloration and morphology; migrate back downstream; and follow ocean currents back to the Sargasso Sea to spawn and die (ASMFC 2012; COSEWIC 2012).

Their complex life cycle and vast geographic range make eels susceptible to numerous stresses. Smaller (<10 cm) American Eels are competent, tenacious climbers on damp surfaces (e.g., Facey and Van Den Avyle 1987; Haro et al. 2000; Verdon et al. 2003; Schmidt et al. 2009), but dams nevertheless hinder their reaching an estimated 84% of their historic North American freshwater habitats (ASMFC 2000). Dams > 2.5 m are thought to pose significant barriers to upstream movement (e.g., Verreault et al. 2004). Hydroelectric dams can present a double threat, blocking upstream passage and causing mortality during downstream migration (ASMFC 2012; COSEWIC 2012; Haro 2013; MacGregor et al. 2014).

Infection by an exotic East Asian swimbladder nematode, *Anguillicola crassus* (aka *Anguillicoloides crassus*), poses an increasing threat (e.g., COSEWIC 2012). Infections by *A. crassus* can occur in most life stages including glass eels (Nimeth et al. 2000), impairing swim bladder function, buoyancy, growth, and overall health (Sokolwski and Dove 2006; Kennedy 2007). Infected eels have appeared as far north as LO, likely from stocking of infected individuals (S. LaPan, New York State Department of Environmental Conservation, personal communication, 2011; OMNR 2012). Exposure to chemical contaminants also may lower survival (Couillard et al. 1997; Belpaire et al. 1999; Dittman et al. 2010a, 2010b; COSEWIC 2012).

American Eel abundance has declined range-wide (Department of Fisheries and Oceans, Canada [DFO] 2010; Dittman et al. 2010a, 2010b; ASMFC 2012; COSEWIC 2012; MacGregor et al. 2014). After fluctuating widely during the first two-thirds of the 20th century, landings rose into the late 1970s before declining consistently and severely to the present. Landing rates reflect not only abundance but market demand and other factors. However, direct measurements of eel demography, crucial

to evaluating the effects of specific stresses and management actions, face unique challenges (de Lafontaine et al. 2010; Engler-Palma et al. 2013; Zhu et al. 2013). ASMFC (2012) and COSEWIC (2012) use several types of data from numerous locations and apply several standardization methods to present the most complete demographic summaries available.

The post-1980 decline in American Eel abundance has prompted repeated petitions for the United States to list it as "threatened or endangered" nationally (U.S. Fish and Wildlife Service 2011), but no decision has been released. Canada is considering classifying it as "threatened" nationally (COSEWIC 2012); and the Provinces of Ontario, Quebec, Newfoundland, and Labrador have classified or are considering classifying it as threatened, vulnerable, or endangered under provincial law (Engler-Palma et al. 2013). Canada has set a goal to reduce eel mortality from all sources by 50% relative to the 1997–2002 average, as a first step toward rebuilding overall abundance (DFO 2010). The United States has not yet set goals for restoration but has implemented measures to reduce harvest of elvers, yellow, and silver eels (ASMFC 2013; Engler-Palma et al. 2013). Concurrently, demand and market prices for glass eels for export have reached all-time highs, and market prices for yellow and silver eel are similarly high (ASMFC 2012; COSEWIC 2012).

AMERICAN EEL IN THE LAKE ONTARIO AND CHAMPLAIN WATERSHEDS

The single strongest factor in the 93%–98% decline in escapement from the LO and LC watersheds appears to be dams that block or limit yellow eel migration to large portions of their historic habitat, some of which also cause mortality among silver eel as they attempt to migrate back to the ocean (ASMFC 2012; COSEWIC 2012; MacGregor et al. 2014). A radical decline in the numbers of yellow eel even attempting to migrate upstream into these watersheds in recent decades (see below) appears to be due to poor recruitment of spawning adults across the entire species range but not a cause of the post-1980 decline in escapements from these watersheds (de Lafontaine et al. 2010).

Reports on the effects of dams on eel distributions in the LO and LC watersheds differ between Canada and the United States in the ways these effects are calculated but present the same general picture. Figure 1 presents the locations of dams >15 m high on the U.S. tributaries to LO and LC and adjacent portions of the SLR basin (Dittman et al. 2010a, 2010b). Dittman et al. (2010a, 2010b) estimate that dams have reduced the overall extent of accessible tributary habitat in the U.S. portions of the LO and LC watersheds by nearly 77% and 40%, respectively. Eel habitat in the Province of Ontario historically consisted largely of the watersheds of LO and the Ottawa River. Maps presented by MacGregor et al. (2010) show an approximately 70% reduction in the total extent of eel distribution across the Province and an approximately 80% reduction in tributary extent (excluding Lake Ontario). These maps also show a much greater density of dams in the LO watershed within the province, suggesting that its losses may be proportionally greater. (These maps address losses in terms of watershed area, within which only water <10 m deep would have provided actual habitat; Verreault et al. 2004, 2012.)

Eel abundance in the LO watershed declined as tributary dams proliferated during the nineteenth to mid-twentieth century (Dittman et al. 2010b; MacGregor et al. 2010, 2014; COSEWIC 2012). However, the largest decline appears to have followed changes at two sites on the SLR downstream from LO: modifications to the hydroelectric station at Beauharnois, Quebec, first completed in 1932, and completion of the Moses-Saunders Power Dam in 1958 at Cornwall, Ontario, and Massena, New York (de Lafontaine et al. 2010; Dittman et al. 2010b; MacGregor et al. 2010; COSEWIC 2012).

Eel ladders have operated on the Canadian side of Moses-Saunders since 1974, on the U.S. side since 2006, and at Beauharnois since 1998 (Dittman et al. 2010b; MacGregor et al. 2010). Nevertheless, counts of upstream passage remain extremely low. COSEWIC (2012) estimates that, even with the additional ladder on the U.S. side, upstream movement past Moses-Saunders remains at only ~3% the rate observed in the early 1980s.

The LC watershed flows into the SLR through the Richelieu River, site of a historically robust eel fishery (Verdon et al. 2003). The decline of this fishery also followed proliferation of tributary dams during the nineteenth to mid-twentieth century (Verdon and Caumartin 2006; Dittman et al. 2010a). However, modifications to the Saint-Ours and Chambly dams on the Richelieu River between 1965 and 1969 blocked further upstream migration into the entire watershed. Eels that had migrated upstream prior to that date continued to mature and depart, sustaining the Richelieu silver eel fishery even after the changes to the dams, but landings began to decline in the 1980s and the fishery closed in 1998 (Axelson 1997; Verdon et al. 2003; Dittman et al. 2010a). Eel ladders were added to Chambly in 1998 and to Saint-Ours in 2001 (Dittman et al. 2010a). However, their benefits have resisted quantification. A significant fraction of the eels passing up the ladders have been individuals previously stocked upstream that had moved downstream through the facilities before heading back up again (DFO 2010). Neither dam generates hydroelectric power (Verdon and Caumartin 2006) and so lack turbines to harm silver eels migrating downstream.

Experimental programs stocked nearly 3 million elvers above Chambly and Saint-Ours during 2005–2008 and roughly 4 million into LO during 2006–2010 (COSEWIC 2012). Although screened for *A. crassus*, some infected individuals escaped detection (S. LaPan, New York State Department of Environmental Conservation, personal communication, 2011; OMNR 2012). Both programs are now suspended, for reasons we discuss further below.

Both watersheds have numerous hydroelectric dams, including Moses-Saunders and Beauharnois (Figure 1; Dittman et al. 2010a, 2010b; MacGregor et al. 2010). Silver eels experience significant injury and mortality during downstream passage through hydroelectric turbines (Figure 2), with annual mortality typically 10%–60% per dam but approaching 100% at some dams (Durif et al. 2003; Verreault et al. 2004; DFO

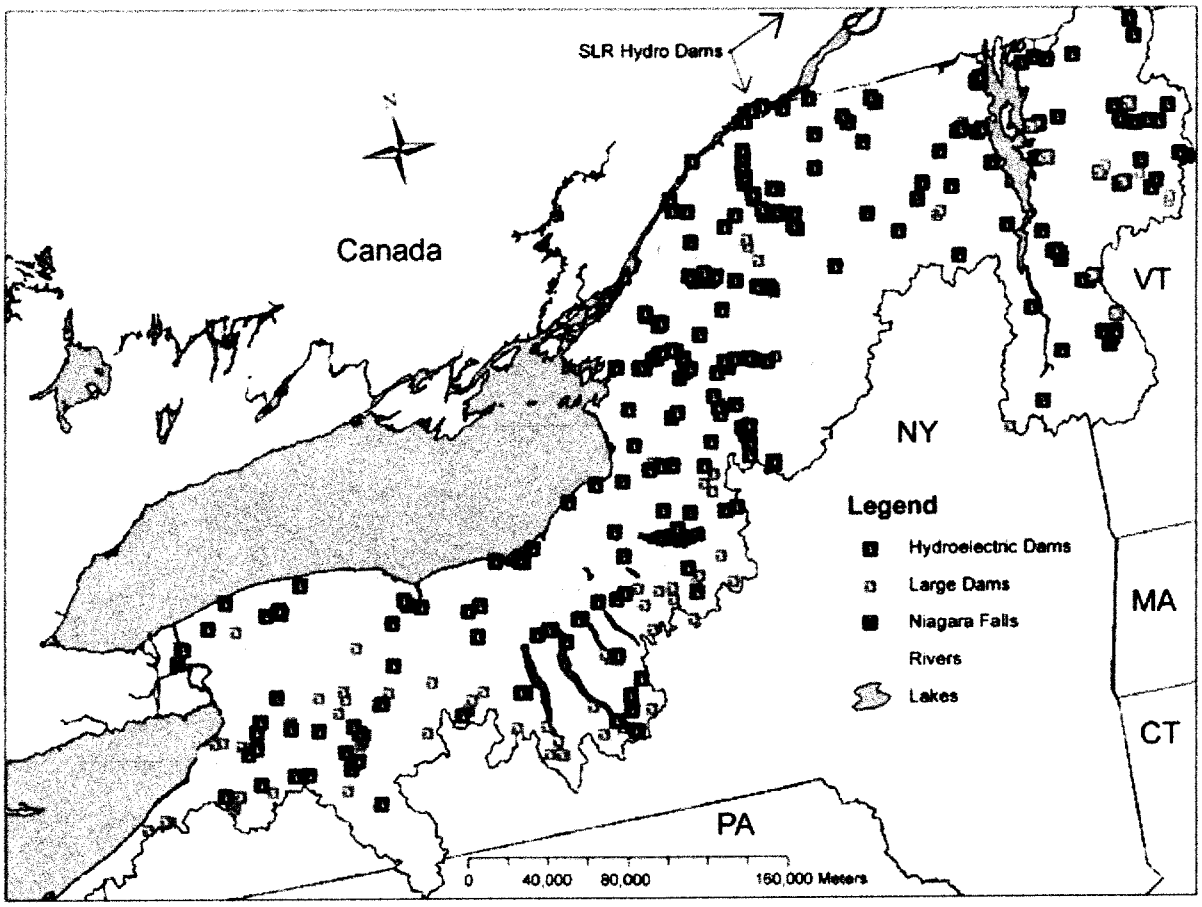


Figure 1. Hydroelectric power and other large (>15 m) dams on the U.S. tributaries of Lakes Ontario and Champlain. Map provided by D. Dittman and M. Chalupnicki, United States Geological Survey.

2010; ASMFC 2012; COSEWIC 2012; MacGregor et al. 2014). Impacts are cumulative, with Moses-Saunders and Beauharnois affecting the escapement of the entire LO watershed. COSEWIC (2012) estimates that hydroelectric dams cause 75% of all anthropogenic eel mortality in Canadian waters and reduce silver eel escapement by at least 40%. Injury and mortality rates vary with water flow (Jansen et al. 2007) and size, type, and design features of hydro-production facility and are greater for larger eels (Calles et al. 2010; ASMFC 2012; COSEWIC 2012; MacGregor et al. 2014; Haro 2013). Improvements to some hydroelectric facilities have not alleviated the overall problem (Lake Ontario Committee, Great Lakes Fisheries Commission [LOC/GLFC] 2005; COSEWIC 2012).

REESTABLISHING AMERICAN EEL IN THE LAKE ONTARIO AND CHAMPLAIN WATERSHEDS

Reestablishing the historic contribution of silver eels from the LO and LC watersheds to the international American Eel population requires action on four fronts (in order of feasibility and likely benefits): (1) closure of the fisheries; (2) improved governance; (3) improved up- and downstream passage; and (4) expanded research on unique life history and inherited traits.

The precarious condition of the international American Eel population demands a precautionary approach to eel management, starting with the closure of the fisheries for all life stages in marine, coastal, and freshwaters. This action can be implemented regionally by the ASMFC for U.S. Atlantic coastal waters. U.S. governance and management would be strengthened by listing the species at least as "threatened" under the U.S. Endangered Species Act; this would also promote its inclusion in the Convention on International Trade in Endangered Species, Appendix II. Protections under Canadian and provincial law also need to be strengthened, along with Canada–U.S. binational cooperation in eel management (Engler-Palma et al. 2013). Completion of the above would parallel actions taken for the European Eel (International Council for the Exploration of the Sea ICES 2013). Protection of the Sargasso Sea under the United Nations Convention on the Law of the Sea, which the United States has not yet ratified, would also be beneficial (Trott et al. 2010).

Fisheries management agencies need to aggressively promote substantial improvements in fish passage past artificial barriers in both directions (e.g., Haro 2013). A model by Beak International (2001) indicated that effective upstream migration and improved downstream passage "could confer sub-

Figure 2. Eel mortality during downstream migration caused by hydroelectric turbines on the St. Lawrence River. Photo credit: K. Reid, Ontario Commercial Fisheries Association.

stantial benefits to egg production from LO and SLR eels" (p. 5.9). Improved up and downstream passage will amplify the benefits from closing the fishery. However, even an aggressive campaign to improve eel passage, coupled with closure of the fishery, will take decades to benefit range-wide eel abundance. Yellow eels able to reach suitable upstream habitat, which alone can take several years (COSEWIC 2012), require 7–20 years to mature and migrate back to the Sargasso Sea before they can spawn any new cohorts.

Stocking, a common enhancement tool, is not a desirable alternative to accelerate upstream reestablishment of the American Eel. Stocking may expand the range of *A. crassus*. Further, stocking can alter population genetics and sex ratios. Higher individual heterozygosity in American Eel has been associated with greater size attained during inland maturation (Pujolar et al. 2005; Laflamme et al. 2012). American Eels also have a "globally advantageous allele with spatially variable effects on fitness" (Als et al. 2011; Gagnaire et al. 2012, p. 734). The stocking of the SLR and LO with "bootlace" eels from Nova Scotia resulted in male dominance, as well as accelerated maturity (i.e., "petite matures"), historically atypical for this system (S. LaPan, New York State Department of Environmental Conservation, personal communication, 2011). Stocking could therefore potentially undermine the unique maturation process in the LO and LC watersheds and reduce natural selection during inland migration, introducing less fit eels into historic freshwater habitat and from there into spawning cohorts (COSEWIC 2012).

Finally, there is a pressing need to fill in crucial gaps in the approaches and knowledge that hamper management of the species. Dittman et al. (2010a, 2010b), ASMFC (2012), COSEWIC (2012), Engler-Palma et al. (2013), and Haro (2013) identify crucial research needs concerning eel biology, demography, geography, threats, and the effectiveness of methods to abate or mitigate threats. Haro (2013), for example, specifically addresses potential ways to improve eel up and downstream passage. The depth of existing knowledge, together with ongoing research, could support a rigorous program of adaptive management built on a detailed conceptual model of the American Eel lifecycle, as called for in ecosystem-based approaches to fisheries management (Busch et al. 2003; Curtin and Prellezo 2010). This program should seek to establish numerical abundance (not harvest) goals for eels at various life stages (i.e., glass, yellow, and silver) based on a specific historic reference period (e.g., 1940–1950 or 1970–1980) identified by consensus as having relatively healthy but not necessarily best "historic" levels (Busch et al. 2003). These goals would be the initial targets against which to evaluate and quantify the stresses that are hindering recovery and against which to measure periodic progress. More specific research should address the location of the spawning area and its specific chemical and physical parameters through radio tagging. If this location has identifiable "attractants" for silver eels, those might be used to help guide eels past hydroelectric facilities.

The research agenda should also address the effects that reestablishing American Eel in the LO and LC watersheds could have within their ecosystems. Losses of migratory species caused by river dams often have wide-ranging ecological consequences within the blocked freshwater systems (Freeman et al. 2003); reestablishing these species would likely also have significant ecological consequences. The current ecosystems in LO and LC and their watersheds are vastly different from their historic, native ecosystems (Mills et al. 2003; Marsden and Langdon 2012). Reestablishing native fishes such as the American Eel in these watersheds will result in further evolution of these ecosystems, not the restoration of previous systems. Adaptive management of this process requires research into the potential ecological impacts of their return, in order to provide options for fisheries managers (Marsden et al. 2010; Stewart et al. 2012; Marsden and Langdon 2012).

For example, as noted, yellow eel prey opportunistically on benthic fauna in shallow waters. At 25% of the historic fish biomass across their freshwater range, yellow eels as predators would have strongly shaped the overall freshwater food web wherever they occurred (Christie 1974). Reestablishing yellow eel therefore could affect numerous native and nonnative

benthic species and life stages. Species that prey on yellow eel (Facey and Van Den Avyle 1987; ASMFC 2012) will be affected as well. Finally, the American Eel is the primary larval host species for the Eastern Elliptio (*Elliptio complanata*), an abundant and ecologically important freshwater mussel native to the Atlantic coastal drainages of North America (Vaughn et al. 2008; Lellis et al. 2013). Reestablishing the American Eel in the LO and LC watersheds could therefore affect the abundance of the Eastern Elliptio in these watersheds, with additional cascading effects.

CONCLUSIONS

The life cycle of the American Eel is complex and spans a vast geographic range under many jurisdictions. Effective protection, restoration, and management of this species cannot be accomplished piecemeal (Engler-Palma et al. 2013). As a panmictic species, it requires a high level of coordinated jurisdictional protection throughout its range that currently does not exist.

Protecting eels from harvest by closure of the fisheries should increase the overall number of recruits to every life stage. This should increase the abundance of recruits specifically moving into the SLR basin and help reestablish the American Eel in the LO and LC watersheds. Based on historic records, the growth of large, highly fecund females in the LO and LC watersheds would enhance the egg supply for the entire species. Increasing freshwater habitat and the production of silver eels may also buffer population numbers from the effects of variation in ocean currents and in watershed hydrology in different parts of the species' range. However, it will take many decades to modify the dams and allow population dynamics to play out, even if all recommended actions are carried out with urgency. Similarly, Astrom and Dekker (2007) estimate that it will take 80 years after complete closure of its fisheries to restore European Eel abundance. The potential time lag between actions and full benefits in turn highlights a need for improved methods of American Eel population assessment, to better support adaptive management of the restoration process. At the same time, we caution against stocking as a rapid, high-volume approach for increasing upstream eel numbers and note that the return of the American Eel to its former habitat will likely result in a cascade of additional ecological effects that will also demand careful attention.

ACKNOWLEDGMENTS

We gratefully acknowledge the many helpful comments on drafts of this article received from J. Ellen Marsden (University of Vermont), Alastair Mathers (Ontario Ministry of Natural Resources), Steve LaPan (New York Department of Environmental Conservation), W. Paul Sullivan (Fisheries and Oceans Canada), and Tom Berry (Office of U.S. Senator Patrick Leahy, Vermont). We also appreciate the useful comments provided by two anonymous reviewers and the editor.

REFERENCES

Als, T. D., M. M. Hansen, G. E. Maes, M. Castonguay, L. Riemann, K. Aarestrup, P. Munk, H. Sparholt, R. Hanel, and L. Bernatchez. 2011. All roads lead home: panmixia of European Eel in the Sargasso Sea. Molecular Ecology 20(7):1333–1346.

ASMFC (Atlantic States Marine Fisheries Commission). 2000. Interstate fishery management plan for American Eel. Atlantic States Marine Fisheries Commission, Report 36, Washington, D.C.

———. 2012. American Eel benchmark stock assessment with terms of reference, advisory report, and assessment report. Atlantic States Marine Fisheries Commission, Washington D.C.

———. 2013. Addendum III to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission, Washington, D.C.

Astrom, M., and W. Dekker. 2007. When will the eel recover? A full life-cycle model. ICES Journal of Marine Science 64:1491–1498.

Axelsen, F. 1997. The status of the American Eel (*Anguilla rostrata*) in Quebec. Pages 121–133 *in* R. H. Peterson, editor, The American Eel in eastern Canada: stock status and management strategies. Canadian Technical Report of Fisheries and Aquatic Science No. 2196. Department of Fisheries and Oceans Canada..

Baltazar-Soares, M., A. Biastoch, C. Harrod, R. Hanel, L. Marohn, E. Prigge, D. Evans, K. Bodles, E. Behrens, C. W. Böning, and C. Eizaguirre. 2013. Recruitment collapse and population structure of the European Eel shaped by local ocean current dynamics. Current Biology 24(1):104–108.

Beak International. 2001. The decline of American Eel (*Anguilla rostrata*) in the Lake Ontario/St. Lawrence ecosystem: a modeling approach to identification of data gaps and research priorities. Available: http://www.glfc.org/lakecom/loc/eel.pdf. (April 2009).

Belpaire, C., G. Van Thuyne, S. Callaars, P. Roose, K. Cooreman, and P. Bossier. 1999. Spatial and temporal variation in organochlorine pesticide and polychlorinated biphenyl pollution in fresh water aquatic ecosystems in Flanders using the European Eel (*Anguilla anguilla* L.) as an indicator. International Council for Exploration of the Sea, Working Group on Eel, September 20–25, Silkeborg, Denmark.

Bonhommeau, S., E. Chassot, B. Planque, E. Rivot, A. H. Knap, and O. Le Pape. 2008. Impact of climate on eel populations of the Northern Hemisphere. Marine Ecology Progress Series 373:71–80.

Boyer, C., D. Chaumont, I. Chartier, and A. G. Roy. 2010. Impact of climate change on the hydrology of St. Lawrence tributaries. Journal of Hydrology 384:65–83.

Busch, W. D. N., B. L. Brown, and G. F. Mayer, editors. 2003. Strategic guidance for implementing an ecosystem-based approach to fisheries management. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, Maryland. Available: http://www.st.nmfs.noaa.gov/st7/documents/Guidance_Ecosystem_Approach_Task_Force.pdf. (April 2014).

Calles, O., I. C. Olsson, C. Comoglio, P. S. Kemp, L. Blunden, M. Schmitz, and L. A Greenberg. 2010. Size-dependent mortality of migratory silver eels at a hydropower plant, and implications for escapement to the sea. Freshwater Biology 55:2167–2180.

Casselman, J. M. 2003. Dynamics of resources of the American Eel, *Anguilla rostrata*: declining abundance in the 1990s. Pages 255–274 *in* K. Aida, K. Tsukamoto, and K. Yamauchi, editors. Eel biology. Springer-Verlag, Tokyo.

Christie, W. J. 1974. Changes in the fish species composition of the Great Lakes. Journal of the Fisheries Research Board of Canada 31:827–854.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2012. Assessment and status report on the American Eel *Anguilla rostrata* in Canada. Available: http://publications.gc.ca/collections/collection_2013/ec/CW69-14-458-2012-eng.pdf. (April 2014).

Côte, C. L., P.-A. Gagnaire, V. Bourret, G. Verreault, M. Castonguay, and L. Bernatchez. 2013. Population genetics of the American Eel (*Anguilla rostrata*): $F_{ST} = 0$ and North Atlantic Oscillation effects on demographic fluctuations of a panmictic species. Molecular Ecology 22:1763–1776.

Couillard, C. M., P. V. Hodson, and M. Castonguay. 1997. Correlations between pathological changes and chemical contamination in American Eels, *Anguilla rostrata*, from the St. Lawrence River. Canadian Journal of Fisheries and Aquatic Sciences 54:1916–1927.

Council for Endangered Species Act Reliability. 2010. Petition to list the American Eel (*Anguilla rostrata*) as a threatened species under the Endangered Species Act. Petition submitted to the U.S. Fish and Wildlife Service, Washington, D.C., and Sacramento Field Office, California.

Curtin, R., and R. Prellezo. 2010. Understanding marine ecosystem based management: a literature review. Marine Policy 34(5):821–830.

de Lafontaine, Y., P. Gagnon, and B. Côté. 2010. Abundance and individual size of American Eel (*Anguilla rostrata*) in the St. Lawrence River over the past four decades. Hydrobiologia 647:185–198.

Denoncourt, C. E., and J. R. Stauffer, Jr. 1993. Feeding selectivity of the American Eel Anguilla rostrata (LeSueur) in the Upper Delaware River. American Midland Naturalist 129(2):301–308

DFO (Department of Fisheries and Oceans, Canada). 2010. Status of American Eel and progress on achieving management goals. Science Advisory Report 2010/062. Available: http://www.dfo-mpo.gc.ca/CSAS/Csas/publications/sar-as/2010/2010_062_e.pdf. (April 2014).

Dittman, D. E., L. S. Machut, and J. H. Johnson. 2010a. American Eel history, status, and management options: Lake Champlain drainage. *In* Final report for C005548, comprehensive study of the American Eel, New York State Department of Environmental Conservation, State Wildlife Grant T-3, Albany.

———. 2010b. American Eel history, status, and management options: Lake Ontario/St.

Lawrence River drainage. *In* Final report for C005548, comprehensive study of the American Eel, New York State Department of Environmental Conservation, State Wildlife Grant T-3, Albany.

Durif, C., P. Elie, C. Gosset, J. Rivers, and F. Travade. 2003. Behavioral study of downstream migrating eels by radio-telemetry at a small hydroelectric power plant. Pages 343–356 *in* D. A. Dixon, editor. Biology, management, and protection of catadromous Eels. American Fisheries Society, Symposium 33, Bethesda, Maryland.

Engler-Palma, C., D. L. VanderZwaag, R. Apostle, M. Castonguay, J. J. Dodson, E. Feltes, C. Norchi, and R. White. 2013. Sustaining American Eels: a slippery species for science and governance. Journal of International Wildlife Law & Policy 16(2–3):128–169.

Facey, M. P., and M. J. Van Den Avyle. 1987. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (North America)—American Eel. U.S. Fish and Wildlife Service Biological Report 82(11. 74), U.S. Army Corps of Engineers, TR EL-82-4. US Fish and Wildlife Service, Slidell, Louisiana.

Freeman, M. C., C. M. Pringle, E. A. Greathouse, and B. J. Freeman. 2003. Ecosystem-level consequences of migratory faunal depletion caused by dams. American Fisheries Society Symposium 35:255–266.

