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 1              GULF OF MEXICO FISHERY MANAGEMENT COUNCIL
 2
 3                       ECOSYSTEM COMMITTEE
 4
 5   Key West Marriott Beachside Hotel          Key West, Florida
 6
 7                         June 20, 2018
 8
 9   VOTING MEMBERS
10   Bob Shipp...................................................Alabama
11   Kevin Anson (designee for Scott Bannon)....................Alabama
12   Glenn Constant...............................................USFWS
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1 The Ecosystem Committee of the Gulf of Mexico Fishery Management
2 Council convened at the Key West Marriott Beachside Hotel, Key
3 West, Florida, Wednesday morning, June 20, 2018, and was called
4 to order by Chairman Bob Shipp.
5
6 **ADOPTION OF AGENDA**
7 **APPROVAL OF MINUTES**
8 **ACTION GUIDE AND NEXT STEPS**
9
10 **CHAIRMAN BOB SHIPP:** We will start off with the adoption of the
11 agenda, and that's Tab Q, Number 1. Do we have a motion to
12 adopt the agenda? It's moved and seconded. Any objections?
13 Hearing none, the agenda is adopted.
14
15 The next item is Tab Q, Number 2, Review of October 2015
16 Minutes. It's been that long since this committee has met, and
17 so do I hear a motion to accept the minutes? With no
18 objections, the minutes are adopted. The next is the Action
19 Guide and the Next Steps, Tab Q, Number 3, and, Dr. Kilgour, I
20 will turn it over to you.
21
22 **DR. MORGAN KILGOUR:** Thank you, Mr. Chair. Today, we're going
23 to have a presentation on the regional ecosystem-based fisheries
24 management roadmap policy that Dr. Karnauskas has worked
25 tirelessly to get together for us, and so this is just
26 informational. Dr. Karnauskas is also working me about the
27 ecosystem policy, that outline that you will see in August, and
28 so feel free to pepper her with questions and comments.
29
30 **MS. LEANN BOSARGE:** Okay, and so do we have Dr. Karnauskas in
31 the audience? There she is. Welcome. We're glad to have you
32 with us today, ma'am.
33
34 **DRAFT ROADMAP OF ECOSYSTEM-BASED FISHERIES MANAGEMENT REGIONAL**
35 **PLAN FOR THE GULF OF MEXICO**
36
37 **DR. MANDY KARNAUSKAS:** Thank you, all. Thank you for your time
38 and interest and for this slot to present to you the Gulf of
39 Mexico Ecosystem-Based Fishery Management, or EBFM, Roadmap
40 Implementation Plan. This is a document we pulled together, as
41 Morgan just mentioned, and the draft was rolled out this past
42 week for public comment, and it will be up until September 30.
43
44 Before I go into the document itself, I wanted to lay out a few
45 definitions. First of all, what is EBFM? Let's make sure we're
46 just starting off on the same page. This is the NOAA Fisheries
47 definition, this graphic, and it's based on the NOAA Fisheries
48 definition of EBFM, and it's considered within the spectrum of a

1 range of approaches that go from single-species approaches all
2 the way up to the full multisectoral ecosystem-based management,
3 and so, in general, EBFM is thought to encompass not just the
4 stock biology itself, but any multispecies interactions as well
5 as climate, habitat, and predator effects.
6
7 While there is this general understanding of what EBFM is, in
8 practice, there is kind of a lack of consensus in EBFM, and that
9 was highlighted nicely by this paper that recently came out by
10 Trochta et al., and they conveyed very nicely that, again, in
11 practice, there is a lack of consensus and that ecosystem-based
12 fisheries management can take many different forms, depending on
13 the region, and so this really calls for a regional-specific
14 approach, which was the idea behind these regional roadmaps.
15
16 To further sort of guide our vision about what EBFM might look
17 like for the Gulf of Mexico, I want to point to this integrated
18 socioecological system of the Gulf of Mexico, this conceptual
19 figure that was put together by NOAA's Integrated Ecosystem
20 Assessment Program, or IEA. Now, the IEA is a national program
21 with regional working groups, and so we have a Gulf regional
22 working group, and that's the mission statement for our Gulf
23 IEA, and the IEA is intended to be the analytical engine to
24 implement EBFM.
25
26 Looking at this conceptual map, we see that the human activities
27 that we're managing for are purposely put at the forefront of
28 the conceptual figure here, and then, the different ecosystem
29 considerations that needed to be accounted for in managing for
30 their activities, you see them along the perimeter of the circle
31 here, and so these ecosystem considerations include not just
32 things like climate and ocean drivers and habitat and the
33 biology itself, but also the social and economic components, and
34 so human well-being, local social systems, and social drivers.
35
36 Not all of the ecosystem research that is conducted in the
37 Southeast falls under the umbrella or is done under the umbrella
38 of the IEA, but certainly I think it's encompassed in this
39 conceptual model, and this is provides a useful visual for
40 thinking about what EBFM in the Gulf looks like.
41
42 Now going into why EBFM -- Why is there this call to move
43 towards an ecosystem-based fishery management approach when
44 single-species management has worked very well so far, and so,
45 as we know, single-species stock assessments have been highly
46 successful in ending overfishing, and the graph I'm showing you
47 here is the proportion of stocks undergoing overfishing in the
48 Gulf of Mexico, and we can see that it has continually decreased