Gagnaire, P. A., E. Normandeau, C. Côté, M. Moller Hansen, and L. Bernatchez. 2012. The genetic consequences of spatially varying selection in the panmictic American Eel (*Anguilla rostrata*). Genetics 190(2):725–736.

Haro, A., editor. 2013. Proceedings of a workshop on American Eel passage technologies convened by the Atlantic States Marine Fisheries Commission March 30–31, 2011, Gloucester, Massachusetts. Atlantic States Marine Fisheries Commission, Special Report No. 90, Arlington, Virginia. Available: http://www.asmfc.org/species/american-eel. (January 2014).

Haro, A., W. Richkus, K. Whalen, A. Hoar, W. D. Busch, S. Lary, T. Brush, and D. Dixon. 2000. Population decline of the American Eel: implications for research and management. Fisheries 25(9):7–16.

Hitt, N. P., S. Eyler, and J. E. B. Wofford. 2012. Dam removal increases American Eel abundance in distant headwater streams. Transactions of the American Fisheries Society 141:1171–1179.

ICES (International Council for the Exploration of the Sea). 2013. Widely distributed and migratory stocks, European Eel, advice for 2014. Available: http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/2013/eel-eur.pdf. (January 2014).

Jansen, H. M., H. V. Winter, M. C. M. Bruijs, and H. J. G. Polman. 2007. Just go with the flow? Route selection and mortality during downstream migration of silver eels in relation to river discharge. ICES Journal of Marine Science 64:1437–1443.

Kennedy, C. R. 2007. The pathogenic helminth parasites of eels. Journal of Fish Diseases 30(6):319–334.

Knights, B. 2003. A review of the possible impacts of long-term oceanic and climate changes and fishing mortality on recruitment of anguillid eels of the Northern Hemisphere. The Science of the Total Environment 310:237–244.

Laflamme, S., C. Côté, P. A. Gagnaire, M. Castonguay, and L. Bernatchez. 2012. RNA/DNA ratios in American Glass Eels (*Anguilla rostrata*): evidence for latitudinal variation in physiological status and constraints to oceanic migration? Ecology and Evolution 2:875–884.

Lellis, W. A., B. S. White, J. C. Cole, C. S. Johnson, J. L. Devers, E. V. S. Gray, and H. S. Galbraith. 2013. Newly documented host fishes for the Eastern Elliptio Mussel *Elliptio complanata*. Journal of Fish and Wildlife Management 4(1):75–85.

LOC/GLFC (Lake Ontario Committee, Great Lakes Fisheries Commission). 2005. Technical workshop aimed at investigating methods for providing safe downstream passage for the American Eel (*Anguilla rostrata*) past hydroelectric facilities on the St. Lawrence River. Great Lakes Fishery Commission, Ann Arbor, Michigan. Available: http://www.glfc.org/lakecom/loc/whp/workshopinfo.pdf. (March 2012).

MacGregor, R., J. M. Casselman, W. A. Allen, T. Haxton, J. M. Dettmers, A. Mathers, S. LaPan, T. C. Pratt, P. Thompson, M. Stanfield, L. Marcogliese, and J.-D. Dutil. 2009. Natural heritage, anthropogenic impacts, and biopolitical issues related to the status and sustainable management of American Eel: a retrospective analysis and management perspective at the population level. Pages 713–740 *in* A. Haro, K. L. Smith, R. A. Rulifson, C. M. Moffitt, R. J. Klauda, M. J. Dadswell, R. A. Cunjak, J. E. Cooper, K. L. Beal, and T. S. Avery, editors. Challenges for diadromous fishes in a dynamic global environment. American Fisheries Society, Symposium 69, Bethesda, Maryland.

MacGregor, R., J. Casselman, L. Greig, W. A. Allen, L. McDermott, and T. Haxton. 2010. DRAFT recovery strategy for the American Eel (*Anguilla rostrata*) in Ontario. Ontario Recovery Strategy Series. Prepared for Ontario Ministry of Natural Resources, Peterborough, Ontario.

MacGregor, R., T. Haxton, L. Greig, J. M. Casselman, J. M. Dettmers, W. A. Allen, D. G. Oliver, and L. McDermott. 2014. The demise of American Eel in the Upper St. Lawrence River, Lake Ontario, Ottawa River and associated watersheds: implications of regional cumulative effects. Pages 1–25 *in* N. Fisher, editor. Fish habitat management. American Fisheries Society, Symposium 78, Bethesda, Maryland.

MacGregor, R., A. Mathers, P. Thompson, J. H. Casselman, J. M. Dettmers, S. LaPan, T. C. Pratt, and B. Allen. 2008. Declines of American Eel in North America: complexities associated with bi-national management. Pages 357–381 *in* M. G. Schechter, W. W. Taylor, and N. J. Leonard, editors. International governance of fisheries ecosystems: learning from the past, finding solutions for the future. American Fisheries Society, Bethesda, Maryland.

Marsden, J. E., B. D. Chipman, B. Pientka, W. F. Schoch, and B. A. Young. 2010. Strategic plan for Lake Champlain fisheries. Great Lakes Fishery Commission Miscellaneous Publication 2010-03. Great Lakes Fishery Commission, Ann Arbor, Michigan.

Marsden, J. E., and R. W. Langdon. 2012. The history and future of Lake Champlain's fishes and fisheries. Journal of Great Lakes Research 38:19–34.

Mills, E. L., J. M. Casselman, R. Dermott, J. D. Fitzsimons, G. Gal, K. T. Holeck, J. A. Hoyle, O. E. Johannsson, B. F. Lantry, J. C. Makarewicz, E. S. Millard, I. F. Munawar, M. Munawar, R. O'Gorman, R. W. Owens, L. G. Rudstam, T. Schaner, and T. J. Stewart. 2003. Lake Ontario: food web dynamics in a changing ecosystem (1970–2000). Canadian Journal of Fisheries and Aquatic Sciences 60:471–490.

Nimeth, K., P. Zwerger, J. Wurtz, W. Salvenmoser, and B. Helster. 2000. Infection of the glass eel swimbladder with the nematode *Anguillicola crassus*. Parasitology 121:75–83.

Oliveira, K. 1999. Life history characteristics and strategies of the American Eel, *Anguilla rostrata*. Canadian Journal of Fisheries and Aquatic Sciences 56:795–802.

OMNR (Ontario Ministry of Natural Resources). 2007. American Eel in Ontario. Great Lakes Fishery Commission, Ann Arbor, Michigan.

———. 2012. Lake Ontario fish communities and fisheries: 2011. Annual report of the Lake Ontario Management Unit. Ontario Ministry of Natural Resources, Picton, Ontario, Canada.

Pujolar, J. M., G. E. Maes, C. Vancoillie, and F. A. Volckaert. 2005. Growth rate correlates to individual heterozygosity in the European Eel, *Anguilla anguilla* L. Evolution 59:189–199.

Ringuet, S., F. Muto, and C. Raymakers. 2002. Eels: their harvest and trade in Europe and Asia. TRAFFIC Bulletin 19(2):2–27.

Schmidt, R. E., C. M. O'Reilly, and D. Miller. 2009. Observations of American Eels using an upland passage facility and effects of passage on the population structure. North American Journal of Fisheries Management 29:715–720.

Sokolwski, M. S., and A. D. M. Dove. 2006. Histopathological examination of wild American Eels infected with *Anguillicola crassus*. Journal of Aquatic Animal Health 18:257–262.

Stewart, T. J., A. Todd, and S. LaPan. 2012. Fish community objectives for Lake Ontario. Public Consultation Draft. Great Lakes Fishery Commission, Special Publication. Great Lakes Fishery Commission, Ann Arbor, Michigan.

Trott, T. M., S. A. Mckenna, J. M. Pitt, A, Hemphill, F. W. Ming, P. Rouja, K. M. Gjerde, B. Causey, and S. A. Earle. 2010. Efforts to enhance protection of the Sargasso Sea. Pages 282–288 *in* Proceedings of the Gulf and Caribbean Fisheries Institute. Vol. 63. Gulf and Caribbean Fisheries Institute, Fort Pierce, Florida.

USFWS (U.S. Fish and Wildlife Service). 2011. 90-Day finding on a petition to list the American Eel as threatened. Federal Register 50:17. September 29, 2011, Volume 76, Number 189.

Vaughn, C. C., S. J. Nichols, and D. E. Spooner. 2008. Community and foodweb ecology of freshwater mussels. Journal of the North American Benthological Society 27:409–423.

Verdon, R., and J. Caumartin. 2006. Fish migration and river navigation—Chambly Dam, Canada. IEA Hydropower Implementing Agreement Annex VIII Hydropower Good Practices: environmental mitigation measures and benefits case study 03-04. New Energy Foundation, Japan.

Verdon, R., D. Desrochers, and P. Dumont. 2003. Recruitment of American Eels in the Richelieu River and Lake Champlain: provision of upstream passage as a regional-scale solution to a large-scale problem. Pages 125–138 *in* D. A. Dixon, editor. Biology, management, and protection of catadromous Eels. American Fisheries Society, Symposium 33, Bethesda, Maryland.

Verreault, G., P. Dumont, and Y. Mailhot. 2004. Habitat losses and anthropogenic barriers as a cause of population decline for American Eel (*Anguilla rostrata*) in the St. Lawrence watershed, Canada. International Council for Exploration of the Sea (ICES) CM 2004/S: 04, September 22–25, Vigo, Spain.

Verreault, G., M. Mingelbier, and P. Dumont. 2012. Spawning migration of American Eel *Anguilla rostrata* from pristine (1843–1872) to contemporary (1963–1990) periods in the St Lawrence Estuary, Canada. Journal of Fish Biology 81:387–407.

Zhu, X., Y. Zhao, A. Mathers, and L. D. Corkum. 2013. Length Frequency Age Estimations of American Eel Recruitment to the Upper St. Lawrence River and Lake Ontario. Transactions of the American Fisheries Society 142:333–344.

RELATED AFS POLICY:

AFS Policies #10 on "Protection of Threatened and Endangered Species," #15 on "Introductions of Aquatic Species," #19 on "Introduction of Threatened and Endangered Species," and #27 on "Conservation of Imperiled Species and Reauthorization of the Endangered Species Act." Although eels are not yet listed under the Endangered Species Act, our related policies do offer usual perspectives.

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Donald Rishell
21 Fountaine Court
Waterford Works, NJ 08089

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a major importer of processed eel product. I do know that in North Carolina, there is a state-of-the-art facility that has the capacity to support eel aquaculture on a commercial scale. The enterprise would like to demonstrate the feasibility of raising disease free, sushi grade American eel to supply American markets that now depend mostly on imported product. Other states may have facilities that need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels in state waters for aquaculture would be a good opportunity to help assess the annual recruitment of each year's cohort for which there are now limited data. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV that would have to be met and that would provide additional eel fishery information which is needed for this data poor fishery. The sampling/collection protocol could be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the State Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. Eel aquaculture facility personnel working with the state Cooperative Extension Service, Area Aquaculture Agents, and other university scientists and students would have an opportunity to work on collecting data concerning the production side of the aquaculture facility and the potential for stocking farm raised eels at a to-be-determined size to increase populations of yellow eels and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. Production/research eel aquaculture facilities in the US could contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow these facilities to get started.
Thank you.

Sincerely,
Donald Rishell

July 8, 2014

Doug Case
354 Welcome Lake Road
Beach Lake, PA 18405
(570) 729-7243

Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Artlington, VA 22201

Dear Kate:

I have been running my eel weir since 1983 in the Upper Delaware River near the town of Narrowsburg, NY. I am the third generation to run our family weir. This year, my son started to learn how to fish the eel rack, as I am getting older in years and am finding some difficulties in piling rocks for wing walls and to build the rack. I am anticipating that he will take it over in the future as a fourth generation eel weir fisherman.

According to the Department of Environmental Conservation, there are only 9 active eel weirs left in the Delaware River. The few eels caught with this small number of racks cannot be causing the detrimental impact on the American Silver Eel population that is being claimed by the Atlantic States Marine Fisheries Commission. In 1983, I caught 1400 lbs of eels and in 2013, I caught 2000 lbs of eels. That being said, the population in the Delaware River has remained stable, if not better, than it has ever been.

Illegal catching of the Glass Eel is the bigger problem that needs to be addressed because they are worth so much money. Just 10 lbs of Glass Eels, if left to mature, is equivalent to what I catch of the American Silver Eels in one season.

Operating an eel trap will be a lost art if we will not be permitted to fish in the future. My first choice for Addendum IV - Commercial Silver Eel Fisheries would be Option 4 - License Cap. My second choice would be Option 3 - Effort Reduction/Time Closures.

Being an eel weir fisherman is not just something that I like to do, it has become a passion of mine over the last 30 years. I look forward to passing this on to my children and keep this 3rd generation tradition alive!

Sincerely,

Doug Case
susanpcase@gmail.com

To whom it may concern:

In light of the discussions on the US Eel fishery the following is my input on the topic. I have been active in this fishery as a fisherman for over 25 years.

-Quota based management is not an effective management method in the eel fishery as compared to gear modifications like incorporating or adding additional 1 x 1/2 mesh cull patches to existing gear.
-Cull patches placed in designated efficient culling areas on the pot will save more of the small eels than quota based management will.
-This year more than half of the eels caught were small eels. Quota based management would have taken more than half of the very eels the commission is trying to protect where the cull patch would let out small eels continuously.

If you have any questions, I can be reached at 757-544-0680

Ed Simpson

Dear Ms. Taylor,

The food chain is an intricately linked and highly evolved ecosystem, depending on healthy adequate populations of species at each level. Whether we are talking about wolves in Yellowstone National Park or glass eels off the East Coast of the United States, the removal of one layer--from the top or the bottom--can have serious ramifications throughout the ecosystem.

In our coastal area, American eels are an important food source for migratory birds and game fish. Spawning in the ocean and then navigating upstream each Spring, these marine-to-freshwater creatures exist in two very different aquatic ecosystems and are important to both. Overfishing of American eels as adults in our lakes and streams or of the juveniles known as glass eels will affect the health and resilience of other marine species as well as migratory birds. The glass eels, in particular, are critical to the recovery of the American eel population.

I urge the Commission to adopt an American Eel management plan that recognizes the critical importance of ecosystem-based management and provides significant protections for glass eels.

Thank you.

Ms. Edrie Irvine
6308 30th St. NW
Washington, DC 20015
202-701-9136
edgery@gmail.com

Kate Taylor

Senior FMP Coordinator

Subject: Maine Elver Fishery

In the year 2014 I was issued a quota of 12.8lbs. I fell short by about 1lb. The beginning of this season was suspended for two weeks while DMR worked out their new laws and regulations and swipe card system. When the season did open the water temperature was extremely cold. Elvers generally do not swim in to the colder water. They will hang out in the bays until the temp warms up. The brave ones that do swim and get caught have a hard fight against them. The fact of the matter is, they have to survive the cold water, they have to survive being in the tail bag until the fisherman is able to tend it which can sometimes be three or more hours after the tide. While in the tail bag they are also subjected to sea fleas that will bite them (they will die) and in some cases I have personally seen skeletons of elvers that were eaten by fleas. This year that was so cold was so hard on them. Once I dump my tail bag I am in a fight against time. The fleas must be screened from the eels ASAP and the cold air temp will chill them and that causes them to become weak and in some cases die. During a normal spring the first half of the fishing season is extremely slow because of this.

It is worth noting that two years ago, we had an unusually warm spring. It was 82 degrees on March 22, 2012. The eels swam and they swam HARD that spring. The water temps were up, they knew it and they swam.

As with ANY fishery some years are better than others. Just because there are a couple of worse years than others doesn't mean that the elver population is declining. How many swim right past nets and through them during closed periods when nets are open?

Last year there was a wide deep ribbon of eels running up the middle of the Penobscot River in Bangor, of course that's center third and illegal to fish. This year near the end of the season there was a large band of them swimming along the bank of the Penobscot. People who were there at the right time did very well, one person with a 40lb quota filled it. Of course the word spread like wildfire and several people, myself included rushed there and set nets. I fished EXACTLY where they hit them the previous night and I only logged .17lbs in two nights! There were several fykes and dippers there and nobody did much. That is typical elver fishing, it can change just that fast.

I don't want to see anymore reductions. There is no way we even made our statewide quota this year. DMR suspended approximately 127 fishermen so how many quotas were not filled? The last three years have been a blessing to my family. We were able to pay off hospital bills one year and start a small business another year. Without the elver industry that would not have been possible.

Thank you for your time.

Eli Brown
521 Kansas RD
Milbridge, ME 04658

Kate Taylor
Atlantic Marine Fisheries Commission

The American eel is one of the most underestimated and important animals in our estuaries, and links the salt and freshwater ecosystems.

I feel we could better preserve the American eel's passageways to and from the sea.

And glass eels need protection. We shouldn't allow overfishing of this species, which is also an important source of bait for fishermen as well as a crucial link in the food chain.

Please create a protective plan that ensures the safe passage of the American eel in any part of its development, and especially protect eels at the glass stage from harvest.

Thanks for listening,

Erik Hoffner

--

Visit the new website for my latest articles, interviews, and photo exhibits ~
http://www.erikhoffner.com

Date: Sun, 29 Jun 2014 17:29:21 -0700
Subject: Eel meeting
From: billy.bj50@gmail.com
To: fvblackpearl@hotmail.com

To who it may concern I am a elver fisherman an I am concerned an Opposed to any more cuts on this fishery. I have seen more eels an elvers in the last 2-3 year's than ever..... I was issued a small state quota an it was met...in a reasonable amount of time an note that in 1night I had to dump back approximately 20lb because I only had 4lb left on my quota ..On that note the state said they were only gonna cut us 15-40% an they cut us 41.8 plus percent? Why? In the years I Have fished I have seen more eels .. I Feel that if anything. We should be able to fish either increase the state quota some, the individual quota some or back to Derby style ., an once the state quota is met shut it down if need be... An if the Amfc wants to see the elver population they should go with the fisherman an see what we see ..the EEls juvenile an adults. Are plentiful .... more cuts are not needed!! Also got to keep in mind that each year is different some years we have mild winters an some years very cold winters an springs that would effect the eel migration due to water temps..... even after our season closes i have seen pounds upon pounds of eels swimming up stream. Its a couple month season with weekends closed ..I dont see where.more cuts on this fishery is warranted or needed so please. NO more cuts!!! Do more reaseach an do it with the fisherman ! The people who are out there everynight..maybe set traps at the bottom of dams an top to help the migration effort..just a suggestion ...THank you

Sincerely
Fred Johnson III

Hello,

The following are my comments/management choices on the Draft Addendum IV to the fishery management plan for American eel for public comment:

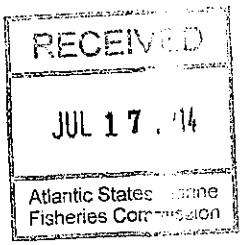
- Glass eel management options: option 3, sub option 3a
- Yellow eel management option: option 6, sub option 6c
- Silver eel fisheries: option 3

I feel that American eel is a species that deserves and demands a fishery closure in order for their populations to be sustainable.

Thank you,

Gabe Gries
14 old hinsdale road
ashuelot, nh 03441

Kate Taylor
Senior FMP Coordinator
1050 North Highland St.
Suite 200A-N
Arlington, Virginia 22201



7/14/2014

Subject: American Eel

Attn: American Eel Board

I would like to see either Option 1 or Option 2 , because we have given up enough. I have been fishing for since the 90"s and I have seen our catches improve in numbers in the past 3 years and we hear that from everyone. I feel that the Eels are growing in numbers and not decreasing. There is not enough food in our rivers and lakes to support the number of Elvers that are returning. There needs to be more Eel ladders made for both inward and outward migration of the Eels. Please allow us to keep our fishery.

Sincerely, Lance W. Geidel

795 Mercer Rd.
Norridgewock, ME. 04957

P.S. I caught my Quota in just 7 Days of Fishing

Kate Taylor
Senior FMP Coordinator
1050 North Highland St.
Suite 200A-N
Arlington, Virginia 22201

7/10/2014

Subject: American Eel

Attn: American Eel Board

I would like to see either Option 1 or Option 2 , because we have given up enough. In the past 2 years of fishing for Elvers my husband and I have seen our catches improve in numbers and we hear that from everyone. I feel that the Eels are growing in numbers and not decreasing. There is not enough food in our rivers and lakes to support the number of Elvers that are returning. There needs to be more Eel ladders made for both inward and outward migration of the Eels. Please allow us to keep our fishery.

Sincerely,

Shelly Geidel

795 Mercer Rd.
Norridgewock, ME. 04957

Hello,

My name is George Schordine and I'm a commercial Bayman on Long Island, NY. I just spoke with our DEC Eel contact, Carol Hoffman, and while she listened to my comments, also recommended I email you also to put my thoughts on record.

I read through the draft addendum and have the following comments:

NY has already shown a major effort to reduce the Eel take, We have a license moratorium, shut down the Elver fishing and instituted a 1/2 x1" mesh pot /escape panel. By adopting some simple measures I believe you can meet your escapement goals without overly burdening the fisherman.

By mandating a 1/2 x 1" mesh pot or escape panel in ALL States you will reduce the take of immature Eels by about 50% . A 1/2 x1/2 mesh pot will retain small eels of 9 to 11 Eels per pound, 1/2 x 1" is 4 to 5 per pound. This won't eliminate the bait Eel market as there will still be a 12" or so Eel to use, and on the same thought, Why are we allowing the use of a potentially threatnened species for bait? It's always the commercial guy that shoulders the biggest burden when reductions are asked for, let the recreational fisherman share the pain by having them use larger Eels or eliminate the bait market entirely, a 3/4 x 3/4 " escape panel will grade out most Eels under 14" and this is a marketable size for the food market.

Shut down the Elver fishery in Maine and South Carolina. You have a perceived problem with recruitment,yet there is a fishery that eliminates a huge portion of your returning year class, at least in those States, Also, a black market is created for poachers in other States that ship through Maine and S. Carolina, and is a Law Enforcement nightmare.

As I read the totals on Silver Eel takes on the Delaware River, I doubt that take would make ANY difference to the spawning efforts, but if it makes everyone feel better, only allow Eeling with a baited pot, which rarely catches Silvers in any quantity, and if necessary, close the Eel fishery in the month of September. Easy to verify and enforce and allows the bulk of the spawners to leave unmolested.

I believe these steps would preclude going to one of your confusing quota options,or, at the least, should only require the minimum reduction of 10%. but, the real problem facing all of us is the deterioration of water quality. Agribusiness, corporate polluters, shoddy wastewater treatment, dredging and other habitat degradation all contribute to declining fisheries, yet the commercial fisherman is asked to bite the bullet, why is that?

Thank You for your time,
George Schordine
119 Bay Ave
East Moriches,NY 11940
gcs53@optonline.net

From: howard frye [ssnova197304664@yahoo.com]
Sent: Thursday, July 03, 2014 6:40 AM
To: Comments
Subject: American Eels Draft Addedumn IV

Hello Kate,

My name is Howard Frye and I have been a Maine elver fisherman for 20 yrs. I was at your presentation in Brewer an I would like to say that you did an excellent job. I am a member of AESA I would like you to know that I support their position on draft addendum IV on all life stages of the American eel.

I would also like to add that the 2014 elver season was bitter sweet for me. I was able to fill my 35 pound quota with not much effort and I believe that I easily would have doubled my catch with normal effort effort if I had not been limited with a quota.

My quota and the lower price equaled about an 80% reduction in income from 2012. This reduction caused me not to spend as much money locally while fishing. I stopped staying in motels near where I fished and did not eat out at local restaurants. Any further cuts in the elver fishery will have a huge financial impact on some of the poorest counties in the United States.

Thank you for allowing me to express my views.

Hi Kate

My name is James Prosek, I'm 39 years old and have lived in the state of CT my whole life (in the same town). I spent 12 years of those 39 working on a book about freshwater eels across the world, as well as an article for National Geographic about eels and PBS Nature series documentary on eels. Bottom line... I like eels, a lot...

Among the many things we don't understand about these fish (in this case our American eels) is at what point the population is too small to carry out their migrations to the Sargasso. Other creatures can be brought back from near extinction with a population reduced to several hundred individuals (like American bison). It is likely that eels need several hundred thousand to even breed successfully, to carry out migrations and find each other on the spawning grounds. We won't see the eels go to a few individuals before they go extinct. Like the passenger pigeon they will be there en mass and then all of a sudden they won't. The endangered species act works in such a way that it cannot help the eel. It won't ever be a case where people can say "the population of eels is down to a few thousand" ... they will be gone long before that happens...

So with this fish beaten down and weary from the elimination of most of its historic habitats by dams why the hell would you continue to fish for them commercially? It would be like, in boxing, if they allowed someone to continue to strike their opponent when they're already on the mat. Why even take the risk? Why is it worth it?

Why open a glass eel fishery in CT? So a very few people can make a few bucks? We don't have enough conservation officers in the state of CT to regulate such a fishery if it were to open. It would cause total poaching chaos as I have witnessed first hand in Maine. The idea is to stop the Asian markets from craving endangered creatures not to continue to supply them... Who is driving this stupid initiative? Is it worth risking the loss of one of the worlds most fascinating creatures? A creature that as I wrote in my book is a thread that ties oceans and rivers together in an interconnected system of beauty magic and mystery (or something like this). We should be focussing research and money and attention on saving this fish not on beating it down further. You're wasting everyone's time that shouldn't be wasted it trying to fight a stupid proposal to open a glass eel fishery. Leave them alone...

If I could be there Tuesday (I'm going to be away) this is something like what I would say... I have much more to say about saving eels but I'll save
my breathe as most of it is in the book I spent over a decade writing. I feel very strongly about all this...

Thank you,

James

From: Giordano, Janice Bowen [Janice.Bowen@UnitedAluminum.com]
Sent: Thursday, June 19, 2014 8:21 AM
To: Comments
Subject: Please help the eel population grow

I am very concerned that our eel populations are very much in danger. We need to protect these long-lived animals in their own right, but also for our growing eagle population and other migratory birds that feed on them.

Thank you,

Janice Bowen Giordano

_____
From: JEAN LAYTON [jeanlayton@optimum.net]
Sent: Sunday, June 22, 2014 4:57 PM
To: Comments
Cc: lmcmillan@CT.environment.org
Subject: eels

Alas, we all have this great opportunity to be effective and save our eels! Just think, YOU MADE A DIFFERENCE IN THE ENVIRONMENT

Thank you.. jean layton (birder on ash creek)

Jeff Johnson
P.O. Box 426
Lubec, ME 04652

To: Kate Taylor
Senior FMP Coordinator
1050 North Highland St.
Suite 200A-N
Arlington, Virginia 22201

Attention American Eel Board

There is no shortage of elvers. Look at how many were dumped back into the rivers this year.

I think the only problem is that the politicians want the people in downeast Maine to live in poverty.

Jeff Johnson
Lubec

6/27/2014

Kate Taylor

Senior FMP Coordinator

1050 North Highland St.

Suite 200A-N

Arlington, Virginia 22201

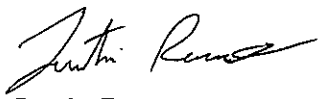
Subject: American Eel

Attn: American Eel Board

My name is Justin Ranco and I would like to see Status Quo for the following reason: Over the past few years I have seen more and more eels each season. For example: late this season there were more eels than ever in just one night in the Penobscot River then I had seen throughout the entire season. I know of a lot of people that filled their quota that night and had to dump back pounds of eels, including myself. With that said, I feel it is unfair for the Maine harvesters to take another hit in the 2015 season without the Hydro Companies first being looked into. They kill thousands of pounds of eels every night with the turbines in their dams.

To conclude I'd like all the fellow parenting fishermen in this industry that rely on this fishery to support their families to be able to have the 2015 season and many more to support their family; to close this fishery industry is just like taking food from our children. Thank you.

Sincerely,



Justin Ranco

Maine Elver Fisherman Association Member

14 Gatekeeper Lane

Trenton, ME 04605

June 24,2014

To: Kate Taylor
Senior FMP Coordinator
1050 North Highland Street
Suite 200 A-N
Arlington,Virginia
22201

Subject: American Eel Addendum IV

I am writing in regard to the current addendum being considered by the ASMFC concerning American eels. My fishing experience, observations, and thoughts are mainly concerning the glass eel or elver life stage; as this is the fishery I have worked in since 1997.

First, I would like to commend the State of Maine and Department of Marine Resources for working with the board during consideration of the last addendum to create and put into place a successful fishery plan which allowed a fishing season for 2014. The introduction of the electronic swipe cards, 48 hr consecutive free passage each week, and total allowable season catch showed that they were committed to preserving this fishery which has in recent years been a huge economic boost to the State.

That being said it was a great disappointment to have the allowable catch reduced 42% . The numbers of elver I have observed in the last several years have been at times incredible. This past season, while cold weather delayed the run, was by far the largest I have ever witnessed. I was able to fill my personal quota of 22.1lbs in only 3 nights of fishing. Many fishermen were video taping footage of these massive runs of elver and can only hope they get some of this footage to board members.

While I would love to see the fishery return to status quo and it would certainly be great to able to go back to a derby free for all, clearly that is not going to happen. I do support the system the State of Maine put into place for the 2014 season of IFQ's. The electronic swipe cards made this system easy to keep track of and prevented people without a license to legally sell elver. The biggest disappointment of all this process is that many of the rules the industry is suffering are a direct result of criminals which have been weeded out with this system now in place.

My observations are just that and do not translate to bar graphs and , but similar results seem to jump out at me when I study the young of year reports included in this addendum which are downplayed by the technical committee because ,”The TC stresses high YOY catches in a few consecutive years do not necessarily correspond to an increasing trend since the YOY surveys can fluctuate greatly.”

I would certainly think if these YOY catches had a few consecutive years of low catches the sky would certainly be falling. For this reason I would strongly oppose any further reduction in Maine's glass eel quota.

The habitat that has been created in Maine for all life stages of American Eel, far out way any other state on the east coast. For the last several years, hydro dams have been removed, fish ways rebuilt, and more damns are scheduled for removal. This forward thinking to reclaim our rivers for all sea run species is a mind set the rest of ASMFC State's should be sharing with their hydro companies.

In closing, I feel this addendum is clearly written and targeting the Maine and South Carolina glass eel fishery for elimination. The language of this document distinguishes the silver and yellow eels as fisheries which have much more significance, maybe that is the reason once again neither of these stages have an option for closure of thier fishery. If the American eel is in fact as depleted as some causes would have the board believe, it seems if all these stages are connected then the options to manage should all be on the table for all stages.

Sincerely,

Joe.McDonald
200 Main st.
Jonesport,ME
04649

Kate
Taylor
June 25, 2014

Senior FMP Coordinator

1050 North Highland St.

Suite 200A-N

Arlington, Virginia 22201

You Have Cut the Elver Fisherman enough Thank You John H Tilghman 634 Bangor Rd. Ellsworth Maine 04605 Please Let It alone thank You.

RECEIVED
JUL 07 2014
Atlantic States Marine Fisheries Commission

Subject: American Eel

Attn: American Eel Board

John H Tilghman
634 Bangor Rd
Ellsworth ME 04605

EASTERN MAINE DPO
03 JUL 2014 PM 1 T

USA
Equality
FOREVER

Kate Taylor Senior FMP Coordinator
1050 North Highland St.
Suite 200A-N
Arlington Virginia
22201

Comments to Draft Addendum IV to the Fishery Management Plan for American Eel

Pennsylvania recreational anglers of anadromous and catadromous fish have been severely limited in the ASMFC managed fisheries of Pennsylvania waters. Atlantic Sturgeon is endangered, River Herring is closed indefinitely, Hickory shad is closed to keep and American shad is limited possession. Striped Bass is limited in size and creel limits with talk of stricter regulations. With little interest in American Eel as a recreational fish the feedback on Addendum IV is limited and mostly conservative. Bait eels sold in Pennsylvania account for less than approximately .05% of all commercial eels landed in the 4 surrounding states. With new 2014 regulations being enforced this amount was cut by 50%.

Pennsylvania does not have a commercial Eel fishery, yet the live yellow eel food consumption market is significant. This market which is centered in the Philadelphia area is being filled by local live eel wholesalers and others as far as New York. Since Pennsylvania does not have a commercial eel fishery very little is known about the amount of eels passing through this market. Table 2 of the addendum shows New Jersey and Delaware account for approximately 160,000lbs of yellow eel in 2013. If the landings of New York and Maryland are included this equates to approximately 80% of the total landings of all states in 2013. No public data is available as to the amount of eels sold in Pennsylvania or their origin waters.

The two (2) facts that prevail in Addendum IV are the 2012 Benchmark American Eel Stock Assessment which found the stock to be depleted in U.S. waters, and the 2010 outstanding petition to USFW for listing as threatened under the Endangered species act (ESA). Feedback from Pennsylvania recreational fisherman consisted of statements that the glass eel and silver eel commercial fishing be shut down until the stock is recovered. Some fisherman questioned if aquaculture is being implemented in other countries why not here. Addendum IV options are numerous and not all of the options can guarantee a positive outcome to the goals of the addendum. The following list of comments were summarized from meetings with recreational fisherman in Pennsylvania.

1. Commercial Glass Eel Fisheries - Option 3 Closure of glass Eel Fisheries until the stock is recovered or until an Aquaculture Plan is developed and States have facilities in place.

2. Commercial Yellow Eel Fisheries - Sub Option 4c 20% Reduction of the 2010 landing as shown in Table 7 of the Addendum.

3. Silver Eel Fisheries - Option- 1 Status Quo. This option should result in a no take of silver eels until the Technical Committee reviews and the Board approves an alternate plan under Section 4.1.3 of Addendum III effective 12-31-2014.

Submitted by John Pedrick, Advisory Panel member, in cooperation with Delaware River Fisherman's Association.

JOHN PEDRICK
jjpedrick@verizon.net

Kate Taylor
Senior FMP Coordinator

June 25, 2014

1050 North Highland St.
Suite 200A-N
Arlington, Virginia 22201

Subject: American Eel

Attn: American Eel Board

I support status quo and the newly implemented swipe card system for the following reasons.

For the past 3 years all over the world there has been a huge increase in returning elvers. On page 2 of draft addendum IV it states..."Currently, the European eels stock is considered severely depleted."

If the stock is severely depleted then the question needs to be asked... where are all of these elvers coming from are.

See Attachment A: ***European eels have been caught in record numbers for the third year running.***

See Attachment B: http://www.dailymail.co.uk/news/article-2322560/Baby-eels-squirm-way-British-menus-biggest-harvest-30-years-drops-prices.html ***this year numbers could reach up to 100million-ten times more than last year.***

See Attachment C: **Record Glass eel runs again this year, European Eel Consultancy, March 25, 2014 by Dr. William O'Connor.** ***"Conservationists suggest the decline of the critically endangered species has been halted and perhaps reversed."***

On page 4 of draft addendum IV is a chart why is it 4 years old? Why does it not have the recent data of the huge increase in returning elvers across Europe and here?

Has anyone taken into account that if an elver cannot surmount a dam it could be possible they are living below the dams and reaching maturity?

See Attachment D. Eels on Wheels http://thewalrus.ca/2008-12-environment/

Which states on page 4 ***"after analyzing the ear stones of American eels it was found that many eels moved freely between saltwater, brackish water and fresh water. By implication that might mean saltwater habitat might be more important than previously understood?"***

Dams: What is the ASMFC doing to implement an action plan regarding dams and their impact on American Eels?

See Attachment E. World Commission on Dams Report http://www.internationalrivers.org/programs/policy-reform

In the citizens guide to the WCD we find the following statements:

- Impacts include extreme economic hardship
- People living downstream of dams have suffered from the loss of natural resources upon which their livelihoods depended.
- Large dams have caused great environmental damage, including the extinction of many fish and other aquatic species.
- The benefits of large dams have largely gone to the rich while the poor have borne the costs.

On page 2 2.3.1 of draft addendum IV it states both the European Union and Canada have taken action to rebuild stocks.

What leadership role is the ASMFC, US Fish &Wildlife, NOAA, NMFS, The EPA, or FERC taking to rebuild our stocks? Even clam diggers participate in reseeding clam flats. I believe with a little help from our federal and state agencies this could easily be accomplished. We are all eager to see an abundance of American Eel. I personally would welcome the opportunity to have these conversations and begin this important work. Collaboration between fishermen and agencies is the key!

On page 7 2.4 Status of the stock. Habitat loss is mentioned why isn't there a statement about how much habitat Maine has opened up? About how many dams have been removed? What are other states doing to improve habitat?

In the next paragraph I read "the benchmark assessment included data only through 2010." That means that 4 years of recent data is being left out. Why is this? And then I read "Since that time some states have heard anecdotal information about increased recruitment as well as recorded evidence of increased recruitment in their fisheries independent YOY surveys." The word anecdotal means: not necessarily true or reliable, because based on personal accounts rather than facts or research.

This past elver season I witnessed the biggest run of elvers I have ever seen. The entire river was elvers! So many that the water rippled from their passage. We could actually hear them. It was INCREDIBLE! There was no PHD standing there with us. So I guess you could say that my account of that event was anecdotal. However the state implemented swipe cards recorded that event when we sold that night. Many reaching their allotted quota and between us dumping hundreds of pounds back into the river. If there had been someone to call to document this event we would have. Then perhaps our account would not be considered anecdotal and would be considered as relevant and given the credence it deserves. If fishing boats can have a government observer why can't we?

Just recently several people fishing in our nearby lakes have caught mature silver eels while trout fishing. What does this mean?

I believe local knowledge is one of the most important tools that we have to help us gain a better understanding of what is really going on. For example if you are lost who do you stop and ask directions from? I feel that each state should be left manage its own fishery. We know what is going on in our own back yards.

We need help with procuring funds to do the studies on all life stages. To build elver ladders... to build weirs to count outward migration, for restocking programs. We need collaboration with other groups fighting to improve fish passage and healthy ecosystems. Cutting the amount of elvers fishermen can catch is not going to improve passage.

Option 7 page 15: Aquaculture Quota says, "This amount would be deducted from the total glass eel quota." The example gives 10% of the total quota to them. And that combined with a 10% set-aside to prevent exceeding the overall quota adds up to a further 20% reduction from the total allowable catch. This is unacceptable. The elver fishermen in this state developed and kept this fishery going not some upstart aquaculture facility looking to cash in now at our expense. Would you like us to take 20% of your income and give it to someone who wanted it? Because of the reductions last year combined with the price I took a 2/3 reduction in my income. We cannot suffer any further cuts.

Please reconsider Status Quo for the State of Maine. We are working hard to protect this fishery and we have every intention of continuing to do so. Thank you for reading my letter.

Sincerely,

Julie Keene, licensed Maine Elver Fisherman
1446 County Road
Trescott Township, ME. 04652
207-733-2320
2peri@myfairpoint.net

Attachment A

European eels caught in record numbers for third year running

Conservationists suggest the decline of the critically endangered species has been halted and perhaps reversed

Lewis Smith
theguardian.com, Tuesday 14 January 2014 07.11 EST

A French fisherman holds a handful of baby eels or 'pibales', caught in fresh water sources that flow into the Garonne River.

Eels have been caught in record numbers for the third year running, leading conservationists to suggest their decline may have bottomed out.

European eels have suffered a massive slump over the last four decades and have been classified as critically endangered but there are now signs that the decline has been halted and perhaps reversed.

The flooding experienced across much of the UK because of a series of severe storms since Christmas could even benefit the species by washing juvenile eels over barriers – including flood defences and dams – that might otherwise prevent them from getting inland. In France, where the arrival of glass eels from across the Atlantic is regarded as a strong indicator of the numbers likely to reach the UK, catches have exceeded all expectations over the last few weeks.

Quotas in three of the main eel rivers in France have been met so rapidly that there are now forecasts that record numbers will reach the UK.

In 2013 the number of glass eels – the juvenile form that reaches the European coast after migrating across the Atlantic – seen arriving in the Severn and other UK rivers was the best for two decades but 2014 now promises to be even better.

Andrew Kerr, chairman of the Sustainable Eel Group, said the signs are that the decline in the numbers of glass eels reaching the coast of Europe may have "bottomed".

Quotas for the Adour River in south-west France were completed within 11 days of the season starting in November, compared to three months in 2012.

The Gironde's season opened on 15 November and the 3.7-tonne quota was filled in eight days compared to six weeks in 2012 and three months in 2011.

It had been hoped that fishing in the Loire, which has a bigger quota, would confirm the early hopes of a third bumper year in succession but fishermen have decided to delay their season because of a slump in the market price.

However, the Arzal estuary, which is further north, has since completed its half-tonne quota in just a few days, and there have been reports that illegal fishing has been widespread in France, further indicating that glass eels are present in large numbers. The French authorities have been using night vision and helicopters in their attempts to tackle illegal fishing and the illicit trade in glass eels.

In the UK the large number of juvenile eels arriving earlier this year has meant record restocking could take place.

More than 1 million young eels were released into UK waterways last year, more than ever before. About three-quarters of the juvenile eels were released almost immediately further upstream, having been carried past barriers blocking their passage inland. The remaining quarter were kept in captivity to grow bigger before being released.

In recent weeks there have been large releases in several locations including Blagdon Lake in the Mendips, the River Teme in Shropshire and Llangorse Lake in Wales.

Attachment B

http://www.dailymail.co.uk/news/article-2322560/Baby-eels-squirm-way-British-menus-biggest-harvest-30-years-drops-prices.html

Baby eels squirm their way back onto British menus after the biggest harvest in 30 years drops prices

- **Elver eel numbers could reach 100million this year - ten times last year**
- **Fishermen say it is the largest harvest they've seen in 30 years**
- **This has meant restaurants can serve the delicacy at reduced prices**

By Janine Yaqoob

Published: 08:32 EST, 10 May 2013 | Updated: 11:08 EST, 10 May 2013

A surge of millions of baby eels in the River Severn this spring has meant local restaurants can serve the delicacy for the first time in years.

Elver catches in the river around Gloucester have been their highest for 30 years - meaning there are enough of the tiny worm-like fish to make their way onto British menus at cut down prices.

This year numbers could reach up to 100million - ten times more than last year.

Attachment C

Record glass eel runs again this year

March 25, 2014 · by Dr. William O'Connor · in Eel recovery plan, Eel restocking, Glass eels. ·
In 2013 the number of glass eels recorded arriving in UK rivers was the best for two decades. Likewise, visual observations on the River Shannon by our staff confirmed that there was a massive run of elvers on the River Shannon in April 2013. However, 2014 now promises to be even better with every indication that 2014 will be a record breaking year in terms of the numbers of juvenile eels returning to European rivers. Reports from the Severn Estuary confirm that the upturn in glass eel numbers is continuing for the third consecutive year. The links below show photos posted by the Environment Agency's Dave Throup on his Twitter account suggest that that there is another bumper of run of glass eels in the River Severn under way.

- Elvers from the Severn Estuary. Huge numbers again this year. (https://twitter.com/DaveThroupEA/status/445966087080128512/photo/1)
- Still loads of elvers making their way up the Severn Estuary. Elver patrols continue (https://twitter.com/DaveThroupEA/status/447022194049429504/photo/1)

(http://europeaneel.files.wordpress.com/2013/08/shannon-eels-12.jpg)
Shannon estuary glass eels

In January it was reported that French glass eel catches were up and that a major year for glass eels and elvers was in store again. The link to this media report is provided below.

- French catches offer promise of bumper year for threatened eel (http://www.fish2fork.com/en-GB/news-index/2014/French-catches-offer-promise-of-bumper-year-for-threatened-eel.aspx)

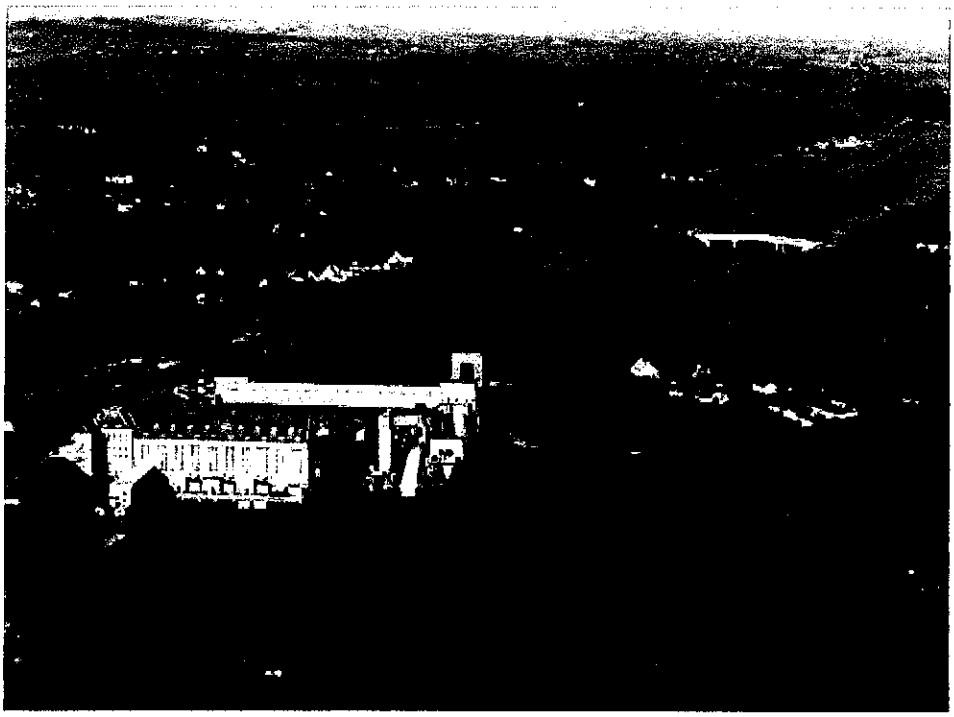
In January the Guardian Newspaper said that *'conservationists suggest the decline of the critically endangered species has been halted and perhaps reversed'*. This report also noted that *'Eels have been caught in record numbers for the third year running, leading conservationists to suggest their decline may have bottomed out'*. In January the Guardian said that *'Quotas in three of the main eel rivers in France have been met so rapidly that there are now forecasts that record numbers will reach the UK'*.

Bumper of run of glass eels again this year

Current reports from the River Severn do indeed suggest that this prediction was right.

So what about Ireland?

In the UK the large number of juvenile eels arriving in the recent years has meant that record restocking could take place. In Ireland glass eel and elver fishing is banned and virtually nothing is being done to maximise this upturn in glass eel numbers on rivers such as the River Shannon.



(http://europeaneel.files.wordpress.com/2013/08/ardnacrusha-dam.jpg)
Less than a fraction of a percent of glass eels entering the Shannon estuary will end up in the inefficient traps at Ardnacrusha

There needs to be glass eel fishery developed on the Shannon Estuary following the Sustainable Eel Group (http://www.sustainableeelgroup.com/) standard. Such a fishery could be self-financing and could supply restocking material to stock lakes throughout Ireland.

In Ireland we are not helping the European eel, we are helping the ESB.

At the moment 95% of these eels, the future of an endangered species, are dying in the Shannon estuary and in the tail race of Ardnacrusha hydroelectric station. Less than a fraction of 1% of the glass eels that enter the Shannon estuary are likely to end up in the inefficient elver trap at Ardnacrusha due to variety of mortality factors, but also due to the presence of this hydroelectric scheme.

It is time to maximise the use of the current upturn in glass eel numbers and secure the future of the European eel in Ireland. We should restore its traditional sustainable fisheries, and reduce/eliminate non-fishing mortality such as hydroelectric turbine mortality instead. In Ireland we are not helping the European eel, we are helping the ESB.

We believe that it is time for Ireland to adopt the Sustainable Eel Group approach (http://europeaneel.com/2014/02/20/river-shannon-eel-management/).

Tags: glass eels, upturn in glass eels

thewalrus.ca http://thewalrus.ca/2008-12-environment/

Eels on Wheels

By David Lees

Peter Hodson was eleven years old the first time he saw an eel, on June 27, 1959. He also saw the Queen that day, a white speck in the distance, as she unveiled the International Friendship Monument, which stands at the precise point where the R. H. Saunders dam, operated by OPG (then Ontario Hydro), meets the New York Power Authority's Robert Moses dam. The unveiling was in effect a delayed ribbon cutting for the joint hydroelectric complex, which had been in operation for a year. Virtually all the fresh water in the Great Lakes basin, barring leaks through a few ship canals, pours through its thirty-two turbines — nine million litres a second, generating 2,090 megawatts of power. More clearly than he remembers the Queen, Hodson recalls the eels, hundreds of them, their dead, broken bodies floating on the surface downstream. The construction of the Moses-Saunders complex, which supplies about 4 percent of Ontario's energy requirements, had required the flooding of 8,000 hectares of the province's shoreline and the relocation of ten communities. Among those displaced were many Akwesasne Mohawks, who moved down stream to a reservation on Cornwall Island. In the seventeenth century, a Jesuit missionary wrote that an aboriginal, hunting eels by torchlight during their annual migration down the St. Lawrence, could spear a thousand a night. Eels were a mainstay of native life: the skins, which tighten when dried, were used to bandage wounds, relieve rheumatism, and wrap tool handles; the fats were used to water proof clothing; the oils, to cure earaches. Most important, the meat was highly nutritious and portable. But after the dam was built, the silvers' annual downstream migration precipitated a new summer ritual: in July and August, the band council sent out trucks and wagons to collect dead and rotting eels along the shore. Henry Lickers, the council's environmental director, says the bodies accumulated half a metre deep in coves and bays downstream from the dam. "It was horrible to see," says Lickers. "It was the wholesale destruction of a species. We complained about it, but no one would hear us. Eels are not seal pups, and in those days there was no 'environment.' " The immediate mortality rate for the large eels that ran the Moses-Saunders gauntlet was 26.4 percent. Of the survivors, another 24 percent died later at the Beauharnois dam. The two-and-a-half-metre blades at Moses-Saunders spin at a rate of 95 rpm, so fish, particularly long ones, are inevitably struck, if not sliced, by them. Moreover, turbine shafts are designed to pressurize the water hitting the turbines, and the rapid change affects the fish's swim bladder, the internal organ that helps it maintain buoyancy. So many more eels probably died farther downstream. The slaughter wasn't exactly a surprise; some commercial fishermen welcomed it as a solution to the "eel nuisance." Eels look like snakes; they're slimy, hard to handle, and tough to kill. Since they have small mouths and small, dull teeth, they extract bite-sized morsels from large carcasses by clamping on, spinning on their axis, and hitting reverse; if the carcass happens to be attached to a gillnet or a longline, too bad for the gear. But a funny thing happened after the dam was built. Domestic and European markets for eel expanded. As the price went up, so did the harvest, which disturbed MNR fisheries managers, who knew that with the dam in place the resource was no longer renewable. Every summer, millions of elvers, twelve to fifty centimetres long, piled up at the foot of Moses-Saunders, particularly on the Canadian side. This created serious problems for Ontario Hydro, which regularly interrupted the flow of water into its turbines, and then dropped stop logs into the tailrace leading out of them so the turbine wells could be pumped dry for maintenance. But before the stop logs could fall, elvers looking for passage upstream would dart into the well and be sucked into the dewatering pumps and jam them. "I don't know if you've ever seen chopped eel, but it starts to rot about ten seconds after it goes through the chopper," says Robert Scally, a former mechanical maintenance superintendent with Ontario Hydro. "All you could do to clean it out is start dismantling things, but that was difficult, because a lot of this

piping is embedded in concrete. It was like the whole system was full of hamburger, and it took days to scoop it out." In the early 1970s, the late Russ Whitfield, a biologist with the MNR, promoted the idea of building an eel ladder that would keep the eels out of the pumps and moving upstream. The proposal was undoubtedly based in pragmatism, but the rationale Whitfield gave a reporter then sounds much more sentimental. "They wanted to migrate so badly," he said, "but the dam was in the way." Eels are endearing in their weirdness. Until recently, they were considered exclusively catadromous, meaning they are born, spawn, and die at sea but spend their lives in fresh water; salmon do it the other way around. Eels are also considered panmictic, in that they do not pair off but spawn in a mass commingling of eels, eggs, and sperm in the Sargasso. The consequence of panmictic catadromy is that there is no selection of mates, and therefore no genetic divergence induced by local conditions, and no homing instinct to a particular freshwater habitat. Currents carry the larvae to the coastal waters of Venezuela, Central America, Mexico, the American Gulf and Atlantic states, the Maritimes, Newfoundland and Labrador, and Iceland. By the time they reach Canadian waters, they are about a year old and are beginning to morph, first into glass eels, which look like swimming vertebrae, and then into tiny yellow eels. Apparently driven upstream by population pressure, like cottagers, the elvers will leave the water if they must, to slither through cracks in rocks, or up damp vertical walls, or even across wet lawns and meadows. They can entwine themselves into a living rope as long as three metres, to overcome obstructions. The eels that manage the journey upstream and live at low density tend to become female; the losers that stay behind, in the crowded lower reaches of rivers or in saline estuaries, predominantly become male. Eels are eaten by just about everything in the saltwater food chain, and by the time they attain the pinnacle they have returned the favour, as both predators and scavengers. When the St. Lawrence Seaway opened, it was not immediately recognized that inbound freighters were bringing with them a horde of invasive species; the still-abundant population of eels undoubtedly consumed many of these pests before they took hold. So there were good reasons to help them reach the lake. No one had ever built an eel ladder to surmount an obstacle thirty metres high. The one thing Whitfield had going for him was that the dam was intersected by ice sluices, twenty-one metres wide and ascending at a seventy-degree angle. These spillways, contained within the dam, were intended to allow upstream ice jams to slide into a downstream inlet. In practice, the ice was never that bad, so this had never happened. Whitfield settled on a design for a wooden trough that zigzagged back and forth up the face of one of the sluices. To test the idea, he installed a single length of the trough with its bottom in the bay and pumped water down it. The elvers were drawn to the current, but none would enter. Whitfield must have figured out that while salmon jump upstream, eels climb. He wired short willow cuttings along the length of the ladder and happily reported that the eels packed in and, a day later, began rolling off the upper end in a steady stream. The full ladder was installed in 1974 and was an immediate success; more than 4.3 million young eels ascended over the next six years. In 1981, Ontario Hydro replaced the wooden structure with a more permanent aluminum ladder. Another 2.6 million eels moved through in 1983 and 1984. The MNR dutifully kept track of the numbers and posted them in an internal fisheries report. "When you spend all that money on a ladder, you want to know that it's working," explains Mike Eckersley, the MNR biologist in charge of the ladder at the time. "But after a few years, we realized that we had the most extensive and most reliable index of eel recruitment in the world." One of the interested biologists who followed the annual eel census was Peter Hodson, by this time a toxicologist at the Maurice Lamontagne Institute, a marine research centre operated by the federal Department of Fisheries and Oceans near Mont-Joli, Quebec. He was studying beluga whales in the Lower St. Lawrence River and the Gulf of St. Lawrence, whose body fat carried an astonishingly high level of chemical contaminants, hypothetically because they were feeding heavily on the silvers coming out of Lake Ontario. (Hodson admits that he would have preferred to study eels directly, but in Ontario and Quebec they are considered a freshwater fish and fall under provincial rather than federal management; in the Maritimes, they are a marine fish, so their harvest is supervised by the DFO.) However, the days of eels as an abundant, albeit obscure, species were about to end. The count was

still high in 1985, when 935,320 juvenile eels ascended the ladder, but over the next four years, like a sputtering investment, it began to fall, hitting 258,622 in 1989. Then it crashed: 121,907 in 1990, 40,241 in 1991, and 11,534 in 1992. "We were quite upset," says Hodson. "It looked like a catastrophe. It wasn't just that 1992 was a bad year; it was the overall trend. We were seeing a 99 percent decline, which is exponential, and there was no sign it was going to let up." Hodson was already slated to present a paper on contaminants in eels at a 1992 conference of the International Council for the Exploration of the Sea in Poland, convened as the stock of European elvers was crashing. Needless to say, the relationship of European and American eels is complex. The two species derive from the same ancestor but are genetically distinct, so they have somehow avoided each other's annual party in the Sargasso. At the conference, Christopher Moriarty, an Irish researcher, put up a graph showing the decline of elver harvests in European rivers from 1980 to 1992. The shape of Moriarty's diagram, Hodson realized, was virtually identical to the graph he had made of the Saunders numbers. The only difference was that the European crash preceded the collapse at Saunders by four years. And that was easily explained by the fact that the dam is 1,600 kilometres from the ocean — a four-to-seven-year swim for an eel. Back in Canada, Hodson worked with biologist Martin Castonguay and pathologist Catherine Couillard, also of the Lamontagne Institute, on the first peer-reviewed paper to report the collapse of the juvenile American eel in the St. Lawrence River. The data from the Moses-Saunders dam was supported by eel surveys showing sharp drops at Quebec rivers feeding into the St. Lawrence. The article examined four possible causes for the decline: pollution in Lake Ontario, construction of the dam and the St. Lawrence Seaway, overfishing, and a weaker Gulf Stream. Lake Ontario was grossly contaminated, but it had been much worse in the 1960s, so if chemicals were to blame the effect should have shown up sooner. Moses-Saunders and the seaway destroyed the habitats of many fish when they were constructed in the 1950s, but again the time lag was too great to explain the current decline. Quebec fishermen were continuing to take silver eels out of the St. Lawrence, and since 1975 had captured about 400 tonnes a year, but the comparative stability of that harvest ruled it out. Finally, it seemed possible the Gulf Stream had weakened, but this had happened in the early 1970s with no notable reduction in eels at the ladder. "By and large," their paper concluded, "we do not really know what caused the pronounced recruitment decline in this species." In August 2003, eel experts on a field trip from an international symposium in Quebec City compared notes on the dramatic drop in juvenile populations among the Atlantic and Pacific branches of the Anguillidae family of eels. Among the scientists were MNR biologist John Casselman and David Cairns, a DFO fisheries manager from Prince Edward Island. "We sat there," Casselman recalls, "saying we really need to do something here and this is the chance to do it." The upshot was the Quebec Declaration of Concern, endorsed by virtually all the symposium delegates from eighteen countries. Its wording, subsequently worked out in telephone calls and emails, departed sharply from the usual calm detachment of scientific papers: "With less than 1 percent of juvenile resources remaining for major populations, time is running out. Precautionary action (e.g., curtailing exploitation, safeguarding migration routes and wetlands, improving access to lost habitats) can and must be taken immediately by all parties involved and, if necessary, independently of each other." Meanwhile, back at the eel ladder the numbers had improved slightly: after hitting an all-time low of 944 in 2001, they were up to 2,876 in 2003. The MNR had twice cut fishing quotas for yellows by 50 percent — not that this was a problem for fishermen, since the actual catch was even lower. Rob MacGregor, the manager in charge of the Lake Ontario fishery, wrote a briefing note recommending the complete elimination of the eel quota. He explained the crisis and dutifully pointed out that given the panmictic, catadromous nature of eels, closing the Lake Ontario eel fishery would not necessarily bring them back. Since population pressure drives eels upstream, the collapse in Lake Ontario, at the extremity of the range, was a strong indicator that the entire species was in decline, notwithstanding the fact that harvests in the Maritimes remained high. Conversely, MacGregor and others thought, even if the species as a whole was not threatened, the past abundance of the Lake Ontario cohort, and its known fecundity, meant it soon would be. The zero quota took effect in the spring of

2004. "Eels are harvested in twenty-five jurisdictions, at every stage, from glass eels to silver eels," says MacGregor. "But it's all one population, and they only spawn once, so everything adds up. Each agency has been doing its own thing, but nobody has looked at the overall population level. On the East Coast, they look upstream and say, 'You've got all these mortalities with dams, so why are you putting all this on our back?' Or jurisdictions look at their own data and say, 'Our eels are fine.' So there were all kinds of reasons to say, 'Well, if all the other jurisdictions aren't doing anything, why should we?' But we weren't going to sell the last eel out of Lake Ontario." The eel debate has been conducted quietly among civil servants, mostly below the radar of the media or environmental activists. In true civil service fashion, problems and differences have been tackled in the decorum of working groups, particularly the Canadian Eel Science Working Group, which is seeking a scientific consensus on the state of the species; and the Canadian Eel Working Group, whose subcommittees are dedicated to pursuing interprovincial and international accords relating to eels, and resolving the still-unanswered question of why eels in Lake Ontario have declined so drastically when they seem abundant elsewhere. A challenge for both groups is that central Canada's provincial resource ministries and the DFO, which manages the East Coast fishery, have dramatically different views of the eels. This became starkly apparent in 2006 at hearings of the Committee on the Status of Endangered Wildlife in Canada. After reviewing a report submitted by the science working group, COSEWIC agreed to recommend to the federal environment minister that the eel be listed as threatened, which would entitle it to a host of rigorous protective measures. But later in the four-day meeting, the issue was reopened, and COSEWIC downgraded its status recommendation to "special concern." Present at that meeting was David Cairns, who had co-authored the Quebec Declaration, and served as co-chairman of the science subcommittee that submitted a report on the decline of the eel to COSEWIC. Cairns no longer believes the eels are endangered. "The idea that the collapse in Lake Ontario in the 1980s and 1990s is a harbinger of bad things to come for the species as a whole is hard to accept in the Maritime provinces," he said, "because since then eel abundance here has doubled or tripled." Cairns fielded questions at the COSEWIC hearing, many of them about research, ongoing since 2003, by Heather Lamson, then a master's student at the University of New Brunswick working under his supervision. Lamson had analyzed otoliths, the ear stones created by calcium deposits, in PEI eels captured in freshwater ponds, in brackish waters at river mouths, and in saltwater bays. By chemically analyzing the otoliths, she found that many eels moved freely among the three environments. More particularly, she showed that 85 percent of the thirty-nine saltwater eels in the study had lived in salt water all their lives. By implication, the existence of eels thriving in a marine environment, safe from both fishermen and hydroelectric dams, might mean that saltwater habitat is more important for the species than previously understood. Cairns presented the same, still-unpublished, data to the US Fish and Wildlife Service, which also considered listing the eel as endangered but ultimately decided against it. MacGregor, among other Ontario biologists, is not convinced that the new study changes anything; no one knows the significance of the marine cohort, its fecundity, or the ratio of males to females. "If you're satisfied with losing eels in fresh water, if your only objective is to keep them from going extinct, that's one thing," he says. "But if you want eels to perform their ecological, cultural, and economic functions in fresh water, that's another." In the meantime, the CEWG subcommittee working on international accords has produced a memo of understanding to coordinate sustainable management, likely to be signed this year by Ottawa, Quebec, Ontario, the binational Great Lakes Fishery Commission, and the Atlantic States Marine Fisheries Commission, which represents the fifteen states of the Eastern seaboard. In Ontario, eels have been listed as endangered, while a national management plan to affect a 50 percent reduction in anthropogenic mortality is undergoing "final tweaking." A committee investigating the impact of dams has taken a hard look at the Ottawa River; another brokered the agreement by which OPG will truck yellow eels to Lac Saint-Pierre until at least 2011. Silvers would have been better, but they are virtually impossible to capture in the lake's open water. As it is, there are so few eels left in Lake Ontario that most of the 1,300 yellows captured this past summer came from the St. Lawrence River, downstream from Moses-Saunders. This summer marked

the third year in a row that OPG trucked young glass eels in the other direction, releasing them near Mallorytown and Deseronto. To the relief of everyone involved in the project, biologists also captured yellow eels in Lake Ontario that had arrived by truck two years earlier. My stated job on the little fishing boat was to stay out of the way, while OPG biologists concentrated on dumping nearly 700,000 elvers out of plastic bags and into Lake Ontario. The elvers were tiny, 7,000 swarming in each of the bags piled in corners of the deck. Someone with exceptionally strong wrists, perhaps a fisherman, had tied the bags shut the day before in New Brunswick, so I volunteered to open them. Since no one complained, I also collected the empties. Some of these, I noticed, still contained stragglers, bravely climbing the plastic or swimming vertically against trickles of water. I don't care what you think about eels; you have to admire a critter less than five centimetres long that travels 6,000 kilometres from the Sargasso to New Brunswick, and then to Lake Ontario, even if it did finish the trip as a hitchhiker. The idea of letting any of them die here, on the doorstep to eel paradise, was unbearable. So I flapped the bags overboard, as unobtrusively as possible, until they fell out. Then I noticed that some had missed the transfer from bag to bucket to lake and were swimming and slithering between our rubber boots on the deck. I got down on my hands and knees to rescue them, too. This was a clear violation of my job description, so I tried to do it quickly. But catching them was like picking up wet hair from a bathroom floor, except they wiggled. OPG had never been noticeably warm to my inquiries about eels, or to my demands to take part in this last release of the summer. I half-expected Ron Threader, the biologist in charge, to tell me that I was literally getting under foot. He might also have reasonably observed that with the completion of the day's work, OPG would have introduced two million elvers to the lake and river, against which a few eels in the bottom of the boat were insignificant. Instead, he knelt beside me. "You need to catch them under your fingernail," he said. He expertly caught one and flicked it overboard. We stayed there until we got them all. So it was a good day for eels, even the stragglers — and, not incidentally, a good day for Lake Ontario.

Attachment E

Fact Sheet
World Commission on Dams

What was the World Commission on Dams?

The World Commission on Dams (WCD) was established by the World Bank and IUCN — The World Conservation Union in May 1998 in response to the growing opposition to large dams. Its mandate was to:

- review the development effectiveness of large dams and assess alternatives for water resources and energy development; and
- develop internationally acceptable criteria, guidelines and standards for the planning, design, appraisal, construction, operation, monitoring and decommissioning of dams.

The 12 Commission members came from a variety of backgrounds, representing a broad spectrum of interests in large dams — including governments and nongovernmental organisations (NGOs), dam operators and grassroots people's movements, corporations and academics, industry associations and consultants.

What did the WCD do?

The WCD relied on extensive public consultation and commissioned a large volume of research. An associated Forum with 68 members from 36 countries representing a cross-section of interests, views and institutions was consulted during the Commission's work. The $10 million necessary to fund the Commission came from more than 50 governments, international agencies, private corporations (including many of the main dam industry multinationals), private charitable foundations and NGOs.

To conduct the most comprehensive and independent review of the world's dams to date, and base its conclusions on a solid foundation, the WCD commissioned and assessed:

- in-depth case studies of eight large dams on five continents, and papers assessing the overall dam-building records of China, India and Russia;
- 17 thematic reviews on social, environmental, economic and financial issues; alternatives to dams; different planning approaches and environmental impact assessments;
- brief reviews of 125 large dams in 56 countries;
- four public hearings in different regions; and
- 950 submissions by interested individuals, groups and institutions.

The Commission's final report, *Dams and Development: A New Framework for Decision-Making*, was released in November 2000.

What were the WCD's main findings?

The WCD found that while "dams have made an important and significant contribution to human development, and benefits derived from them have been considerable ... in too many cases an unacceptable and often unnecessary price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers and by the natural environment." Applying a "balance-sheet" approach to assess the costs and benefits of large dams that trades off one group's loss with another's gain is seen as unacceptable, particularly given existing commitments to human rights and sustainable development.

The WCD's final report provides ample evidence that large dams have failed to produce as much electricity, provide as much water, or control as much flood damage as their supporters originally predicted. In addition, these projects regularly suffer major cost overruns and time delays. Furthermore, the report found that:

- Large dams have forced 40-80 million people from their homes and lands, with impacts including extreme economic hardship, community disintegration, and an increase in mental and physical health problems. Indigenous, tribal, and peasant communities have suffered disproportionately. People living downstream of dams have also suffered from water-borne diseases and the loss of natural resources upon which their livelihoods depended.
- Large dams cause great environmental damage, including the extinction of many fish and other aquatic species, huge losses of forest, wetlands and farmland.
- The benefits of large dams have largely gone to the rich while the poor have borne the costs.

Jerry Noll
368 Springbrook Road
Shohola, PA 18458

To;
Atlantic States Marine Fisheries Commission.

July 14, 2014

In regard to the informatonal meeting held in Narrowsburg, NY, concerning the Draft Addendum (4) to the Interstate Fishery Management Plan for American Eel.

After attending the meeting and reading the Executive Summary, it appears the A.S.M.F.C. would put unfair restrictions/ regulations on the Commercial Silver Eel Fisheries.

Realizing the Status Quo cannot be continued, the Commercial Silver Eel Fisheries Measures, "not Options" (please explain), are:

#2. Extension of Sunset Provisions (never defined)

#3. Effort Reduction/Time Closures

#4. License Cap.

As a commercial fisherman I would like to have the same options available to the Silver Eel Fisheries that were presented to the Glass and Yellow Eel Fisheries.

We were not given any other options as were:
Commercial Glass Eel; Options # 2,4,5,6,7,and 8.

Commercial Yellow Eel; Options #2,3,4,5,6,7,and 8.

Thank you for your time and receiving public comments.

Sincerely,
Jerry Noll

From: Lisa Somes [Lisa.Somes@jax.org]
Sent: Monday, July 07, 2014 8:36 AM
To: Comments
Subject: glass eel fishery

I am an elver fishermen and have been since it began back in the 1990,s . I am concerned about the future cut backs that are proposed. I don't believe there is enough science to warrant further cuts to our fishery. If further cuts are made i am concerned we will not have much of a market left, not to mention what it would do to our local and state economy. I would like to see more research done , and we as fishermen could help by doing surveys along with the marine patrol in rivers , streams, and lakes in our state to see what kind of adult population are living in these waters. I believe the State of Maine has shown that it takes this fishery seriously and with the changes it made in 2014 spring season we should be able to keep the quota as is, not reduced. My husband and I both fish and this has been a huge boost to us in the spring, even when it wasn't 2000.00 a pound we depended on the season to catch up on oil , and other bills incurred during the long winter. Please consider what further reductions would do to us individual fishermen and the economy of our State.

Thanks Lisa Somes

From: Lynette Dimock [sldimock@sbcglobal.net]
Sent: Tuesday, June 17, 2014 8:13 PM
To: Comments; lmcmillan@ctenvironment.org
Subject: American Eel

Please save the American Eel population by protecting glass eels. They are a crucial part of the aquatic food web, serving as a food source for migratory birds and game fish. American Eels also help waterways stay clean and healthy by eating dead animal matter that other animals won't eat.

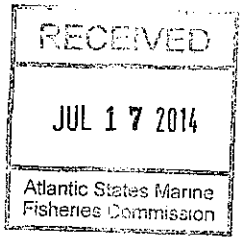
Don't let over fishing destroy this important species. Put regulations in place that will allow the population to recover.

Thank you,
Lynette Dimock

Kate Taylor, Senior FMP Coordinator

1050 North Highland St., Suite 200A-N

Arlington, Virginia 22201



07/14/14

Dear Ms Taylor,

Enclosed please find (1) A letter to the American Eel Board outlining my concerns in relation to the Elver Fishery in Maine, and (2) An article that I wrote after years of research and experience titled "Eel Fisheries 1963-2013". I was told by Julie Keene, Secretary of the Maine Elver Fisherman's Association, that you were the person to send this to so that they will get passed on to the American Eel Board.

I thank you for all of your help in this matter. If you have any questions, I can be reached at (207)483-6643.

Sincerely,

Luther C. Choate

Luther C. Choate

406 Water Street

Addison, ME 04606

07/14/14

Subject: American Eel

Attn: American Eel Board

My name is Luther C. Choate and I am one of the two people that started the glass eel fishery in Washington County, Maine in the spring of 1971. I hope you will take the time to read this entire letter as it may help you understand why it is of great importance that the glass eel season not be cut any more than it has been. This is NOT a big money area and one has to be versatile to make a living here, especially with all of the restrictions that we already have. I have been a lobster fisherman, a marine worm digger, a clam digger, a scallop dragger , a herring and silver eel weir fisherman as well as a glass eel fisherman since I was honorable discharged from the Army in 1958. I have also been a Deputy Sheriff for the last thirty-nine years. I have been able to glean from each of these vocations a considerable amount of knowledge.

I have a daily log all the way back to the spring of 1958. If it would be of any help to you I would be willing to share the information that I have documented in my log books on the American Eel for over half a century. [Please note: I was just reviewing my log book records for 1971, for example, and on the 4th of July I dip netted three pounds of elvers and on the 5th I caught five pounds. I have been back to that same location this year in July and found that the elvers are still coming in in July of 2014. This leads me to believe that they come into the rivers for most of the summer, unnoticed unless one looks for them at just the right time on the incoming tide. The elvers that I saw in July this year were just as thick as they were in 1971.]

It is my belief that there are more elvers now than there were when we started. Years ago we never got any really large catches like the ones being caught on some of the big rivers today. We get good years and bad years elver fishing, just as we do on everything else, an example of how nature controls things better than people do. I do not believe that the way the state has set the limits is fair in any way.

The limits were set from what each individual caught over the previous three years, some people getting very small limits while the "glutton" got huge limits. I had heart surgery during this evaluation period so I was given a very small limit with no consideration for bad health during those years. The fact that I was one of the two people that got this fishery off the ground was also never considered. The only fair way to handle limits is to give everyone the same limit. If some fall short of their limit the result would be a built-in reduction in overall catch, if you are really serious about conservation . ONE MORE THING THAT I THINK SHOULD BE MENTIONED IS THE FACT THAT THE SWIPE CARDS ARE WORKING TO REDUCE THEFT. I did not have any elvers stolen this season like I have had in past years. I was typically having nets hit two or three times a season and this season I did not have any nets bothered. It appears to me that the swipe cards have eliminated 99% of what poaching went on in previous years.

I really thank for reading this entire letter, including the attached article that I wrote, Eel Fisheries 1963 to 2013, and though we may not agree on all the things I have written about, I hope you can tell that I am indeed interested in keeping the glass eel season open since the longer we fish the more we can learn and there is still so much more to learn about the American eel.

Sincerely,

Luther C. Choate

EEL FISHERIES 1963 to 2013

When I started potting yellow eels on the Pleasant River in about 1963, back when there was a fish factory operating in town and eels were just "boiling" in the river around the factory, I could not have imagined that the fishery would ever be as valuable as it is to the state of Maine now. Eels were very cheap when I was potting them and not worth a whole lot more in the 1968 when my partner and I ran five weirs for silver eels on Tunk Stream, Six Mile Dam on the Mopang, Little River and Pleasant River in Columbia and Sabio Dam in Township #Thirty-Five, Middle Division. We didn't make any money on the silver eels that year as there was a drought during August and September when the eels would normally leave the rivers for the Atlantic Ocean and very few went out through that season. Additionally, what eels we did catch were not worth much. After we figured out what we spent to build the weirs and the cost of gas, I'm not even sure we broke even.

I believe it was in 1971 when my brother, George, and I were contacted by a biologist from Sea and Shore Fisheries. He wanted to know if we were interested in working on a project to find out if there could be a viable elver fishery in the State of Maine. All three of us thought it would be interesting and started building devices to capture elvers. We kind of went by trial and error, quite a lot of error at times. That first season none of us made any money on elvers but as years passed the fishery kept growing but eventually elvers did very slowly increase in price. Prices varied from five dollars a pound to twenty-five dollars a pound for quite a few years. Over these years many people tried elver fishing but most of them dropped out when they found out that it was a lot of work and not as lucrative as they thought. A few of us hung in there and kept building fyke nets and dip nets, and eventually we learned to catch elvers and were rewarded when the price increased slowly to what it is today.

After fifty years of eel fishing I hope I have learned something about them, but I also realize that there is still a lot that is unknown. There is quite a lot of information on the internet since quite a bit of research has been done by biologist on the American Eel. People in the know have told us that during

the year the adult eels come out of the eastern rivers to make their spawning trip to the Sargasso Sea, where they die after spawning is finished. The young elvers are caught up in the Gulf Stream current and are carried along the coast where they eventually work their way up the rivers to repeat the whole process. These elvers are in what is known as the floating leaf stage while they are in the Gulf Stream and transform to a cylindrical shape as they work their way up the rivers. We are told by the biologist that they are not river specific which means that they do not return to the same waters that the parent eel came from. This tells us that an adult eel that came out of a river in Florida could have young that would end up in a Maine river and vice versa. In other words, it is believed that mom or dad adult eel could come out of the Hudson River to spawn and die and junior could move into the Penobscot or the Machias River in Maine. It is well known that Maine and South Carolina are the only states that legally harvest elvers. That tells us that all the other states along the coast that do not have an open elver season have adult eels going to the Sargasso unencumbered to spawn. Think about it. It would mean that South Carolina and Maine could not possibly harm the eel population because there are adult eels pouring into the Sargasso from all those other states that have no eel season and their young are returning to all the states as well as Canada.

Another thing that I have observed over the years is the effect elver fishing has on the Maine smelt population. Back when we were allowed to use five fyke nets there was an abundance of smelts. They spawned on the nets just as they do on burlap put into brooks by biologist who want to reintroduce smelts where there are no longer present in abundance. Spawn on fyke nets are somewhat protected. I have seen spawn on them thick enough so it could have been scraped off with a putty knife. It is my belief that when the extra nets were taken out of the water the smelt population crashed. Perhaps this is one of those situations where one fishery enhances the other.

With the experience that I have had with the American Eel, *Anguilla rostrata,* over the past fifty years, I have come to believe that they will never be threatened with nets. Anyone can have an opinion

fishery has put close to 40 million dollars into the Maine economy and helped a lot of people at the time of the year they need to put food on their tables and put fuel in their tanks to heat their houses. THIS IS PROBABLY THE BEST REASON NOT TO FIX SOMETHING THAT IS NOT BROKEN SO THAT A HANDFUL OF PEOPLE CAN HAVE A FEEL GOOD FEELING ABOUT THEMSELVES.

ASMFC American Eel Committee Members,

As owner of Chesapeake Star Seafood, the largest American Eel buyer on the Chesapeake Bay, I would like to provide comment on Draft Addendum IV To The Fishery Management Plan For American Eel.
I would also like to provide some insight and observations from the industry point of view and from our fisherman who are spread across the Chesapeake Bay.

The goal of the ASMFC, as stated, is to increase overall conservation of American Eel stocks.

My concern is that the conservation method proposed in Draft Addendum IV will have the opposite effect and will be in direct opposition to the ASMFC goals.

I see every year that eel recruitment is increasing. Our fisherman are seeing larger numbers of small eels this year than many of them have seen since they first began eeling, some as far back as the 80's. These increased recruitment levels should be the focus of the ASMFC conservation efforts.

A quota based management system for the American Eel is not a proper conservation method. In Virginia, for example, a quota based management system this year would have ensured that over 50% of that total quota would be comprised of the very same small eels that the ASMFC has a goal of protecting. This is conclusively based on the percent of small eels vs large eels that have been purchased and graded by size. Furthermore, in Maryland, closer to 60% of that total quota would be filled with small eel catch.

It is with this reality that I am in favor of the Status Quo option proposed in Draft Addendum IV, only because I do not feel that quota based management will be effective in increasing the overall conservation of American Eel stocks.

Thank you for your consideration of this recommendation.

Matt Pruitt
President
Chesapeake Star Seafood
410-905-4721

John M. Williams Company, Inc.
BOATBUILDERS • MOUNT DESERT, MAINE
THE HOME OF STANLEY YACHTS

Hello,

My Name is Michael Clough and I have been fishing for elvers since the late 90's. The last three years I have personally seen a dramatic increase in the number of Glass eels coming into our waters, not only During our short season, but a lot After in the month of June. This last season I was Able to reach My Personal Quota in About seven days of fishing. I Also had to release seven Pounds on My last night to Stay below My personal quota. I strongly feel the Quota System Should be done away with, and put back to the way it used to be. I know this year would have been an Absolute bommer year for Myself, and MANY others. I have never seen so MANY elvers as I witnessed this year. Please take into Consideration that Many of us rely heavily on Eels to Provide for our FAMILYS. Thank you.

Registered MAINE Guide
Michael Clough

P.O. Box 80 • 17 Shipwright Lane • Hall Quarry • Mount Desert, Maine 04660
207-244-7854 • fax 207-244-9912 • jmw@acadia.net • www.stanleyboats.com

TO KATE TAYLOR, ATLANTIC STATES MARINE FISHERIES COMMISSION

I, MICHAEL KLINGERMAN AM 62 YEARS OLD. I HAVE HAD AN EEL PERMIT FOR THE LAST SEVEN YEARS.

IN RESPONSE TO THE EVALUATION OF ASMFC TO RENDOR A DECISION OR DECISIONS FOR OUR EEL FISHERIES MANAGMENT OPTIONS, I STRONGLY URGE THE ASMFC TO OPT FOR OPTION TWO (2). THIS OPTION SEEMS TO BE AN IDEAL SOLUTION AND FOUNDATION TO START FOR REGULATION OF OUR INDUSTRY, ELIMINATION OF LAWS BEING BROKEN EG. POACHING ACROSS STATE LINES AS WELL AS POACHING IN MAINE

THE QUOTA OF 11,749 POUNDS SEEMS TO BE SMALLER THAN I EXPECTED, BUT A REDUCTION IN THIS QUOTA FOR THE UPCOMING YEAR (2015) SHOULD NOT BE WARRANTED W/O FURTHER RESEARCH AS TO DETERMINE THE VOLUME, POPULATION OF GLASS EELS AND THEIR IMPACT ON SURVIVAL RATES EXCLUDEDING FISHING EG PREDATOR RATES, DAMS AND OTHER OBSTRUCTIONS, I could BE WRONG BUT IS A WAY THAT ASMFC HAS BEEN ABLE TO ACTUALLY DETERMINE THE ABUDANCE OR EELS UP AND DOWN THE ATLANTIC SEABOARD?

THE QUOTA SYSTEM I SURE HAS BEEN A HARDSHIP FOR MANY FISHERMEN AND THEIR FAMILIES? I STRONGLY OPPOSE ALL OTHER OPTIONS THAT THE BOARD HAS CREATED.

for example taking away a portion of Maine and S. Carolina's quota to supplement Aquaculture Farming in another state, N. Carolina? I Believe this is option seven (7)

The state of Maine has done a good job laying down a foundation to alleulate poaching problems, people who fish w/o proper ID's, and disobeying rules.

The state has also recognized that dams and other obstructions of passage for Glass eels to reach maturity, this is and ongoing challenge and wil continue to be if we do not continue to pursue these roadblocks to sustain our fishery long after we have left this earth.

I tried to mention just a few problems that face this industry not withstanding other areas of vital concern. I hope this letter lets you understand how a lot of eel fishermen feel, please consider my plea and maintain option two (2) as a viable option to preserve our fishery

Sincerely

[signature]

Member of M.E.F.A,
Former United Steelworkers Union President (3047)
B.S. From Youngstown State Universi

10 Beals Ave.
Eastbrook, ME
04634

EASTERN MAINE 044
14 JUL 2014 PM 1 L

Kate Taylor / Atlantic States Marine Fisheries
1050 North Highland Street
Suite 200-A
Arlington, VA
22201

22201825

From: nancy c messer [212sva@optonline.net]
Sent: Wednesday, June 18, 2014 11:32 AM
To: Comments
Cc: lmcmillan@ctenvironment.org
Subject: American Eel

Dear Kate Taylor,

I support maintenance of the bio-system and its integrated diversity which ultimately supports the human species. In this context, I believe protecting the glass eel is worthwhile because the effort supports bio-diversity. Short-sighted destruction of habitat and foolish over-fishing destroys the opportunity for a healthy environment to bequeath to the next generation.

Regards,

Nancy C. Messer

Dear Ms. Taylor;

I am writing with deep concerns about the prospects for recovery of American Eels and Glass Eels. We have worked so hard for so long in our state to clean up our waters, deconstruct dams, and protect marshlands. We must also protect the Eels residing in our state. They are a critical food source for many birds, some of whom are on the Endangered List. In fact, the Eels themselves belong on the Endangered List and should be added as soon as possible.

In the meantime, it is our responsibility to protect Eels and see that their numbers can recover. I urge you to support this mission and I support every effort the Marine Fisheries Division can possibly make in this quest.

I hope to be at the meeting in Rocky Hill, but please include my voice in supporting all efforts to protect our precious Eels.

Thank you for your work,

Noreen P. Cullen
Glastonbury

To: Kate Taylor, Senior FMP Coordinator
Atlantic States Marine Fisheries Commission
1050 North Highland Street, Suite 200A-N
Arlington, VA 22201
Email: comments@asmfc.org (cc: kahattal@gw.dec.state.ny.us)
FROM: Ray Turner, eel fisherman, Hancock, New York
SUBJECT: American Eel - Policy considerations regarding eel weirs on the Delaware River
DATE: July 15, 2014

Thank you for the opportunity to present my views on the referenced subject. The habitat for the American eel extends from Colombia, South America, to Nova Scotia and includes a large portion of the Mississippi watershed. In your consideration of the impact of eel fishing on the Delaware River, I believe you are missing the larger context.

Commercial fishing on the Atlantic coast, according to documentation dated June, 2014, totaled 978,004 pounds, landed in 2010. Contained in the handout document at the June 30, 2014 open meeting in Narrowsburg, NY, per Table 9 on page 3.1.3, the average yearly total for Delaware River eel fishing, from 2003-2012, is 5373 pounds. The Delaware watershed landing is 0.5% – less than one half of a percent - of the Atlantic coast landing.

I feel that using a number at less than half a percent as regulatory data should be re-examined.

The Anguilla rostrata eel is a North American resource. The largest percentage of those landed – as much as 85-90% - is being shipped overseas. At the same time, the species is being considered for endangered status. We need to either stop or drastically reduce exports.

The move from 6" to 9" size limit is a good step, but for a species that could reach endangered status and is still used for bait, this represents mismanagement of the resource.

The concept of carrying capacity of a geography is what sustains the species of that area, as discussed at the Narrowsburg meeting on June 14, 2014. The D.E.C. is stocking trout in the Delaware. I feel that a body of water

containing a life form in decline and adding foreign competition for food supply has a negative effect on all the water's inhabitants. The trout being introduced are not of this area, and they compete with all other inhabitants. I understand that trout fishing in the Delaware generates considerable revenue for the area, but at what cost to indigenous declining species? To stock trout has its merits, but why not stock glass eels from heavily landed glass eels populations into the areas that show eel decline?

Again referencing the document from the Narrowsburg meeting, Item 3.1.3. regarding silver eel fisheries – the chart shows reporting for July through November. If the Effort Reduction option becomes part of silver eel management, as a fisherman I would sacrifice July and November and allow eel harvesting during August, September, and October. Three months out of twelve is an acceptable approach.

Thank you for the extension relating to eel harvesting in 2014.

The low percentage (0.5%, cited above) that represents Delaware watershed harvesting of eels compared to total coastal harvesting indicates to me that the impact of eel weir fishing on the Delaware is minimal in the larger context, and such fishing should be allowed to continue. The no permission from September 1 to December 31 would eliminate harvesting during the eel run, which occurs during a week around 29 September, depending on migration indicators, water temp, new moon, etc. We fishermen need the period August through October to allow for the tremendous effort to construct a weir and be ready for the harvest, or the operation cannot be successful.

Eel weir fishing is an ancient, Native-American type of fishing. North America can preserve this heritage without destroying the livelihood of fishermen such as myself, who arguably have the strongest interest of all in preserving the Delaware ecosystem and maintaining a healthy eel population.

I appreciate your taking my comments into consideration.

From: 2073232420@mypixmessages.com [2073232420@mypixmessages.com]
Sent: Monday, June 30, 2014 7:11 PM
To: Comments
Subject:

This is Rick Sibley. I fished for a lot years and let my license go. It was a choice between food or fishing. Then got into a lottery and got it back. I had a choice between fike net or dip net. I picked dip net becouse i have seen the mess the fike netter left behind (rope broken limbs and trees stuff like that). I think it should go to dip net only and pick a river and its tributaries and fish them only. Then give everyone the same quota.

Thanks for giving me a chance to speak. Have a good night!

To ASMFC,

I am writing to comment on the Fishery Management Plan for American Eel.

I have eeled for 37 yrs, and have seen ups + downs in the fishery. The ASMFC is not going to see large numbers of eels caught because of several reasons.

The price of fuel:

The price of bait:

Lack of buyers:

A Fisherman can't lay out thousands of dollars for bait, thousands of dollars for fuel, pay their household bills and eat, when you can only sell their live catch every 2 to 3 weeks.

As far as a management idea for yellow eels, I believe a 1/2" x 1" panel in the pot would let the small eels escape and grow in the rivers and bays. The buyers could still get enough bait eels out of that size for the recreational StripedBass market.

Thank you.

Richard Huether
1630 Town Point Rd
Cambridge, MD. 21613
443-521-0609
rich.7119@yahoo.com

Kate Taylor
Senior FMP coordinator
1050 North Highland St.
Suite 200A-N
Arlington, Virginia 22201

6/30/2014

subject: American eel

Attn: American eel board

Hello, my name is Robert Stanley, a licensed elver fisherman sense 1995. I am asking for option 1. Status quo for the following season. The past 3 years have been the best fishing I have ever seen in the rivers and brooks where I live. This past year, 2014 I was forced to fish for price and not amount, meaning I didn't fish my usual high yield spots and had to hold my catch to the very end of our season to get the best price.

Our state has opened up over 1.5 million areas of habitat in the last 10 years. The young of year survey shows an increas for eels, not a decrease, stocks are stable at very least. If status quo is not at all possible I would at least like to see option 2. The 2014 management plan seemed to wort good this year. I am humbly asking you to please not make any more reductions in our quotas. Our livelihoods depend on our fishery. Outword migration is where our biggest problems are. Hydro companies kill thousands of pounds of spawning eels every season. How come there isn't an option to hold hydoo companies to a standerd? Why do us, the fisherman have to pay for what there doing? Address the real problem, the hydro companies.

Our state has a small quota of 11,779 lbs for eels. Southern states have much higher quotas. Maryland for example has a 522,000 quota. How come there not getting a reduction in quota? How is that fair?

Sincerely, Robert Stanley

14 Libby RD
Gouldsboro, Me, 04607

Dear Kate Taylor,
Senior FMP Coordinator

My name is Rosalyn Kim , my husband Juho Kim is license holder about 10 years. When he go to the eel weir, I always go with him. Thank you so much for giving us opportunity to write on our part.

We are hard working people who trying to make extra money and also enjoying working in the water. Before water get the colder, we move heavy rock to file the eel weir. This is hand labor work. It wasn't easy to figure how to make eel weir. We couldn't catch any for few years. When I went to the museum, it exhibit how the Indian fish in the river.

In part of Delaware River, there is few eel weir that catch the fish same way our ancestor did. I was amazed we are doing what our ancestor did. And it might be part of river culture to be seen for next generation. I think this is part of our river culture anybody doesn't want to be missed and need to be conserved too. People could look what fisherman do in the river; they might be thinking that it is beautiful moment what natures give to the people.

So please let us keep the license.

We would like to dare to say how we are doing is not harming any nature balance. Amount we are catching is not a lot. If water is getting high, water flow fast, you need to fish out otherwise, you lose them all. Water get high fast then eel weir is ruin by water and you are done for the season. It is very lucky right amount of water flow to be fishing. Water flow is low, we not getting any eels. We need to clean so many leaves and one leaf clot the hole, you done for that day. Daily trip at least twice to eel weir is time consuming and a lot of effort. Without the passion what he is doing, I don't think it couldn't keep that job even this is also dangerous sometime.

What I am trying to tell is we are not getting fish as much as you think but we are like to keep doing this because we got used to it and we love to do it.

Time goes by and we learn how to build the eel trap and eel weir. Nobody tell you how to do except regulation that we suppose to keep. It is about 10 years we are doing and we are kind of expert on this. America eel is natural resource in the river that migrate to other country and it doesn't stay in one place and weather change might be reason that warmer place to move to.

Please keep our license as long as we can.

Thank you for your generous consideration.

Sincerely yours,

Rosalyn Kim, Juho Kim
385 Gumaer Falls Rd.
Wurtsboro, NY 12790
(845)888 0034

July 11, 2014

Kate Taylor
Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

To Ms. Kate Taylor,

I am writing this request for change to the Addendum IV American eel management plan on behalf of a group of Maine citizens with extensive experience in the aquaculture and seafood industries. We are interested in the aquaculture of eels in Maine and do not want to see the species listed as endangered or threatened. We believe aquaculture can play an important role in the future of the American eel if a management plan supports aquaculture exclusively in states with established glass eel fisheries and advocates for aquaculture based restocking programs.

We do not support the current draft's proposal for a separate aquaculture allotment. A more practical approach would be for aquaculture programs in states with glass eel fisheries to purchase glass eels from established buyers, who operate under one state quota, rather than creating two separate quotas – one for market and one for aquaculture. The group believes that this separation of quotas would not only create an economic loss to the state but it would also create unnecessary competition.

Furthermore, focusing industry development in states with established glass eel fisheries will give incentive to those states to support efficient development and management of aquaculture to maximize economic benefits. Allowing these states to manage their quotas would keep the market stable and allow the aquaculture programs in those respective states to flourish.

In addition to economic benefits, an aquaculture industry for eels could bring increased spawning stock to the entire American eel fishery when coupled with restocking programs. Our group would like to see restocking programs that use aquaculture, as several European studies have shown higher survival to silver eel stage when using larger farmed juvenile eels for restocking. These programs, which would maximize the amount of silver eels going to spawn from Maine and South Carolina, could be supported with reimbursement or an increase in glass eel quota allotment based on restocking practices.

We believe addressing aquaculture in the management plan is critical to the future of the American eel and keeping it off the endangered species list. We would like to see the Addendum IV changed to allow eel aquaculture only in states with glass eel fisheries and for it to include a requirement for restocking plans.

Sincerely,

Sara Rademaker
rademsc@gmail.com
260-417-2893

Des Fitzgerald

Frank Simon

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Scott Minish
9210 Deerpark Lane
Charlotte, NC 28277

As a resident of North Carolina, I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a big importer of processed eel product. The American Eel Farm (AEF), a local North Carolina small business located in Trenton, working with the State of North Carolina, is a state-of-the-art facility that has the capability and could demonstrate the feasibility of raising disease free, sushi grade American eel to supply American markets that now depend mostly on imported product. Other states need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels for aquaculture at the AEF will be a good opportunity to assess in NC the annual recruitment of each year's cohort which is unknown. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV would be met and provide eel fishery information which is needed for this data poor fishery. The sampling/collection protocol would be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the NC Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. The AEF has a history of working with the NC State Cooperative Extension Service. A NCSU Area Aquaculture Agent, and other university scientists and students would have an opportunity to work on collecting data concerning the production side of the AEF and the potential for stocking farm raised eels at a to-be-determined size to increase populations of yellow eels in NC and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. A production/research facility such as the AEF can contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow this facility and others in coastal states to get started. cc: Garry Wright

American eels are a critical food source for migratory birds and game fish. They spawn in the ocean and then navigate upstream in spring, to spend 20-40 years in freshwater lakes and ponds as they mature into adults. The state of Connecticut and other groups have spent significant money to clear passages and dams in the state to enable passage of the eels upstream.

Overfishing is a major problem; given Asian markets find them a delicacy. Humans have other items to eat whereas our birds and fish have much more limited choices given human activity. The U.S. Fish and Wildlife Service is considering putting them on the Endangered Species List. Please help by protecting them!

Sincerely,
Shirley McCarthy, M.D., Ph.D.
Professor, Diagnostic Radiology
and Obstetrics and Gynecology
Yale University School of Medicine
333 Cedar St, New Haven, CT 06520
off: 203.785.2384

Dear All:

I have been involved in river restoration efforts in Connecticut for over ten years working as a project manager for several land trusts, Trout Unlimited, Connecticut Fund for the Environment and others. While most of our efforts have been directed at improving migratory fish passage for alewives and blueback herring, eel passage is becoming a mainstream goal in all of our projects.

Eels used to be much more abundant in my life time. Older residents of Branford, CT, talk about regularly spearing eels as well as catching them while fishing.

Please take all actions needed to bring back eels to their relative abundance in the fresh and salt water environments on the East Coast. I would support a ban on all glass eel fisheries as well as major reductions on the yellow and silver eel fisheries. There are lots of substitutes for fishing lures and baits.

Regards,

Tom Cleveland
tomclevelandjr@gmail.com
Cell: 203-981-9040

6/30/2014

Kate Taylor
Senior FMP Coordinator
1050 North Highland St.
Suite 200A-N
Arlington, VA 22201

RE: American Eel for the American Eel Board

There are more and more eels on our rivers and streams every year. When I started fishing over 20 years ago, the glass eel population was a fraction of what it is now in our waters. Although the season started two weeks late this year I still finished the season with two weeks off left because of filling my quota.

The income this fishery provides my family and my community is critical. Any option other than option 1 is unacceptable for the reasons I have stated above. The cuts made were unnecessary and had an adverse effect on our markets and our income. Because of the uncertainty of the availability of eels for this year's market, many farmers loaded up with Pacific eel which ended up decreasing the demand for our eels.

I urge you to support Option 1 status Quo.

Sincerely,

Velton Alley Jr.
Jonesport Maine
Elver Fisherman

Comments on DRAFT ADDENDUM IV TO THE FISHERY MANAGEMENT PLAN FOR AMERICAN EEL FOR PUBLIC COMMENT (17 July 2014)

John Waldman, Ph.D., Queens College, City University of New York

Karin Limburg, Ph.D., State University of New York – College of Environmental Science and Forestry

Merry Camhi, Ph.D., Director, New York Seascape Wildlife Conservation Society

Points of Reference

The addendum acknowledges that American eel history indicates that eels made up 25% of East Coast stream-fish biomass. And that eel is now at or near *historically low levels*. That, in itself, is compelling, but likely minimizes the extent of the decline because of how "history" is defined. Examination of colonial and early post-colonial accounts of eel abundances shows them to have existed in truly extraordinary numbers that swamp our normally accepted reference points.

Here is one account from a newspaper that was reported in Annual Report of the Commissioner of Fisheries, New York State (1899): a Mr. Wallace who was informed by his wife, who had gone to the Big Bushkill (Delaware Basin) in Pennsylvania for a pail of water that there was a mass of eels ascending the creek. Mr. Wallace went to the creek and for awhile ". . . watched a procession such as he had never seen before . . ." The four-inch long eels formed a dense column up to three-feet wide, that was rapidly making its way upstream. Mr. Wallace left and returned an hour afterward and found the line still going." Remember that this was just one of thousands of streams and other spurs glass eels could turn off to after traveling from months with the Gulf Stream and then deciding to move towards the coast.

Also, from *Running Silver* (Waldman 2013): "While near Onondaga Lake in 1655, a medium-sized water body within the Oswego River watershed, missionary Father Chaumont wrote of the Indians that 'the eel is so abundant there in the autumn that some take with a harpoon as many as a thousand in a single night.' Catches of eel were so high in the late Seventeenth Century within the St. Lawrence drainage as to be considered 'an infinite quantity.' Further reports from that period estimated eel were once considered the most common fish along with salmon. Indeed, the lowly eel may have been more important to New England and St. Lawrence region Native Americans than more glamorous diadromous species such as salmon, shad, or sturgeon." Today, the Iroquois have an Eel Clan, but fewer and fewer clan members have even seen live eels.

"In 1958 the ninety foot-high Moses-Saunders Power Dam came on-line on the St. Lawrence, flooding ten communities near Cornwall, Ontario, that came to be known as the Lost Villages. It also was a losing proposition for the American eel, following by twenty-six years construction of another dam on the St. Lawrence at Beauharnois, Quebec. Maybe one of the few plusses to placing obstacles such as dams in the path of migrating fish is that sometimes they provide a way to count those passing through. But

because of the detrimental effects of dams, these counts rarely provide good news. Since the early 1980's, biologists have counted young eels moving up an "eel ladder" that zig-zags its way over Moses Saunders Dam. In the mid-1980s, between 25,000 and 30,000 pencil-sized eels a day slithered up the ladder and over the dam on they moved upriver towards the Great Lakes. "It was just seething with eels," said John Casselman, an eel expert with the Ontario Ministry of Natural Resources. The population of young eels coming up the ladder had plummeted from nearly a million in the 1980s, to about one-hundred thousand in the early 1990s, to less than ten thousand in the late 1990s, to near zero in 2000. Today, peak numbers are only 20 or 30 a day, Casselman said, and those eels are not young eels moving upstream, but larger ones simply moving back and forth on the river. Lake Ontario had once been dominated by eels, with female eels perhaps constituting one-half the flesh of its inshore fishes; today, nary an eel is to be seen." Eels are more or less extinct in the New York drainages to Lake Ontario (Dittman et al. 2006; Report from USGS Great Lakes Science Center, Cortland, NY).

Continued from Waldman (2013): "Upstream of the dam, Lake Ontario alone was home to 5 to 10 million eels as recently as two decades ago. That number has declined to several tens of thousands as old eels migrate out and are not replaced by young eels. "It is like our passenger pigeon," Casselman said. In Oneida Lake, in the Lake Ontario watershed, in the early 1900s one-hundred tons of silver eels were taken annually; after dams and canals were built on the Oswego and Oneida Rivers only two eels were caught in research sampling in Oneida Lake over a 25-year period."

Tractability and Effectiveness

The assessment found the stock of American eel is at or near historically low levels due to a combination of historical overfishing, habitat loss and alteration, productivity and food web alterations, predation, turbine mortality, changing climatic and oceanic conditions, toxins and contaminants, and disease. These dozen or so factors are broadly accepted as contributors to eel declines. But they present a broad spectrum of saliency towards what ASMFC can do to restore the eel stock. Most of these factors simply don't provide any immediate management tractability and effectiveness. The factors that ASMFC can actually influence on meaningful time scales are overfishing, habitat loss and alteration (via dam removal and implementation of eel ladders), and turbine mortality. However, by far the most salient, tractable, and effective of these over the short term is reduction in fishing mortality.

Our Recommendations

The Status of the Stock section (2.4) of the draft addendum states, referring to the benchmark assessment: "The assessment indicated that the American eel stock has declined in recent decades . . .". And that "The stock is considered depleted, however no overfishing determination can be made at this time based solely on the trend analyses performed." Virtually all of the data plots and analyses presented in the Draft Addendum only go back as far as the mid-1900s. This near-term analysis is misleading, giving readers the sense that eel stocks are in some trouble that may or may not be detectable in quantitative analyses.

However, the growing field of historical ecology is again and again making the point that earlier anecdotal observations are as real and important (and often even more important) than highly quantitative short-term analyses. The deviations in eel metrics among recent years may be viewed as little more than noise along an asymptote of long-term eel decline. That is, considering the typical dramatic long-term slope seen in plots for diadromous species, the focus currently is on minor wiggles on the far right side of the graph along the asymptote of the x-axis rather than huge crash from way up high on the y-axis. What is lacking in the ASMFC analyses is recognition of the severe crash that American eels have experienced throughout their entire post-colonial history. Simply put, the points of reference are wrong—what is taken for acceptable and perhaps normal is drastically below what unadulterated eel abundances looked like. For this reason, we advocate Draconian measures to initiate a meaningful restoration, one which enables the American eel to gain play its important role in aquatic ecosystems.

We are not recommending particular sets of the options presented. However, we remain especially concerned with the glass eel fisheries. The only reasonable option we see is to close them. It makes no sense to allow two states to maintain these fisheries for a panmictic species, in which the take in these two states eventually diminishes eel numbers in all of the states. It also doesn't make sense to open these fisheries in other states, given the need to protect eels, and that this fishery has been associated with societal conflicts and an increase in poaching. Indeed, the ease of poaching, combined with high prices for glass eels, is a recipe for continued declines, unless truly stiff penalties are imposed.

Those responsible for management of American eels need to think beyond tweaks towards minor abundance increases that will sustain minor fisheries and to recognize that the American eel is a species that has truly crashed and is in need of orders-of-magnitude level restoration.

Kate taylor ATTN: American EEL

I would like to see Option 1 status Quo
For the Following ~~Reason~~ Reason

IN the past 4 years I have seen more glass EEL
That I Filled my personal QuotA IN 8 days
Maine has opened up over 1.5 million areas OF
Habitat in the last 10 years The young of year
survey shows an Increase For EELs, not a decrease
OR at least it shows a stable stock.
IF status Quo is not Passible Then I choose
Option 2. we DONT Need anymore Reductions
I Think we should go back to 2012 Quo.

thanks

Kevin
Cyhife

Kevin White **Maine Elver Fishermen Association**
June 29 at 2:31pm

I just want to point out that the amount of yellow eels caught on the East coast by member states of the ASMFC totals just under 1 MILLION pounds annually, with over 500,000 lb of that being caught in Maryland alone. (That is over 500,000 pounds!) Maine catches less than 2% of the total eel weight for the whole east coast annually. These yellow eels represent the 1+ year old survivors of the estimated 99 percent mortality rate of the glass eel. However no cuts or quotas have been established for this life stage. No emergency legislation was ever passed. Just something to keep in mind during the meetings.

Like · Comment

Write a comment...

Maine Elver Fishermen Association You will want to put that in on your comments. When you send it in before July 17th.
Like · Reply · 5 hrs

Chat (Off)

6/30/2014

Kate Taylor
Senior FMP Coordinator
1050 North Highland St.
Suite 200A-N
Arlington, VA 22201

RE: American Eel for the American Eel Board

There are more and more eels on our rivers and streams every year. When I started fishing over 20 years ago, the glass eel population was a fraction of what it is now in our waters. Although the season started two weeks late this year I still finished the season with two weeks off left because of filling my quota.

The income this fishery provides my family and my community is critical. Any option other than option 1 is unacceptable for the reasons I have stated above. The cuts made were unnecessary and had an adverse effect on our markets and our income. Because of the uncertainty of the availability of eels for this year's market, many farmers loaded up with Pacific eel which ended up decreasing the demand for our eels.

I urge you to support Option 1 status Quo.

Sincerely,

William Milliken
Jonesport Maine
Elver Fisherman

June 30,2014

To: Kate Taylor
Senior FMP Coordinator
1050 North Highland Street
Suite 200 A-N
Arlington,Virginia
22201

Subject: American Eel Addendum IV

I am writing in regard to the current addendum being considered by the ASMFC concerning American eels. My fishing experience, observations, and thoughts are mainly concerning the glass eel or elver life stage; as this is the fishery I have worked in since 1997.

First, I would like to commend the State of Maine and Department of Marine Resources for working with the board during consideration of the last addendum to create and put into place a successful fishery plan which allowed a fishing season for 2014. The introduction of the electronic swipe cards, 48 hr consecutive free passage each week, and total allowable season catch showed that they were committed to preserving this fishery which has in recent years been a huge economic boost to the State.

That being said it was a great disappointment to have the allowable catch reduced 42% . The numbers of elver I have observed in the last several years have been at times incredible. This past season, while cold weather delayed the run, was by far the largest I have ever witnessed. I was able to fill my personal quota of 22.1lbs in only 3 nights of fishing. Many fishermen were video taping footage of these massive runs of elver and can only hope they get some of this footage to board members.

While I would love to see the fishery return to status quo and it would certainly be great to able to go back to a derby free for all, clearly that is not going to happen. I do support the system the State of Maine put into place for the 2014 season of IFQ's. The electronic swipe cards made this system easy to keep track of and prevented people without a license to legally sell elver. The biggest disappointment of all this process is that many of the rules the industry is suffering are a direct result of criminals which have been weeded out with this system now in place.

My observations are just that and do not translate to bar graphs [redacted], but similar results seem to jump out at me when I study the young of year reports included in this addendum which are downplayed by the technical committee because ,"The TC stresses high YOY catches in a few consecutive years do not necessarily
correspond to an increasing trend since the YOY surveys can fluctuate greatly."*
I would certainly think if these YOY catches had a few consecutive years of low catches the sky would certainly be falling. For this reason I would strongly oppose any further reduction in Maine's glass eel quota.

The habitat that has been created in Maine for all life stages of American Eel, far out way any other state on the east coast. For the last several years, hydro dams have been removed, fish ways rebuilt, and more damns are scheduled for removal. This forward thinking to reclaim our rivers for all sea run species is a mind set the rest of ASMFC State's should be sharing with their hydro companies.

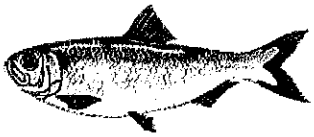
In closing, I feel this addendum is clearly written and targeting the Maine and South Carolina glass eel fishery for elimination. The language of this document distinguishes the silver and yellow eels as fisheries which have much more significance, maybe that is the reason once again neither of these stages have an option for closure of thier fishery. If the American eel is in fact as depleted as some causes would have the board believe, it seems if all these stages are connected then the options to manage should all be on the table for all stages.

Sincerely, Joe McDonald

Joe.McDonald
200 Main st.
Jonesport,ME
04649

* pg 7 addendum IV

Alewife Harvesters of Maine



"Conserving to preserve Maine's heritage

June 30, 2014

To: Kate Taylor
Senior FMP Coordinator
1050 North Highland Street
Suite 200 A-N
Arlington, VA 22201

Comments on Draft Addendum IV American eel.

Attn. American Eel Board

The Alewife Harvesters of Maine (AHOM), are pleased to support the Maine Elver Fishermen Association (MEFA), and all river directed fishermen.

USFWS cites that inward and outward migration and turbine mortality is the big problem to American eel (Addendum III 2012). Overfishing has not been determined (2012 stock assessment ASMFC). We, the Alewife Harvesters of Maine, agree.

Migration, inward and outward, are the key to any healthy river system. The hydro industry has blocked rivers and streams for hundred of years. Hydro facilities are the cause for the decimation of Atlantic salmon and help cause the crash of many river directed species.

Why is there not an option in Draft Addendum IV American eel plan to deal with turbine mortality and passage? ASMFC recognizes in Addendum III American eel plan the problem, but these words have no meaning without an action plan.

ASMFC, USFWS, NOAA, NMFS should use their powers of FERC L-3 Articles 15 and 16 to gain passage and reduce turbine mortality instead of making river directed fishermen and their families pay for hydro facilities' lack of responsibility to the rivers.

AHOM **supports** 3.1.1 glass eel fishery management plans following options:

Option 1, status quo/ option 2, 2014 management measure / option 6, glass eel harvest allowance based on stock enhancement projections / option 9, reporting requirement / option 10, monitoring requirement.

AHOM **rejects** the following options in 3.1.1 glass eel fishery management plans, option 3 closure of glass eel fishery / sub option 3a, 3b and 3c / option 4 glass eel quota based landings sub options 4a, 4b and 4c.

We **reject** 3.1.1 option 5 quota overages

We reject and **do not support** 3.1.1 option 7 aquaculture quota / option 8 aquaculture permitting.

AHOM **supports** 3.1.2 yellow eel fishery management plans following options:
Option 1, status quo and option 7 quota transfers.

AHOM **will not** and cannot **support** 3.1.2 yellow eel fishery management /option 2 adjusted yellow eel quota sub option 2a, 2b and 2c / option 3 sub option 3a, 3b and3c, / option 4a, 4b and 4c.
Option 5 weighted yellow eel quota sub option 5a, 5b and 5c / option 6 quota overages / option 8 catch caps sub option 8a, 8b and 8c.

AHOM could **support** 3.1.3 silver eel fisheries management plan options 1 – 4.

AHOM **supports** 3.1.4 state specific sustainable fishery management plans for American eel.

Sincerely,

Jeffrey Pierce
Executive Director
Alewife Harvesters of Maine

Dear Ms. Taylor,

I am writing as chairman of the Chester, CT Conservation Commission to voice the commission's concern about the health of the American Eel population. This past year the commission began work to construct an eelevator on Great Brook in Chester to capture elvers to then be transported to suitable habitat above a series of dams. We have been working with Steve Gephardt of the CT Dept. of Energy and Environmental Protection and hope to have the eelevator operation next spring.

It is our understanding that the ASMFC is considering an American Eel Management Plan. We urge the ASMFC to do everything possible to protect the American Eel population - to limit harvesting of elvers, to help establish/reestablish suitable eel habitat and to reduce illegal taking of elvers.

Thank you for your assistance in these matters.

Sincerely,
Sandy Prisloe, Chairman
Chester Conservation Commission

Farmington River Watershed Association, Inc.
749 Hopmeadow Street, Simsbury, CT 06070
(860) 658-4442 Fax (860) 651-7519 www.frwa.org

June 25, 2014

Kate Taylor,
Senior Fishery Management Plan Coordinator,
1050 N. Highland St., Suite 200 A-N,
Arlington, VA 22201

Ms. Taylor,

Thank you for this opportunity to comment. On behalf of the Farmington River Watershed Association, I am writing to encourage and support the more conservative harvest options for all life stages of the American Eel fishery, as described in Addendum IV of the Atlantic States Marine Fisheries Commission's American Eel Fishery Management Plan.

Our watershed association actively restores habitat for diadromous fishes in the Farmington River system. We realize that diadromous fish stocks, including American Eel, are subject to a number of factors that may depress their numbers, including fishing, habitat loss, habitat degradation by pollutants or other factors, altered ocean food webs, and changing climatic conditions. We are committed to improving those factors that we can control here in our freshwater system, by protecting water quality, improving fish passage at barriers, and maintaining or restoring habitat.

However, our best efforts are undercut if management options for the American eel harvest allow stocks to become depleted. Because of the multiple factors putting pressure on eel populations, it can be argued that harvest is not the primary cause of depletion in every instance. Regardless, harvest will not enhance the recovery of this species. Given the declining harvests of the last two decades and the ASMFC's determination that the stock is depleted, measures that allow recovery are clearly needed. Under present circumstances, eels should get all the help we can give them.

Glass Eel Fisheries Management

Option 1, Status quo. While it could be argued that taking juvenile eels is less destructive to eel stocks than taking older individuals, the depleted state of the stock has led to requests for placing American eels on the Endangered Species list. Allowing harvest, even of juveniles, under these conditions, creates confusion and controversy. Also, Addendum IV cites the need for fishery independent life cycle surveys, presumably because more information is still needed on the age-dependent mortality of eel life stages and the real impact of taking glass eels. In addition, keeping a glass eel fishery open in any Atlantic coast state provides a channel by which illegally taken glass eels from other states may be sold. For these reasons, we do not support the status quo option.

Option 2, 2014 Management Measures. This option employs an improved quota management system in Maine (though not South Carolina) that included reducing the

landings 35% from the 2012 landings. This is a good step forward; but if this option is chosen, a more conservative quota should be adopted, and both states should participate.

Option 3, Closure of Glass Eel Fisheries. **FRWA prefers this option as the most supportive of American eel stock recovery.** Delayed closure (option 3b) is acceptable if necessary to reduce impact on commercial operations. In addition to being the most protective option for this life stage, closure addresses the inherent difficulties of law enforcement for a limited glass eel harvest. It would also make sense to suspend harvest pending the U.S. Fish & Wildlife Service decision in September 2015 about whether American Eel will be listed as threatened under the Endangered Species Act.

If it can be demonstrated (and verified) that the best management practice for sustainability is to balance a limited harvest of glass eels with greater protections for eels at later life stages, then closure of the glass eel fishery could be reconsidered. But it should be reconsidered after recovery is well underway or complete. Reconsideration should include evaluating the impact of removing glass eels as a food resource for other species, since their removal might affect other commercial and conservation interests.

Option 4, Glass Eel Quota Based on Landings. If this option is adopted, the quotas for Maine and South Carolina should be based on Sub-option 4c, the most conservative.

Option 6, Harvest Allowance Based on Stock Enhancement Programs. This option raises several concerns. First, it allows for any state or jurisdiction to join in glass eel harvest based on the initiation of stock enhancement programs. Good stock enhancement projects are certainly desirable. However, this option's success depends on adequate monitoring and enforcement. Agencies would not only have to monitor and enforce harvest limits, but also monitor and evaluate the success of stock enhancement programs. Given the resources available to state fisheries agencies, it's unrealistic to expect adequate tracking of either activity, let alone both, in every state. The cap on coastwide harvest in this option will be inadequate protection if it is not well monitored or enforced in all states.

In addition, given the lucrative nature of the glass eel fishery, this option would allow commercial interests for the fishery to become established in several more states. Idealistically speaking, this could create a larger constituency with a stake in good management of the resource. On the other hand, the result could also be political pressure to keep the fisheries open despite any inadequacies in monitoring and enforcement that may become apparent over time. Thus Option 6 creates an incentive for stock enhancement programs but simultaneously opens the door to overharvest of glass eels in the long term.

Options 5 and 7: If options 2 or 4 are chosen, we support the related measures for overages and aquaculture quotas in options 5 and 7.

Options 9 and 10: If glass eel fisheries continue, we support the requirements for reporting and monitoring in Options 9 and 10.

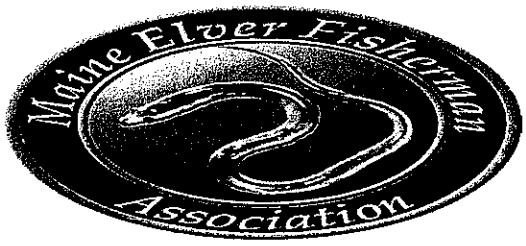
Yellow Eel and Silver Eel Fisheries Management

For yellow eels, we favor Option 4, and specifically Sub-Option 4c, which would result in a coastwide quota that represents a nearly 20% decrease from 2010 landings. The reason for this choice is that among all the options for yellow eels, this one has the minimum total harvest level. Since Addendum IV is intended to enhance the recovery of American eel minimizing mortality at all life stages, 4c is a logical choice.

For silver eels, FRWA prefers the status quo, which would close the New York silver eel fishery on the Delaware River at the end of 2014. Silver eels are about to reproduce, so this measure would protect the eels with the most potential to contribute to the recovery of the species. Offspring of the Delaware River's silver eels help maintain and restore the eel population in other rivers, including the Farmington River, so we have an interest in their protection. The coastwide closure of silver eel fishing would also simplify law enforcement for silver eel harvest.

Sincerely,

Eileen Fielding,
Executive Director



Kate Taylor
Senior FMP Coordinator
1050 North Highland St.
Suite 200 A-N
Arlington, VA 22201

June 30, 2014

Subject: American Eel Comments on Draft Addendum IV

Attention: American Eel Board

MEFA's comments on the Glass Eel Fishery Management 3.1.1 Option.

We support Option 1, Status Quo, as specified under the FMR and Addendum I-III, to remain in place for the following reason:

> Overfishing has not been determined (ASMFC 2012). Young of Year surveys experienced high catches in most areas. If this does not indicate and increase, it certainly does not show a decrease.
>
> USFWS states that the biggest threat to American eel is outward migration, as indicated in Addendum III. Why is is that outward migration is not a part of the options? Yes, it is in the Addendum III documentation. These words are meaningless if there is no action plan for inward and outward migration.
> If this is the biggest threat to the American eel, then why are the fishermen and their families having their feet held to the fire, and not the biggest problem, hydro facilities?

MEFA will support 3.1.1 of the Glass Eel Management Plan Option 2, 2014 management measures.

MEFA will not support any of the following management options:

> Option 3.1.1 of the glass eel management plan.
> Option 3a, 3b (closure of the glass eel fishery).
> Option 4a, 4b and 4c (glass eel quota based on landings)
> Option 7 or 8 (aquaculture quota, as this option is not fair or just.)

We could support the following options laid out in 3.1.1 of the glass eel management plan:
Option 5, glass eel harvest quota overages.
Options 6, 6a, 6b and 6c, allowance based on stock enhancement program

MEFA does support 3.1.1 glass eel fishery management Plan Option 9, Reporting Requirement and Option 10, Monitoring Requirements.

MEFA supports 3.1.2, Yellow eel management, Option 1 Status Quo for the same reason, its supports status quo in 3.1.1 glass eel fishery management plan Option 1.

We do not support 3.1.2 yellow eel 3.1.2 yellow eel management plan's following Options:

2a, 2b, 2c, 3,3a, 3b, 3c, 4-a,b,c, 5-a,b,c,6, 8-a,b & c.

We do support 3.1.2 yellow eel management Option 7, quota transfer.

MEFA could support 3.1.3, silver eel fishery management options 1 – 4.

MEFA supports 3.1.4 State specific sustainable fishery management plans for American eel.

Thank you for allowing us to comment, we the members of the

Maine Elver Fishermen Association.

Commonwealth of Massachusetts
Marine Fisheries Advisory Commission
251 Causeway Street, Suite 400
Boston, MA 02114
Fax (617) 626.1509

July 17, 2014

Kate Taylor
Senior FMP Coordinator
1050 N. Highland St., Suite 200A-N
Arlington, Virginia 22201

Re: Comments on Draft Addendum IV to the Fishery Management Plan for American Eel

Dear Ms. Taylor,

The Massachusetts Marine Fisheries Advisory Commission (MFC) is a state board that represents recreational and commercial fishing interests and is responsible to approve marine fishery regulation changes in Massachusetts. American eel traditionally have supported important seasonal fisheries for food and bait and are considered an important prey in our coastal watersheds. We have a significant interest in the proposed changes to the American Eel Interstate Fishery Management Plan as an avenue to promote eel conservation and restoration. This effort is essential at this time because our eel fisheries have declined sharply to historically low levels, while incentives to illegally harvest glass eels in Massachusetts have never been higher.

The MFC submits for the American Eel Management Board's consideration the following comments on Draft Addendum IV.

1. Management Goal and Options We appreciate the effort put forth by ASMFC to prepare a stock assessment and addendum options in response to the finding that the American eel population in U.S. waters is depleted. We commend and support the stated goal of Draft Addendum IV to reduce overall mortality and increase overall conservation. However, we find that many of the management options run directly counter to this goal; rather than proposing expected reductions to existing fisheries, some options would expand existing fisheries or, worse yet, develop new fisheries. The MFC supports those options that are consistent with the goal of the draft addendum, as further described below.

2. Glass Eel Quota Only Option 3 (immediate or phased-in closure of the glass eel fisheries) is consistent with the goal of reducing mortality on glass eels from 2010, the stock assessment's terminal year from which it was recommended that mortality be reduced. Thus this is the MFC's preferred management option. It is also the scenario under which the illegal harvest of glass eels can be best controlled. The rampant glass eel poaching of 2011-2014 has had significant consequences in Massachusetts and other states related to future stock recruitment and diversion of law enforcement resources.

However, we are skeptical that closure of the glass eel fisheries is politically possible. Under this situation, we can support Option 4c (quota system based on 2010 landings) as an alternative. This is the only quota option that excludes state landings data from 2011 – 2013, as recommended by the Technical Committee and Plan Development Team. As noted in the draft addendum, the use of data outside the stock assessment period (post-2010) is problematic on account of the market influences and illegal harvest that resulted in a rapid escalation of landings after the assessment's terminal year. Consequently, quota options 4a and 4b (quota systems based on 2004 – 2013 landings) result in an expansion of glass eel harvest from the 2010 baseline, and are thus in stark contrast to the stated goal of the addendum. We would have preferred to see an option(s) that set the quota based on 1998 – 2010 landings as recommended by the Stock Assessment Sub-Committee and Technical Committee.

Similarly, we oppose Option 2 (2014 management measures) as it would result in a glass eel fishery nearly four times greater than the 2010 baseline for reduction. Furthermore, the inclusion of this option in the draft addendum suggests that the state of Maine has resolved the illegal harvest problem by improving its internal enforcement process. The ASMFC and the public needs to be fully aware the high prices of 2011-2013 attracted wide-spread illegal harvest in Massachusetts and the new Maine regulations and lower price in 2014 brought evidence of greater sophistication and coordination of illegal activity but not less effort or harvest. We continue to have a significant problem of illegal harvest of eels in Massachusetts that is a costly draw on law enforcement resources and could negate our efforts to conserve eel stocks and improve future eel recruitment.

We support the following requirements for states with a commercial glass eel fishery: full paybacks for quota overages (Option 5); daily trip level reporting with daily electronic accounting to the state for harvesters and dealers (Option 9); and implementation of at least one fishery independent life cycle survey covering glass, yellow, and silver eels (Option 10).

3. Glass Eel Harvest Allowance Based on Stock Enhancement Programs The MFC agrees with the concept of incentivizing stock enhancement programs with the reward of a glass eel allowance, but cannot support Option 6 as written at this time because it could result in the development of new glass eel fisheries when the science dictates action in the opposite direction. We could support Option 6 if the issuance of such state allowances were restricted to periods of better stock status than currently exists. Credit for implementing habitat restoration, fish passage or other stock enhancement projects now would be granted once stock status improves, thus the incentive for states to take these actions would not be lost. If Option 6 were revised in this manner, we would also recommend that the start date for creditable programs be set at January 1, 2010 in recognition of efforts influenced by the ASMFC stock assessment. States have been actively moving forward with enhancements in recent years as the awareness of declining eel abundance increased.

4. Glass Eel Aquaculture Quota and Permitting We were pleased to see the consideration of options to foster the development of U.S. based eel aquaculture. Given existing market export conditions, future potential for domestic eel aquaculture is scant without setting aside part of the glass eel quota for aquaculture purposes. Domestic eel aquaculture would have socio-economic benefits to the Atlantic coast states. We thus support Options 7 and 8. Our support of Option 7 would be retracted if either of the following key provisions of the option were removed: 1) that the aquaculture quota be a set-aside from the coastal quota as opposed to being in addition to it, such that the option does not constitute an expansion of glass eel fisheries; and 2) that the eels produced from aquaculture operations not be sold until they reach the minimum size for yellow eels, such that the option does not permit short-term holding of glass eels prior to sale into the usual export market.

5. Yellow Eel Fisheries Management Options Establishing a yellow eel quota is an essential step towards population based management of eel under ASMFC. We thus oppose Option 1 (status quo). Draft Addendum IV provides several options for a yellow eel quota with all using Atlantic coast state harvest data from 2010 to set the quota and then having various scenarios for reducing and allocating the quota. While it is too late in the addendum process to make this change, our preferred approach for setting the quota is to use the landings data from 1998 – 2010. This time period was recommended by the Stock Assessment Sub-Committee and Technical Committee. We find it curious that no options used the 1998 – 2010 period for quota setting.

Regarding the specific options, our selection is based on providing fairness, conservation and consistency with ASMFC technical advice. The options that come closest to this are 4b and 4c, both of which represent a reduction from the 1998 – 2010 average harvest, base state allocation on the widest range of years considered within the options (2002 – 2012), and consider each state's three highest landings in this time period. We are firmly opposed to Options 2 and 5, which penalize Massachusetts and other New England states by allocating quota either wholly or partially based on very recent landings, contrary to all ASMFC committee advice.

We strongly recommend that a process is developed to allow states to increase their quota allocation under conditions of improving stock status.

We also note that it is likely that Massachusetts yellow eel landings are greater than documented in the draft addendum due to under-reporting of yellow eel landings kept for personal commercial bait use (i.e., not sold, thus not counted in dealer reports). *MarineFisheries* began mandatory trip-level reporting for harvesters in 2010 and continues to try to educate harvesters that all landings harvested under the authority of a commercial permit – whether sold or unsold – must be documented.

We support full payback of yellow eel quota overages (Option 6) and establishment of a yellow eel transfer mechanism (Option 7).

The MFC shares your goals in restoring our local eel stock to support ecological benefits and rebuild commercial and recreational eel fisheries for food and bait. We appreciate this opportunity offered by ASMFC to amend and improve the American Eel Management Plan.

Sincerely,

Mark Amorello
Chairman

Cc: MFC
Diodati, McKiernan, Chase (*MarineFisheries*)

Mystic River Watershed Association
your community • your watershed

July 15, 2014

Kate Taylor
Senior FMP Coordinator
1050 North Highland Street
Suite 200 A-N
Arlington, VA 22201

RE: American Eel

Dear Ms. Taylor:

The following are the comments of the Mystic River Watershed Association of Arlington, Massachusetts regarding the Draft Addendum IV to the Fishery Management Plan for American Eel.

The Mystic River Watershed Association (MyRWA) is a non-profit organization dedicated to the preservation and enhancement of the Mystic River Watershed in Massachusetts. The mission of MyRWA is to work to protect and restore the Mystic River, its tributaries, watershed lands and the fisheries resources therein, for the benefit of present and future generations to celebrate the value, importance and great beauty of these natural resources. As a part of this mission MyRWA has, for the last three years been working directly with the Massachusetts Division of Marine Fisheries to monitor and count returning elvers that pass over the eel ladder at the dam between the Upper and Lower Mystic Lakes.

MyRWA supports the goal of the Draft Addendum IV to "reduce overall mortality and increase overall conservation of American Eel stocks." (Draft, p. 7.) Evidence to support the need for this goal is presented throughout the Draft Addendum. The 2012 American Eel Benchmark Stock Assessment fount that "the American eel population in U.S. waters is depleted (Draft, p.1.) The U.S. Fish and Wildlife Service (USFWS), in a 90 Day Finding on a Petition to List the American Eel as Threatened, (76 Fed. Reg. 189, 60431 (2011)), found that changes in oceanic conditions due to climate change, specifically an increase in sea surface temperatures directly related to global warming in the Sargasso Sea are affecting American eels. This has has several impacts. First, increased surface water temperature has reduced primary production (eel food production) which may affect the feeding success of leptocephali (larval eels). Second, the spawning grounds of the American eel appear to have been moving north as a result of sea surface temperature increases. "Shifting spawning grounds may affect where leptocephali enter and subsequently leave the ocean currents used for dispersal and may, therefore, negatively affect coastal recruitment of American eels." (76 Fed. Reg. 189, 60443.) The USFWS found that these increases in ocean surface temperatures are well documented. Based on this they found "This climate change information, coupled with the suggested impacts on sea conditions and coastal eel recruitment, is substantial enough to find that it may pose a significant threat to the American eel." Id. These impacts were of enough concern to the USFWS that they issued a preliminary finding that there was "substantial scientific or commercial information indicating that

listing the American eel (as a threatened species) throughout its entire range may be warranted." Id. at 60444.

The concerns expressed by the USFWS are reinforced by findings throughout the Draft Addendum IV. Specifically, in addition to the Eel Benchmark Stock Assessment cited above, the Technical Committee found that "current levels of fishing effort may still be too high given the additional stressors affecting the stock . . ." (Draft, p. 7.) Stressors such as the effects of global warming cited above. The technical Committee also found that "Fishing on all life stages of eels, particularly young-of-the-year and in-river silver eels migrating to the spawning grounds could be particularly detrimental to the stock." (Draft, p. 7.) This assessment fits into the Stock Assessment review of all available data that found "it was not able to construct eel population targets that could be related to sustainable fishery harvests." (Draft, p. 11.)(Emphasis added.) The ultimate finding of the Stock Assessment is that the stock of American eels is "considered depleted." (Draft, p. 7.) It is within this framework that MyRWA makes its comments on the Draft Addendum IV.

3.1.1. Glass Eel Fisheries Management Options

MyRWA recommends the adoption of Option 3 – Closure of Glass Eel Fisheries, including Sub-Option 3a, Immediate Closure of all glass eel fisheries upon final approval of the Draft Addendum. Based on the determination that the stock of American eels is depleted, when combined with the USFWS findings of the global warming impacts reducing the reproductive success of the American eel and reduced recruitment of glass eels, immediate closure of the glass eel fisheries is warranted. In addition to the stresses outlined above, there is considerable glass eel poaching, poaching that will be encouraged as long as the glass eel fisheries remains open anywhere. Such poaching puts additional pressure on glass eel recruitment. We have seen the impact of poaching even here on the Mystic River as the Massachusetts Environmental Police arrested glass eel poachers on the Mystic River this spring. Reduced recruitment of glass eels is a serious problem in a depleted population, and all measures must be taken to improve such recruitment. Therefore, closure of the glass eel fisheries is warranted.

3.1.2. Yellow Eel Fisheries Management Options

MyRWA does not support any of the proposed options under the Yellow Eel Fisheries Management Options. The Stock Assessment recommended that mortality should be reduced on all life stages of American eels. The Plan Development Team noted a study that found "methods to set catch limits at or above the average of recent catches has led to some of the highest probabilities of overfishing." (Draft, p. 17.) All of the Options proposed suggest some kind of catch limit, and rely on states or other jurisdictions to police these limits. Unfortunately, there is no way to guarantee that these limits will be enforced in a timely fashion, and the probability of catching numbers over the limits remains. When research indicates that this is a method that will result in the probability of overfishing a stock that is already depleted, then such limits should not be used. If fishing on all life stages of the stock could be detrimental, then such fishing should be stopped. This is especially true when there are so many other factors reducing the eel stock.

3.1.3. Silver Eel Fisheries

Because the proposed measures concerning the silver eel fishery applies only to the commercial weir fishery in the New York portion of the Delaware River and its tributaries, MyRWA has no specific comment on these proposals other than that this fishery should sunset as specified in Section 4.1.3 of Addendum III. However, the take of any out migrating silver eels should be should be discontinued based on the Stock Assessment which found "fishing on . . . out-migrating silver eels could be particularly detrimental to the stock, especially if other sources of mortality (e.g. turbine mortality, changing oceanographic conditions) cannot be readily controlled." (Draft p. 27.)

It is because of our concern over the cumulative effects of climate change and the mortality reflected in all methods of American eel harvest, the Mystic River Watershed Association has respectfully submitted these comments on the Draft Addendum IV to the Fishery Management Plan for American Eel. Thank you for your cooperation.

Very truly yours,

EkOngKar Singh Khalsa
Executive Director
Mystic River Watershed Association

SAVE THE BAY®
NARRAGANSETT BAY

July 10, 2014

Atlantic States Marine Fisheries Council (ASMFC)
Rhode Island Commissioners
C/o Mr. Robert Ballou
RI Department of Environmental Management
235 Promenade Street
Providence, RI 02908

Re: Closure of the Glass Eel Fishery Coast-wide

Dear Commissioners:

Save The Bay represents thousands of members and supporters committed to preserving, restoring, and protecting the ecological integrity and value of Narragansett Bay and coastal Rhode Island. We are greatly concerned over the status of the American eel (*Anguilla rostrata*). The American eel was once the most abundant species in Narragansett Bay tributaries and was critically important to the region's ecology and people. The species has now declined to the point where it is being considered by the USFWS for listing under the Endangered Species Act. Yet even in the face of this extreme decline, our regional fisheries management structure continues to enable a glass eel fishery that harvests immense numbers of animals as they first enter New England's rivers.

Larger yellow and silver eels are valuable as a direct food source and as bait for recreational and commercial rod and reel fisheries. Historically, these life stages have been extensively utilized by Native Americans and New Englanders for food, oil, and leather. In contrast, glass eels are sent to Asia and their harvest provides little benefit to our community or culture.

Because of the ecological, cultural, and economic importance of eels and other diadromous species, federal and state agencies, local governments, and non-profits are currently investing over 11 million dollars in fish passage projects for Rhode Island's tributaries. Many of these projects include specially designed eel ways. Yet despite ongoing improvements to habitat connectivity and habitat quality for American eels, we continue to see a population decline.

Meanwhile, the glass eel fishery has recently increased to over 20,000 pounds of young-of-the-year eels per year. With the average glass eel weighing only 0.14 grams, this equals over 65 million individuals per year, which is more than **10 times the number of yellow eels taken per year from every Atlantic state combined.** Findings of the ASMFC Benchmark Stock Assessment of 2012 conclude that the "American eel population is depleted", "the stock is at or near historically low levels", and "[f]ishing on all life stages of eels, particularly young-of-the-year… could be detrimental to the stock…"

It is clearly the collective opinion of the Atlantic states, which the ASMFC represents, that this fishery should be prohibited. Indeed, all states except Maine and South Carolina prohibit fishing for glass eels. Yet, due to the transportability and high value of glass eels, poaching remains a threat to every state where glass eels can be caught. The ASMFC Law Enforcement Committee has concluded that the glass eel fishery is impractical to enforce, and they recommend that changes are made to the regulations or

Save The Bay Center
100 Save The Bay Drive
Providence, RI 02905

phone: 401-272-3540
fax: 401-273-7153
www.savebay.org

statutes that will facilitate enforcement. As long as a legal market remains on the east coast, poaching will continue. The only viable solution is a coast-wide closure; otherwise, the Maine and South Carolina glass eel fisheries will continue to recklessly threaten the resources of all Atlantic states to protect the profits of very few.

Save The Bay strongly urges you, as our representatives to the ASMFC, to **insist upon a complete coast-wide closure of the glass eel fishery**. No other options offered in the draft eel management plan reduce fishing pressure from the harvest levels that contributed to the current depleted and historically low population status recognized in the 2012 stock assessment. In fact, with the exception of Option 4C (quota set at 2010 levels), all other options actually *increase* fishing pressure over the assessment levels. Closure of the glass eel fishery is the only valid solution to the conservation and restoration of this very important species. Please stand up to the vocal minority and do what is right, for the good of the species, the ecosystem, and all users of this important resource.

Thank you for considering these comments. Should you have any questions, please do not hesitate to contact me at 272-3540 x116.

Respectfully submitted,

Tom Kutcher
Narragansett Baykeeper

CC:
Janet Coit, Director of DEM
Mark Gibson, Deputy Chief, DEM Division of Fish and Wildlife
David V. D. Borden, Commissioner
Sen. Susan Sosnowski, Commissioner
Kate Taylor, Senior FMP Coordinator, ASMFC

Save The Bay Center
100 Save The Bay Drive
Providence, RI 02905

phone: 401-272-3540
fax: 401-273-7153
www.savebay.org

National Association of State Aquaculture Coordinators

Debra Sloan, President
NC Department of Agriculture
208 Sugar Cove Road
Franklin NC 28734
(828)524-1264 (828)421-9664 cell
debrasloan@earthlink.net

(NASAC)

Todd Low, Vice President
Hawaii Department of Agriculture
99-941 Halawa Valley Street
Aiea HI 96701-5602
(808)483-7130 (808)483-7110 fax
todd.e.low@hawaii.gov

MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

July 16, 2014

To: Ms. Kate Taylor
From: Debra Sloan, President NASAC

Subject: Comments on Draft Addendum IV to the Fishery Management Plan for American Eel

On behalf of the Board of Directors of the National Association of State Aquaculture Coordinators (NASAC), an affiliate of the National Association of State Departments of Agriculture (NASDA), I wish to state our support for option 3.1.4 in the "Draft Addendum IV to the Fishery Management Plan for American Eel".

The American Eel is a unique fish, which forms the basis of a multi-million dollar international industry. Asian countries have profited by utilizing glass eels from the Atlantic coast with little return to our citizens or concern for proper fisheries management. The current proposal would allow a quota of glass eels for aquacultural production in each state under the jurisdiction of the Atlantic States Marine Fisheries Commission.

Adoption of the aquaculture option will allow the domestic production of a value added industry. Eel aquaculture has proven itself in both Europe and Asia. This will give our nation's fish farmers another option. We would like to see quotas allocated to existing aquaculture facilities, which have the technology to successfully raise eels to harvest. Quotas should also be large enough to justify the significant private investment in eel aquaculture facilities.

The establishment of an eel aquaculture allocation should prompt additional research into the various life stages of the eel. Such work would be of benefit to both the protection and enhancement of the wild eel population as well as helping to build a strong knowledge base for commercial production.

We would endorse the stocking of some of the eels quota back into the nation's rivers, once raised to a larger size by the aquaculture. This has been done successfully in Europe. Such stocking has been valuable to the enhancement of a previously depleted wild fishery.

We wish to thank the Atlantic States Marine Fisheries Commission for recognizing the opportunity to utilize aquaculture as a means of protecting a unique species while providing opportunities to our citizens.

NEW JERSEY MARINE FISHERIES COUNCIL
501 EAST STATE STREET, 3RD FLOOR
Mailing Address
P.O. BOX 420 Mail Code 501-03
TRENTON, NJ 08625-0420
609-292-7794
609-984-1408 FAX

July 10, 2014

Ms. Kate Taylor
ASMFC
1050 N. Highland St
Suite 200 A-N
Arlington, VA 22201

Dear Ms. Taylor,

On behalf of the New Jersey Marine Fisheries Council (Council), I would like to submit the following public comment in regards to ASMFC Draft Addendum IV (Addendum) to the American Eel Fishery Management Plan. Our Council's American Eel Advisory Committee recently met to initiate a dialogue with commercial and recreational advisors in regards to the Addendum and to develop a public comment strategy from the Council to ASMFC.

At our July 10, 2014 meeting, the Council approved the following as public hearing comments to ASMFC:

Glass Eels
The attendees agreed with Option 3 which would require those states with glass eel fisheries to close under whatever timetable the ASMFC decides but preferably when Addendum IV is implemented. It was noted that the closure of the fishery would assist Law Enforcement in all states that currently do not allow the legal harvest of glass eels.

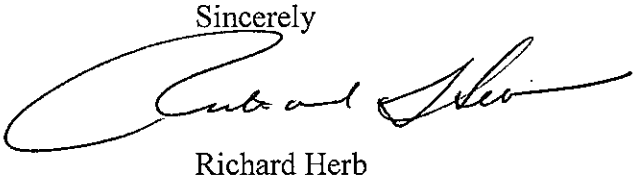
Yellow Eels
The majority of the discussions were focused on yellow eels since this is New Jersey's major harvesting life stage. The Committee discussed the various options and agreed that Option 1 (status quo) was their preferred option.

Silver Eels
It was agreed that Option 1 (status quo) was the best option since any seasonal closure or effort reduction would be detrimental to the fishery.

ther Issues

he attendees supported options for aquaculture, stock enhancement programs and ıstainable fishery management plans to be included in the Addendum with the ıderstanding that there is currently a lack of funding and staff available for such projects . New Jersey.

Sincerely



Richard Herb
Acting Chairman

NORTH CAROLINA FARM BUREAU FEDERATION, INC.
PO Box 27766, Raleigh, NC 27611 Phone: 919-782-1705 Fax: 919-783-3593 www.ncfb.org

July 11, 2014

Ms. Kate Taylor
Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, VA 22201

RE: Comments on Addendum IV American Eel Fishery Management Plan

Dear Ms. Taylor:

As the state's largest general agricultural organization, North Carolina Farm Bureau advocates for rural and agricultural issues on behalf of our 500,000+ member families. North Carolina Farm Bureau Federation supports our state's farmers in their efforts to develop and maintain our most important economic sector.

We support the concept presented in option 3.1.4 presented within the ASMFC American Eel Draft Addendum IV.

Among the principles we wish to stress are:
- **Fair allocation.** Natural resources, such as the American eel fishery should be allocated fairly to states. Allowing one state to virtually monopolize the American glass eel market is unacceptable and places our domestic producers at a competitive disadvantage. Providing states a fair allocation of glass eels should be a priority.
- **Aquaculture production**. States with the capability of producing American eels to marketable size (9 inches) should be allowed to grow out a portion of their allocation.
- **Wild stock enhancement.** Our state's licensed aquaculture facilities are capable of growing out health-certified restocking populations for controlled release.

We believe our state's aquaculture farmers are a valuable partner in supporting the American eel fishery and strongly encourage the American Eel Management Board and Advisory Panel to adopt options that fairly allocate the glass eel resource and strengthen eel populations through glass eel harvest and aquacultural production.

Sincerely,

Larry B. Wooten

Larry B. Wooten
President

NORTH CAROLINA FARM BUREAU FEDERATION

DEBBIE HAMRICK
Specialty Crops Director

PO Box 27766
Raleigh, NC 27611
5301 Glenwood Avenue
Raleigh, NC 27612
www.ncfb.org

Direct: (919) 334-2977
Main: (919) 782-1705
Fax: (919) 783-3593
Mobile: (919) 302-9538
E-mail: debbie.hamrick@ncfb.org

North Carolina Aquaculture Association
NCAA
"Farming Fresh Alternatives"
300 Industrial Drive – New Bern, NC 28562 – 252-633-1477

Date: July 16, 2014

To: Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: North Carolina Aquaculture Association
300 Industrial Drive
New Bern, NC 28562

Re: Comments on Addendum IV American Eel Fishery Management Plan

Members of the American Eel Management Board and Advisory Panel,

The North Carolina Aquaculture Association supports the concept of option 3.1.4 presented by the ASMFC American Eel Draft Addendum IV.

We would like to stress the areas below concerning the proposal:

1) Harvesting and 'fair' economic opportunities for all states under the Atlantic States Marine Fisheries Commission in regards to the American Eel Industry, primarily for glass eels. The American Eel industry should be open to all states versus that of a two state 'monopoly.'

2) Environmental resources conservation proposals of restocking, by licensed aquaculture facilities with health certified eels, for wild stock enhancement.

3) Limiting exploitation of the American Eel by enforcing a required growout of 9 inches, versus the exportation of thousands of pounds of glass eels overseas and the loss of domestic market opportunities.

Under the North Carolina Aquaculture Development Act, the NC General Assembly finds and declares that it is in the best interest of the citizens of North Carolina to promote and encourage the development of North Carolina's aquacultural resources in order to augment food supplies, expand employment, promote economic activity, increase stocks of native aquatic species, enhance commercial and recreational fishing and protect and better use the land and water resources of the State.

The proposed option 3.1.4 best represents the Act by promoting economic activity and increasing stocks of the American Eel by proposed restocking efforts.

Respectfully,

Randy Gray, President
NC Aquaculture Association

Steve Troxler
Commissioner

North Carolina Department of Agriculture and Consumer Services

Division of Marketing

Tom Slade
Director

July 17, 2014

Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

Dear Ms. Taylor:

Re: Comments on Addendum IV American Eel Fishery Management Plan

Members of the American Eel Management Board and Advisory Panel,

The NC Department of Agriculture and Consumer Services supports the concept of option 3.1.4 presented by the ASMFC American Eel Draft Addendum IV.

We would like to stress the areas below concerning the proposal:

1) Harvesting and 'fair' economic opportunities for all states under the Atlantic States Marine Fisheries Commission in regards to the American Eel Industry, primarily for glass eels. The American Eel industry should be open to all states versus that of a two state 'monopoly.'

2) Environmental resources conservation proposals of restocking, by licensed aquaculture facilities with health certified eels, for wild stock enhancement.

3) Limiting exploitation of the American Eel by enforcing a required growout of nine (9) inches, versus the exportation of thousands of pounds of glass eels overseas and the loss of domestic market opportunities.

Under the NC Aquaculture Development Act, the General Assembly finds and declares that it is in the best interest of the citizens of North Carolina to promote and encourage the development of North Carolina's aquacultural resources in order to augment food supplies, expand employment, promote economic activity, increase stocks of native aquatic species, enhance commercial and recreational fishing and protect and better use the land and water resources of the State.

The proposed option 3.1.4 best represents the Act by promoting economic activity and increasing stocks of the American Eel by proposed restocking efforts.

Respectfully,

Ron Fish, Assistant Director
Marketing Division
Agribusiness and Aquaculture Development
North Carolina Department of Agriculture and Consumer Services

cc: Pete Anderson
Commissioner Steve Troxler
Dr. Richard Reich

Dear Kate,

The American Eel is the only migratory fish that makes it through the Park River conduit into both the North and South Branches of the Park River regional watershed. Given the decline of the species, further challenges that might eliminate this important link between our urban-suburban watershed and the ocean ought to be minimized.

Our recent May 24th event at the New Britain Museum of American Art, "Turtles, Eels, and Birds of the Park Watershed" demonstrated that there are plenty of people with interested in the revitalization of ecosystems that can support increasing local wildlife, fish and bird populations.

Note that many urban-suburban citizens do not have time to go visit the Long Island Sound or for that matter, even the Connecticut River. If the magic and mystery of wildlife is not available for viewing in local urban-suburban tributaries it will be increasingly difficult to convince the population that there is a critical link between global environment and their daily lives.

For this reason, Park Watershed is **against** a glass eel fishery.

Sincerely,
Mary Rickel Pelletier
Director, Park Watershed, Inc.

We have reviewed the Atlantic States Marine Fisheries Commission's (ASMFC) Draft Addendum IV concerning management of the American eel. With American eel populations at historically low levels from threats such as habitat loss and overfishing, we strongly urge the ASMFC to adopt prudent and effective measures to protect the American eel and allow its recovery. The South Central Connecticut Regional Water Authority (RWA) is a non-profit, public corporation and political subdivision of the state. Our mission is to provide high quality drinking water at a reasonable cost while promoting the preservation of watershed land and aquifers. The source of this water is a system of watershed and aquifer areas that cover about 120 square miles within 24 municipalities. Much of our 27,000 acres of land is managed for watershed protection, timber resource conservation, wildlife habitat, open space, education, and research.

The RWA recognizes its role as an environmental steward and how its mission connects to the overall sustainable management of water resources. We have engaged the Connecticut Department of Energy and Environmental Protection in cooperative efforts to extend access of diadromous fish to historical habitats, including two projects directly focused on American eel migration enhancements. The State of Connecticut and conservation groups have also invested considerable resources in preserving this important species. American eels are an important food source for migratory birds and game fish, and vital to the health of coastal and freshwater aquatic ecosystems.

Thank you for the opportunity to comment. If there are questions I can be reached at 203-401-2733; jhudak@rwater.com .

Sincerely,

John P Hudak
Environmental Planning Manager

John Hudak
Environmental Planning Manager
South Central Connecticut Regional Water Authority
90 Sargent Drive | New Haven, CT 06511
Phone: 203-401-2733 | Fax: 203-603-4982
Email: jhudak@rwater.com | Website: http://www.rwater.com

SAVE THE BAY®
NARRAGANSETT BAY

July 10, 2014

Atlantic States Marine Fisheries Council (ASMFC)
Rhode Island Commissioners
C/o Mr. Robert Ballou
RI Department of Environmental Management
235 Promenade Street
Providence, RI 02908

Re: Closure of the Glass Eel Fishery Coast-wide

Dear Commissioners:

Save The Bay represents thousands of members and supporters committed to preserving, restoring, and protecting the ecological integrity and value of Narragansett Bay and coastal Rhode Island. We are greatly concerned over the status of the American eel (*Anguilla rostrata*). The American eel was once the most abundant species in Narragansett Bay tributaries and was critically important to the region's ecology and people. The species has now declined to the point where it is being considered by the USFWS for listing under the Endangered Species Act. Yet even in the face of this extreme decline, our regional fisheries management structure continues to enable a glass eel fishery that harvests immense numbers of animals as they first enter New England's rivers.

Larger yellow and silver eels are valuable as a direct food source and as bait for recreational and commercial rod and reel fisheries. Historically, these life stages have been extensively utilized by Native Americans and New Englanders for food, oil, and leather. In contrast, glass eels are sent to Asia and their harvest provides little benefit to our community or culture.

Because of the ecological, cultural, and economic importance of eels and other diadromous species, federal and state agencies, local governments, and non-profits are currently investing over 11 million dollars in fish passage projects for Rhode Island's tributaries. Many of these projects include specially designed eel ways. Yet despite ongoing improvements to habitat connectivity and habitat quality for American eels, we continue to see a population decline.

Meanwhile, the glass eel fishery has recently increased to over 20,000 pounds of young-of-the-year eels per year. With the average glass eel weighing only 0.14 grams, this equals over 65 million individuals per year, which is more than **10 times the number of yellow eels taken per year from every Atlantic state combined.** Findings of the ASMFC Benchmark Stock Assessment of 2012 conclude that the "American eel population is depleted", "the stock is at or near historically low levels", and "[f]ishing on all life stages of eels, particularly young-of-the-year… could be detrimental to the stock…"

It is clearly the collective opinion of the Atlantic states, which the ASMFC represents, that this fishery should be prohibited. Indeed, all states except Maine and South Carolina prohibit fishing for glass eels. Yet, due to the transportability and high value of glass eels, poaching remains a threat to every state where glass eels can be caught. The ASMFC Law Enforcement Committee has concluded that the glass eel fishery is impractical to enforce, and they recommend that changes are made to the regulations or

Save The Bay Center
100 Save The Bay Drive
Providence, RI 02905

phone: 401-272-3540
fax: 401-273-7153
www.savebay.org

statutes that will facilitate enforcement. As long as a legal market remains on the east coast, poaching will continue. The only viable solution is a coast-wide closure; otherwise, the Maine and South Carolina glass eel fisheries will continue to recklessly threaten the resources of all Atlantic states to protect the profits of very few.

Save The Bay strongly urges you, as our representatives to the ASMFC, to **insist upon a complete coast-wide closure of the glass eel fishery**. No other options offered in the draft eel management plan reduce fishing pressure from the harvest levels that contributed to the current depleted and historically low population status recognized in the 2012 stock assessment. In fact, with the exception of Option 4C (quota set at 2010 levels), all other options actually *increase* fishing pressure over the assessment levels. Closure of the glass eel fishery is the only valid solution to the conservation and restoration of this very important species. Please stand up to the vocal minority and do what is right, for the good of the species, the ecosystem, and all users of this important resource.

Thank you for considering these comments. Should you have any questions, please do not hesitate to contact me at 272-3540 x116.

Respectfully submitted,

Tom Kutcher
Narragansett Baykeeper

CC:
Janet Coit, Director of DEM
Mark Gibson, Deputy Chief, DEM Division of Fish and Wildlife
David V. D. Borden, Commissioner
Sen. Susan Sosnowski, Commissioner
Kate Taylor, Senior FMP Coordinator, ASMFC

Save The Bay Center
100 Save The Bay Drive
Providence, RI 02905

phone: 401-272-3540
fax: 401-273-7153
www.savebay.org

The Nature Conservancy
Protecting nature. Preserving life.™

July 16, 2014

Kate Taylor, Senior FMP Coordinator
1050 North Highland Street, Suite 200A-N
Arlington, Virginia 22201
via email: comments@asmfc.org

Re: Addendum IV to the American eel Fishery Management Plan

Dear Ms. Taylor:

The Nature Conservancy offers the following comments on Addendum IV to the American eel Fishery Management Plan being considered by the Atlantic States Marine Fisheries Commission (ASMFC).

The mission of The Nature Conservancy (the Conservancy) is to conserve the lands and waters on which all life depends. With the support of more than one million members, the Conservancy has protected more than 120 million acres and 5,000 river miles around the world. We currently run more than 150 marine conservation projects in 32 countries and every coastal state in the U.S. The Conservancy has staff working in each of the Atlantic states and, therefore, our comments are based on our work directly within the ASMFC region.

The American eel population, due to its unique life cycle and large range, requires an integrated freshwater and marine approach to management and conservation. Eel are a key component of our freshwater ecosystems and, along the coast they are important forage for a variety of commercially important species including striped bass. Eels face a variety of threats and many are difficult to resolve in the near term so reducing fishing mortality across all life stages is a key step to stem the decline of this species. Addressing habitat concerns is key as well; mortality rates up to 100% have been observed for silver eels attempting to pass downstream of hydroelectric dams, and although we realize the ASMFC has limited ability from a regulatory perspective to address this, we encourage the Commission to work with the Federal Regulatory Energy Commission and individual states to develop safer options for downstream passage.

Consistent with the goal of reducing mortality, the Conservancy **does not support** the following options for any life stage within this Addendum:

- **Quotas based on landings data that are outside of the 2012 Benchmark Stock Assessment**: New research highlighted within this addendum has shown that establishing catch limits at or above the average of recent landings has led to the highest probabilities of over fishing.

- **The opening of new fisheries:** The Technical Committees concluded, after an analysis of the YOY glass eels surveys since the 2012 Benchmark Stock Assessment, that the depleted status of the eel is still justified. Opening up new glass eel fisheries is at odds with the need to reduce mortality on this stock.

- **The harvest of wild eels for commercial aquaculture**, we question the economic viability of any aquaculture proposal that calls for the harvesting of extremely valuable glass eels and investing to grow these eels to legal size, as far less valuable fish.

Managements Options:
The Conservancy **supports the following specific management options** within Addendum IV:

Glass eels:

Option 4c & 5 Glass Eel Quota Based on Landings. Sub Option 4c-2010 Landings w/Quota Overages Option

Aside from closing the fishery, Option 4c represents the only meaningful reduction in glass eel mortality in current fisheries in Maine and South Carolina. We commend the steps that the State of Maine has implemented to reduce effort and manage this extremely valuable fishery; however the 35% reduction from 2013 harvest still represents a significant increase in mortality from recent average landings. **We are aware of the importance of this fishery from an economic standpoint and therefore would support a multi-year phase-in approach to reaching the quota levels in sub Option 4c**.

To discourage overfishing, following- year quota deductions for overages is a prudent management tool.

Option 9: Due to the conservation status of the Japanese eel and the restriction on export of the European eel, demand for glass and juvenile eels is unlikely to decrease significantly. Due to the short harvest season on glass eels an ***electronic*** **trip level ticket system** is the only way to provide timely harvest data required to enforce a quota system.

Option 10: Better monitoring is urgently needed for improved eel management and any state with a glass eel fishery should be required to complete annual fishery independent life cycle surveys within one basin at a minimum.

Yellow eels

Option 4 Yellow Eel Quota based on 2010: Sub-Option 4c 20% Reduction
Consistent with the PDT's recommendation to reduce mortality at all life stages in order to rebuild the stock, we recommend setting a coastwide quota to achieve a minimum 20% reduction from 2010 landings. This would represent a modest reduction in mortality of yellow eels coastwide.

Silver eels
Option 1: Status Quo
Although commercial silver eel fisheries are limited, inland weir fisheries in particular are targeting out-migrating silver eels. Natural mortality of silver eel is low, and loss of large, mature females during their spawning migration has a significant impact on stock status. We support the expiration of the one- year extension granted to New York and the implementation of the regulation specified under Section 4.1.2 in Addendum III.

State Specific Sustainable Fishery Management Plans

Although we applaud the Board's implementation of the shad and river herring fishing sustainability plans that required states to demonstrate that existing fisheries could be kept open and allow for stock recovery we are concerned that *state-specific* eel sustainable fishing plans may be inappropriate for a species that has a single population (across all ASMFC states and beyond) and is extremely data poor. We encourage the ASMFC to work with Canada and other states outside of the ASMFC region and countries to develop a range wide conservation and recovery plan.

The Nature Conservancy appreciates the opportunity to provide comments to the Atlantic States Marine Fisheries Commission regarding Addendum IV to the American eel Fishery Management Plan. If you have any questions, please contact Mari-Beth DeLucia at 914-714-4699 or mdelucia@tnc.org.

Sincerely,

Lise A. Hanners, Ph.D.
Director of Conservation, Eastern U.S. Conservation Division

Upper Delaware Council

P.O. Box 192, 211 Bridge Street, Narrowsburg, New York 12764-0192 • (Tel.) 845-252-3022 • (Fax) 845-252-3359
www.upperdelawarecouncil.org

July 3, 2014

Kate Taylor, Senior FMP Coordinator
Atlantic States Marine Fisheries Commission
1050 North Highland St.
Suite 200 A-N
Arlington, VA 22201

RE: Draft Addendum IV to the Fishery Management Plan for American Eel

Dear Ms. Taylor,

The Upper Delaware Council, Inc. (UDC) urges the Atlantic States Marine Fisheries Commission (ASMFC) to allow the commercial silver eel fishery to remain active in the New York State portion of the Delaware River and its tributaries beyond the current regulatory expiration date of December 31, 2014 based on its continued significance to the regional culture and economy.

The *River Management Plan for the Upper Delaware Scenic and Recreational River: New York and Pennsylvania*, adopted in 1986, provided that "the commercial taking of eels by eel weirs or other traditional methods may continue in accordance with state laws and regulations" in support of the overall objective to "ensure the continued public use and enjoyment of the traditional and historical uses of the public lands and waters of the river corridor for hunting, fishing, trapping and commercial taking of eels and bait…" (Fisheries and Wildlife section, page 69-70).

Please take note that New York State Executive Order #169 signed on March 22, 1993 directs all state agencies to act consistently with the policies of the River Management Plan.

Draft Addendum IV, for which public comments are being solicited through July 17 and the ASMFC's American Eel Management Board is expected to finalize approval in August 2014, outlines four options under consideration for the commercial silver eel fishery:

1) Allow New York's one-year exemption to expire at the end of the year;
2) Extend the sunset provision by a timeframe specified by the Board;
3) Implement a time closure for no taking of eels in the Delaware River system of NY;
4) Limit the Delaware River weir fishery to those permitted New York participants that fished and reported landings anytime during the period from 2010-2013.

The stated goal of Draft Addendum IV is to reduce overall mortality and increase conservation of American eel stocks. A 2012 Benchmark American Eel Stock Assessment found that the population of glass, yellow, and silver eels is at or near historically low levels in United States waters due to a combination of historical overfishing, habitat loss and alteration, productivity and food web alterations, predation, turbine mortality, changing climatic and oceanic conditions, toxins and contaminants, and disease. The baseline assessment, however, was not able to construct eel population targets that could be related to sustainable fishery harvests.

While the UDC encourages continued scientific study to determine stock depletion trends, we are aware that the Delaware River holds the distinction of having the only commercial silver eel fishery operating in the 15 states of the Atlantic coast. The American eel fishery primarily targets yellow stage eel, while glass eel fisheries are currently prohibited in all Atlantic states except Maine and South Carolina. Given that only 16 permits are currently issued - with even fewer eel weirs in actual operation on the Delaware and Neversink Rivers - the overall impact of New York's commercial silver eel fishery on the coastal system appears minor.

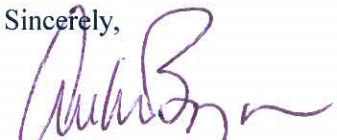
If New York's exemption is allowed to expire, a provision of Addendum III which prohibits the retention of eels from Sept. 1 to Dec. 31 will go into effect. Considering that from 2003-2012, average monthly landings from the Delaware's eel weir fishery were reported as: July, 139 lbs.; Aug., 1,005 lbs.; Sept., 2,574 lbs.; Oct., 1,653 lbs.; and Nov., 2 lbs., this restriction would be detrimental to an already challenging business enterprise which exists to supply a demand.

We support approval of a management option or combination of options that will keep the commercial silver eel fishery open while implementing reasonable conservation objectives.

The UDC was established as a non-profit organization in 1988 to administer, in partnership with the National Park Service, the River Management Plan for the Congressionally-designated section of the Delaware River from the confluence of the East and West Branches below Hancock, NY to Railroad Bridge No. 2 in Mill Rift, PA. Voting members are the two states and 13 NY towns and PA townships that border along the 73.4-mile Upper Delaware River, with the Delaware River Basin Commission participating as a non-voting member.

We appreciate the New York State Department of Environmental Conservation hosting a public informational meeting about these potential regulatory changes at the UDC's Narrowsburg office on June 30 and this opportunity to offer comments to ASMFC. Please advise the Upper Delaware Council of any further developments on Addendum IV and the ultimate action taken.

Sincerely,



Andrew Boyar,
UDC Chairperson

Cc: Kathy Hattala, Fisheries Biologist, NYS Dept. of Environmental Conservation
Bill Rudge, UDC Representative, NYS DEC Region 3 Natural Resources Supervisor
Michael Flaherty, UDC Alternate, NYS DEC Region 3 Inland Fisheries Manager
Kris Heister, Superintendent, NPS Upper Delaware Scenic and Recreational River
Don Hamilton, Chief of Resource Management, NPS Upper Delaware S&RR
U.S. Congressman Chris Gibson, 19th District
U.S. Congressman Sean Patrick Maloney, 18th District
New York State Governor Andrew Cuomo
Senator John J. Bonacic, 42nd District
Assemblywoman Aileen Gunther, 100th District
Assemblyman Clifford Crouch, 107th District

United States Department of the Interior

NATIONAL PARK SERVICE
Upper Delaware Scenic and Recreational River
274 River Road,
Beach Lake PA 18405

IN REPLY REFER TO:

July 11, 2014

1.A.2 (UPDE SO)

Ms. Kate Taylor, Senior Coordinator
Fisheries Management Program
1050 North Highland Street
Suite 200A-N
Arlington, VA 22201

RE: Draft Addendum IV to the Fishery Management Plan for American Eel

Dear Ms. Taylor:

The National Park Service (NPS) appreciates the opportunity to provide comments on *Draft Addendum IV to the Fishery Management Plan for American Eel.* The Upper Delaware Scenic and Recreational River includes the uppermost 73.4 miles of the main stem Delaware River and comprises the majority of the New York waters fished in the silver eel fishery - the last remaining such fishery on the Atlantic Coast. As a unit of the NPS, the park enabling legislation cites the need to protect the river's water quality and scientific features, and to fulfill other vital national conservation purposes. Additionally, the *River Management Plan for the Upper Delaware Scenic and Recreational River: New York and Pennsylvania*, adopted in 1986, states that "the commercial taking of eels by eel weirs or other traditional methods may continue in accordance with state laws and regulations" (COUP 1986). In recognition of their ecological, cultural, and economic significance, along with the fact that the silver eel fishery amounts to less than 1% of American eel landings annually, and provides the only source of data on this life stage coast wide, the NPS supports the silver eel fishery remaining open at this time under regulations that will promote the future sustainability of healthy populations of this very significant fish.

The NPS encourages the Atlantic States Marine Fisheries Commission (ASMFC) to carefully consider the wide range of management options proposed for the glass eel, yellow eel, and silver eel fisheries under Draft Addendum IV. It is also important to consider the fisheries and eel stock data over the past several decades, and to include in any management strategy the collection of baseline data sufficient to construct eel population and trend information that can be used to guide sustainable fishery management, set harvest quotas, and above all else ensure

viable eel populations into the future. Factored into any decision should be the findings in a recent paper that American eel are most likely the primary host fish enabling reproduction of eastern elliptio (*Elliptio complanata*) mussel, a ubiquitous, ecologically important and often dominant member of freshwater mussel assemblages throughout the Atlantic Slope drainage in the United States and Canada (Lellis et. al. 2013).

Although reduced in numbers and somewhat restricted in distribution in impounded river systems, American eels remain prominent components of lotic fish assemblages in many Atlantic Slope river systems. This, combined with their robust metamorphosis of glochidia compared with 38 other fish species evaluated, makes them the most likely primary host fish of *E. complanata* in this region (Lellis 2013). *E. complanata* make up the greatest animal biomass in this stretch of the Delaware River, and play an integral role ecologically through their filtering and nutrient processing capabilities. This can be contrasted with the Susquehanna River, where dams block American eel passage into the upper river, and no evidence of *E. complanata* reproduction can be found (W. Lellis, personal communication). Availability of suitable hosts has long been shown to impact distribution and abundance of freshwater mussels (Williams et al. 1993; Waters 1996; Kelner and Seitman 2000). Ongoing loss of American eel to overharvest, stream blockage, and other anthropogenic stressors (ASFMC 2000) may significantly impact *E. complanata* distribution and abundance in many coastal watersheds. Decoupling of these fish and mussel species or the displacement of either from coastal rivers may produce significant ecosystem-level effects that are not yet well understood (Lellis 2013). As a keystone species that plays a critical role in maintaining the structure of Atlantic Coast river ecosystems, it is crucial that management decisions promote the sustainability of viable populations of American eel into the future.

In order to achieve a balance between the ecological, cultural, and economic values associated with American eel, the benefits derived from this fishery need to be weighed against findings in the Benchmark 2012 American Eel Stock Assessment that "fishing on ... out-migrating silver eels could be particularly detrimental to the stock, especially if other sources of mortality (e.g. turbine mortality, changing oceanographic conditions) cannot be readily controlled." The NPS supports adoption of a combination of the management options presented in Draft Addendum IV for the silver eel fishery, including *Option 4*, a License Cap to limit the number of licenses, and *Option 3*, an Effort Reduction/Time Closure. These combined options will best support the goals of Draft Addendum IV to reduce overall mortality and increase conservation of American eel stocks and is consistent with the River Management Plan objective of maintaining the "traditional and historical uses of public lands and waters of the river corridor for hunting, fishing, trapping, and commercial taking of eels and bait" (COUP 1986).

Currently, 16 permits are issued for the operation of eel weirs in the New York Portion of the Delaware River and its tributaries, with fewer eel weirs (9 to 10) fishing and reporting landings during the 2010-2013 seasons. A cap on the number of licenses, perhaps limited to the number of weirs in actual operation during the 2010-2013 timeframe, would serve to maintain current business operations, supply existing demand, and reduce potential impacts to the region's economy as well as reduce the likelihood of industry expansion leading to potential overharvest. A reasonable time closure, perhaps for the month of October on, would reduce the silver eel harvest by approximately 30% based on harvest data (average monthly landings) reported between 2003 and 2012. This number is in keeping with targeted percentage reductions in other

life stage fisheries. This closure would also allow escapement of more of the larger late-running silver eels critical to reproductive success.

The NPS appreciates the opportunity to provide these comments and looks forward to working with the ASMFC to promote the sustainability of viable populations of American eel into the future. For more information on the technical aspects of these comments please contact Don Hamilton, Chief of Natural Resources, at 570-729-7842 or don_hamilton@nps.gov.

Sincerely,

Kristina M. Heister

Kristina M. Heister
Superintendent

Cc: Kathy Hattala, Fisheries Biologist, NYS Dept. of Environmental Conservation
Bill Rudge, UDC Representative, NYS DEC Region 3 Natural Resources Supervisor
Michael Flaherty, UDC Alternate, NYS DEC Inland Fisheries Manager
Laurie Ramie, Executive Director, Upper Delaware Council

References:

[ASMFC] Atlantic States Marine Fisheries Commission. 2000. Interstate fishery management plan for the American eel (Anguilla rostrata). Fishery Management Report No. 36 of the Atlantic States Marine Fisheries Commission (see Supplemental Material, Reference S1, http://dx.doi.org/10.3996/102012-JFWM-094.S3).

ASMFC. 2012. American Eel Benchmark Stock Assessment. Stock Assessment Report 12-01 of the Atlantic States Marine Fisheries Commission. 342 pp.

[COUP] Conference of Upper Delaware Townships. 1986. Final River Management Plan Upper Delaware Scenic and Recreational River: New York and Pennsylvania. 197 pp.

Kelner DE, Sietman BE. 2000. Relic populations of the ebony shell, Fusconaia ebena (Bivalvia: Unionidae), in the Upper Mississippi River drainage. Journal of Freshwater Ecology 15:371–377.

Lellis WA, White BS, Cole JC, Johnson CS, Devers JL, Gray EVS, Galbraith HS. 2013. Newly documented host fishes for the eastern elliptio mussel Elliptio complanata. Journal of Fish and Wildlife Management 4(1):75–85; e1944-687X. doi: 10.3996/102012-JFWM-094

Watters GT. 1996. Small dams as barriers to freshwater mussels (Bivalvia, Unionoida) and their hosts. Biological Conservation 75:79–85.

Williams JD, Warren ML, Cummings KS, Harris JL, Neves RJ. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries 18:6–22.

July 14, 2014

Thomas O'Connell, Chairman
ASMFC American Eel Management Board
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

RE: American Eel Addendum IV

Dear Mr. O'Connell and Members of the American Eel Management Board,

Wild Oceans is a non-profit group of anglers dedicated to advancing a broad, ecosystems approach to fisheries management that reflects our expanding circle of concern for all marine life and the future of fishing. The American eel's unique life cycle brings newly hatched eels hundreds of miles from the Sargasso Sea to congregate in our inland river systems where they play a critically important role in the forage base supporting a myriad of wildlife. **We are concerned for the American eel population, which is depleted to historically low levels, possibly warranting listing under the Endangered Species Act.[1] We fully support Management Board actions that will reduce mortality across all life stages, as advised in the 2012 American Eel Benchmark Stock Assessment.[2]** Below we offer commercial management recommendations for inclusion in Addendum IV to the Interstate Fishery Management Plan for American Eel.

3.1.1 Glass Eel Fisheries Management Options

We support Option 4 - Glass Eel Quota Based on Landings, Sub-option 4c, which would implement a quota system for glass eel fisheries based on landings from 2010, which is the terminal year included in the assessment. We note that the stock assessment subcommittee cautioned that "current levels of fishing effort may still be too high given the additional anthropogenic and environmental stressors affecting the stock. Fishing on all life stages of eels, particularly YOY and out-migrating silver eels, could be particularly detrimental to the stock…"[3] Sub-option 4c offers the most conservative quota while allowing the continuation of glass eel fisheries important to Maine and South Carolina.

[1] USFWS. 28 Sept 2011. American eel may warrant protection under the endangered species act. *U.S. Fish and Wildlife Service*. Retrieved from: http://www.fws.gov/northeast/news/2011/092811.html
[2] ASMFC, 2012. American eel benchmark stock assessment. Stock assessment report 12-01 of the Atlantic States Marine Fisheries Commission. 342 pp.
[3] Ibid, *see* Preface

For the glass eel quota system to be effective, **we also support Option 5** (deducting quota overages the following year with no carryover of un-harvested quota), **Option 9** (required daily electronic reporting to track and enforce quota) **and Option 10** (required fishery independent life cycle survey for states with glass eel fisheries). *We highlight the importance of Option 9 for thwarting illegal harvest of glass eels and insist that a robust reporting and enforcement system be a prerequisite for any glass eel quota allocation.*

3.1.2 Yellow Eel Fisheries Management Options

We do not have a position on the allocation components of the options presented, but more generally support the options (**Option 4, Sub-Option 4c & Option 5, Sub-Option 5c**) that would implement a yellow eel quota system and reduce harvest by approximately 20% from 2010, consistent with the assessment recommendation to reduce mortality from this level. As with the glass eel management options, we support deducting quota overages, pound for pound, the following year (**Option 6**). Under no circumstances should quota underages be carried over to the next year.

3.1.3 Silver Eel Fisheries

We support **Option 1**, the status quo, which requires the State of New York to comply with the silver eel fishery time closure in Addendum III. Once again, we emphasize that the stock assessment subcommittee cautioned that fishing on out-migrating silver eels could be "particularly detrimental to the stock."[4] We note that the Addendum III time closure measure offers states the flexibility to submit an alternative closure plan if a state can demonstrate that the alternative closure encompasses the silver eel outmigration period.

With a life cycle that reaches hundreds of miles inland to hundreds of miles off the coast in the Sargasso Sea, the American eel epitomizes the need for fishery managers to work cooperatively across jurisdictional boundaries. Indeed, the benchmark stock assessment peer review panel flagged "coordinate(d) monitoring, assessment, and management among agencies that have jurisdiction within the species' range" as a "very high priority."[5] By making meaningful conservation strides through Addendum IV, the Atlantic states have an opportunity to play a significant role in the recovery of the American eel population, setting the stage for international cooperation.

Thank you for your consideration.

Sincerely,

Pam Lyons Gromen
Executive Director

[4] Ibid
[5] See note 2, p.29

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Allyn B. Powell (retired Research Fishery Biologist, NMFS, Beaufort Laboratory, Beaufort, NC)

I have visited the the "American Eel Farm" facility in Trenton, NC. I firmly believe that this is a first class facility that should be approved by the ASMFC to rear American eels . This facility, and the operators strategy, could provide valuable economic and scientific assets. Based on my observations of the facility coupled with minutes made by the recent ASMFC Management Board, I support the following comments presented to the ASMFC by the American Eel Farm and would like the ASMFC to consider their merits.

As a resident of North Carolina, I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a big importer of processed eel product. The American Eel Farm (AEF), a local North Carolina small business located in Trenton, working with the State of North Carolina, is a state-of-the-art facility that has the capability and could demonstrate the feasibility of raising disease free, sushi grade American eel in North Carolina to supply American markets that now depend mostly on imported product. Other states need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels for aquaculture at the AEF will be a good opportunity to assess in NC the annual recruitment of each year's cohort which is unknown. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV would be met and provide eel fishery information which is needed for this data poor fishery. The sampling/collection protocol would be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the NC Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. The AEF has a history of working with the NC State Cooperative Extension Service. A NCSU Area Aquaculture Agent, and other university scientists and students would have an opportunity to work on collecting data concerning the production side of the AEF and the potential for stocking farm raised eels at a to-be-determined size to increase populations of yellow eels in NC and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. A production/research facility such as the AEF can contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow this facility and others in coastal states to get started.

cc: Garry Wright

To: Ms. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Frederick H. Clayton, Sr.
4913 Growden Avenue
Feasterville-Trevose, PA 19053

Dear Ms. Taylor,

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you for your time and consideration.

Sincerely yours,

Frederick H. Clayton, Sr.

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: David Crestin
6 Paddock Drive
Harwich, MA 02645

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV to The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the strong potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However , world-wide, eel aquaculture is a multi-billion dollar business and the US is a major importer of processed eel product. I do know that in North Carolina, there is a state-of-the-art facility that has the capacity to support aquaculture on a commercial scale. The enterprise would like to demonstrate the feasibility of raising disease free, sushi grade American eel to supply American markets that now depend mostly on imported product. Other states may have facilities that need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels for aquaculture in state waters would be a good opportunity to help assess the annual recruitment of each year's cohort for which there are now limited data. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV that would have to be met and that would provide additional eel fishery information which is needed for this data- poor fishery. The sampling/collection protocol could be developed using the ASMFC Standard Procedures for American Eel Young-of-the-Year Survey, in cooperation with the State Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. Eel aquaculture facility personnel, working with the state Cooperative Extension Service, Area Aquaculture Agents, and other university scientists and students, would have an opportunity to collect data concerning the production side of the aquaculture facility and the potential for stocking farm-raised eels at a to-be-determined size to increase populations of yellow eels and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. Production/research eel aquaculture facilities in the US could contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow these facilities to get started. Thank you.

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Allyn B. Powell (retired Research Fishery Biologist, NMFS, Beaufort Laboratory, Beaufort, NC)

I have visited the the "American Eel Farm" facility in Trenton, NC. I firmly believe that this is a first class facility that should be approved by the ASMFC to rear American eels . This facility, and the operators strategy, could provide valuable economic and scientific assets. Based on my observations of the facility coupled with minutes made by the recent ASMFC Management Board, I support the following comments presented to the ASMFC by the American Eel Farm and would like the ASMFC to consider their merits.

As a resident of North Carolina, I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a big importer of processed eel product. The American Eel Farm (AEF), a local North Carolina small business located in Trenton, working with the State of North Carolina, is a state-of-the-art facility that has the capability and could demonstrate the feasibility of raising disease free, sushi grade American eel in North Carolina to supply American markets that now depend mostly on imported product. Other states need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels for aquaculture at the AEF will be a good opportunity to assess in NC the annual recruitment of each year's cohort which is unknown. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV would be met and provide eel fishery information which is needed for this data poor fishery. The sampling/collection protocol would be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the NC Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. The AEF has a history of working with the NC State Cooperative Extension Service. A NCSU Area Aquaculture Agent, and other university scientists and students would have an opportunity to work on collecting data concerning the production side of the AEF and the potential for stocking farm raised eels at a to-be-determined size to increase populations of yellow eels in NC and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. A production/research facility such as the AEF can contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow this facility and others in coastal states to get started.

cc: Garry Wright

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

July 1, 2014

From: Lt/Colonel Richard Hurley USAF (Retired)
623 Hawick Road
Raleigh, NC 27615

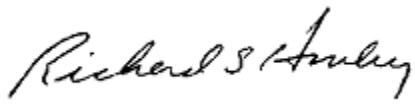
As a resident of North Carolina, I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a big importer of processed eel product. The American Eel Farm (AEF), a local North Carolina small business located in Trenton, working with the State of North Carolina, is a state-of-the-art facility that has the capability and could demonstrate the feasibility of raising disease free, sushi grade American eel in North Carolina to supply American markets that now depend mostly on imported product. Other states need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels for aquaculture at the AEF will be a good opportunity to assess in NC the annual recruitment of each year's cohort which is unknown. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV would be met and provide eel fishery information which is needed for this data poor fishery. The sampling/collection protocol would be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the NC Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. The AEF has a history of working with the NC State Cooperative Extension Service. A NCSU Area Aquaculture Agent, and other university scientists and students would have an opportunity to work on collecting data concerning the production side of the AEF and the potential for stocking farm raised eels at a to-be-determined size to increase populations of yellow eels in NC and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. A production/research facility such as the AEF can contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow this facility and others in coastal states to get started.

cc: Garry Wright



To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Donald Rishell
21 Fountaine Court
Waterford Works, NJ 08089

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a major importer of processed eel product. I do know that in North Carolina, there is a state-of-the-art facility that has the capacity to support eel aquaculture on a commercial scale. The enterprise would like to demonstrate the feasibility of raising disease free, sushi grade American eel to supply American markets that now depend mostly on imported product. Other states may have facilities that need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels in state waters for aquaculture would be a good opportunity to help assess the annual recruitment of each year's cohort for which there are now limited data. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV that would have to be met and that would provide additional eel fishery information which is needed for this data poor fishery. The sampling/collection protocol could be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the State Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. Eel aquaculture facility personnel working with the state Cooperative Extension Service, Area Aquaculture Agents, and other university scientists and students would have an opportunity to work on collecting data concerning the production side of the aquaculture facility and the potential for stocking farm raised eels at a to-be-determined size to increase populations of yellow eels and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. Production/research eel aquaculture facilities in the US could contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow these facilities to get started.
Thank you.

Sincerely,
Donald Rishell

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Greg McIntosh
1615 East Camino del Rio
Vero Beach, FL 32963

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a big importer of processed eel product. I do know that in North Carolina, there is a state-of-the-art facility that has the capability and would like to demonstrate the feasibility of raising disease free, sushi grade American eel to supply American markets that now depend mostly on imported product. Other states may have facilities that need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels for aquaculture in states would be a good opportunity to help assess the annual recruitment of each year's cohort for which there are limited data. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV that would have to be met and that would provide additional eel fishery information which is needed for this data poor fishery. The sampling/collection protocol could be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the State Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. Eel aquaculture facilities working with the state Cooperative Extension Service, Area Aquaculture Agents, and other university scientists and students would have an opportunity to work on collecting data concerning the production side of the aquaculture facility and the potential for stocking farm raised eels at a to-be-determined size to increase populations of yellow eels and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. Production/research eel aquaculture facilities in the US could contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow these facilities to get started.

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201
From:

As a resident of North Carolina, I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you.

John Butler
Raleigh, NC

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Mr. John P Gangemi

3000 Sunnybranch Drive

Wilmington, NC 28411

As a resident of North Carolina, I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you,

John P. Gangemi

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Mary S.. Morris
979 Colonial Meadows Way
Virginia Beach, VA. 23454

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you.

Mary S. Morris

To: Ms. Kate Taylor, Senior FMP Coordinator

1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Miten Patel
120 Island Forest Ln,
Mooresville, NC 28117
(980) 875-8236

Dear Ms. Taylor,

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you for your time and consideration.

Sincerely yours,

Miten Patel

To: Ms. Kate Taylor, Senior FMP Coordinator

1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Pastor Jim Jarman

Dear Ms. Taylor,

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you for your time and consideration.

Sincerely yours,

Pastor Jim Jarman
Agape Life Family Church
(910)-467-9747

To: Ms. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Pramod Poojary
1320 E Algonquin Rd Apt 1R,
Schaumburg, IL - 60173.

Dear Ms. Taylor,

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you for your time and consideration.

Sincerely yours,
Pramod Poojary

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Raymond J. Hanlein
8105 Collins St.
Annandale, VA 22003

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you.

Raymond Hanlein

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Robert A. Reitz
149 Ruby Ridge Trail
Talking Rock, GA. 30175

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

At this time, to my knowledge, there are **no** operating American eel aquaculture facilities in the US. However, world-wide, eel aquaculture is a multi-billion dollar business and the US is a major importer of processed eel product. I do know that in North Carolina, there is a state-of-the-art facility that has the capacity to support eel aquaculture on a commercial scale. The enterprise would like to demonstrate the feasibility of raising disease free, sushi grade American eel to supply American markets that now depend mostly on imported product. Other states may have facilities that need this opportunity as well and Option 3.1.4 could provide that.

The collection of local glass eels in state waters for aquaculture would be a good opportunity to help assess the annual recruitment of each year's cohort for which there are now limited data. As the ASMFC eel management plan states, data from a young-of-the-year abundance survey could provide a barometer with which to gauge the efficiency of management actions. As part of this plan, all of the requirements specified under the Aquaculture Plan section of Addendum IV that would have to be met and that would provide additional eel fishery information which is needed for this data poor fishery. The sampling/collection protocol could be developed using the ASMFC Standard Procedures for American Eel Young of the Year Survey and in cooperation with the State Division of Marine Fisheries representative on the ASMFC Eel Board's Technical Committee. Eel aquaculture facility personnel working with the state Cooperative Extension Service, Area Aquaculture Agents, and other university scientists and students would have an opportunity to work on collecting data concerning the production side of the aquaculture facility and the potential for stocking farm raised eels at a to-be-determined size to increase populations of yellow eels and enhance spawning potential.

There are many questions concerning management options for American and European eels that need to be answered as documented in ICES Reports and EU Eel Recovery Plans. Production/research eel aquaculture facilities in the US could contribute to the knowledge needed to answer some of those questions. The Aquaculture Plan in Option 3.1.4 of Addendum IV would allow these facilities to get started. Thank you.

Sincerely,
Robert A. Reitz

To: Ms. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Robert Colantonio
89 PENN ST
PROVIDENCE, RI 02909

Dear Ms. Taylor,

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.
Thank you for your time and consideration.

Sincerely yours,
Robert Colantonio

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Sal Vitale

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you.

From: Tanmay Patel [wktkpr89@yahoo.com]
Sent: Thursday, July 17, 2014 9:19 AM
To: Comments
Subject: ASMFC

From: Tanmay Patel

Dear Ms. Taylor,

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you for your time and consideration.

Sincerely yours,

Tanmay Patel

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201

From: Tom Clayton
11 Tiffany Ave
Waterford, CT 06385

I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you.

To: MS. Kate Taylor, Senior FMP Coordinator
1050 North Highland Street
Suite 200A-N
Arlington, Virginia 22201
From: Walter O Stokes

As a resident of North Carolina, I support Option 3.1.4 (Aquaculture Plan) of the Atlantic States Marine Fisheries Commission's (ASMFC) Addendum IV To The Fishery Management Plan For American Eel. This will provide needed opportunities for American eel aquaculture and the beneficial economic impacts it can have in coastal states. Additionally, there is the potential for stock enhancement provisions similar to those found in European Union eel recovery plans that include aquaculture, translocation and stocking as a major part of their plans.

Thank you.