1 from the late 1990s to the present day. Essentially, we have
2 ended overfishing, and so the task is complete.
3
4 Again, under single-species stock assessments and management
5 framework, we have ended overfishing, and so now, in terms of
6 going forward, it really becomes a question of fine-tuning the
7 management or optimizing the management, and so we have
8 questions such as optimum yield and what is optimum yield and
9 how do we get from MSY to OY, and OY, by definition, is MSY as
10 reduced by economic, social, and ecological factors, and so,
11 inherently, there is a need to understand these greater
12 ecosystem considerations to define optimum yield.
13
14 Of course, there is many other ways that we can think about
15 optimizing management. For example, we might be able to improve
16 our short-term projections. What I am showing on the top left
17 here is one of our typical stock-recruitment relationships, and,
18 as is typical, there is very little resolution in the data. We
19 tend to project forward based on just sort of a mean
20 recruitment, but, of course, the recruitment in any given year
21 can be substantially higher or lower than that mean.
22
23 By having a greater understanding of expected recruitment and
24 not just recruitment but other stock processes, we could
25 essentially reduce this cone of uncertainty, as it were. Also,
26 rebuilding plans are costly, and obviously there is things to be
27 avoided. Avoiding falling into that overfished designation
28 requires some understanding of the amount of variability that
29 we're likely to see in the stock from year-to-year.
30
31 Then, finally, one of the big reasons, big arguments, for going
32 towards EBFM is that we have the right to productive fisheries,
33 and there is a lot of factors external to fishing in our systems
34 that are likely reducing the productivity of fisheries, and
35 these are largely, of course, out of fishery management control,
36 but, by researching, investigating, and quantifying these losses
37 to productivity of our fisheries, I think that gives us some of
38 the leverage that we might need to potentially address these
39 effects.
40
41 Moving on to how we're going to accomplish EBFM, this is the
42 national NOAA Fisheries EBFM Roadmap Policy. These are the
43 guiding principles that they outlined in this document. There
44 is six driving principles, and the National EBFM Policy was
45 released in May of 2016. In 2017, in the summer, they initiated
46 the regional roadmap development, and so that's when we began
47 work on the Gulf EBFM roadmap. As I mentioned, the public
48 comment period just was initiated, and the drafts were rolled

1 out last week, and that's going to be open until September 30, I
2 believe, and then we're aiming to incorporate those comments and
3 publish the final roadmaps by the end of this calendar year.
4
5 Now I will delve into the purpose of the Gulf EBFM roadmap
6 specifically. This is the stated purpose of the document, and
7 this comes right from the text. First of all, we wanted to
8 document the efforts that the Southeast Fisheries Science Center
9 and its partners have completed, and we want to guide the
10 organization of ecosystem science within the Southeast Region,
11 clarify regional priorities in order to facilitate
12 collaboration, and assist the Gulf Council with ecosystem-level
13 planning.
14
15 The intended audience of the document is the Gulf Council, the
16 interested public, NOAA Fisheries Southeast Region and its
17 collaborating partners, and the overarching goal or objective is
18 to motivate a dialogue on how EBFM can be effectively applied in
19 the Gulf region, taking into account stakeholder views, regional
20 capacity, and the current state of the science.
21
22 Just a quick note on the development of the Gulf EBFM roadmap,
23 the process we used. The plan involved development including
24 the Southeast Fisheries Science Center, the Regional Office,
25 council staff, and we had Morgan Kilgour come in and work with
26 us for a couple of days, and we also used a scoping survey to ID
27 some of the priority issues, and we reached about thirty-five
28 individuals from the Southeast labs and other NOAA offices in
29 the region, and so we got a -- I feel we cast a pretty wide net
30 and got a lot of ideas on what were the priority issues that we
31 need to address, and this is just a graph showing some of those
32 issues and how they fell out.
33
34 This is the outline of the EBFM roadmap, and the priority issues
35 fell mainly into these seven categories that you see here under
36 this regional context portion, and so, in the next slides, I'm
37 going to walk you through those priority issues and some of the
38 science that we're producing that can address these priority
39 issues.
40
41 The expected outcomes and benefits section of the roadmap go
42 into how these actions link up to those Headquarters priorities.
43 For the sake of time, I'm not going to go into that today, and,
44 then, at the end of the roadmap, we have a stakeholder
45 engagement strategy, and I will touch on that briefly at the end
46 of this presentation.
47
48 Moving into those priority areas, one of the priority areas is

1 improving stock assessments, and we can consider quantitative
2 ecosystem linkages that are directly put into the stock
3 assessment model, and this is -- We have to be cautious in doing
4 this. Not necessarily all data put into the stock assessment is
5 going to make it a better stock assessment, but we have had some
6 successes in doing this sort of thing in the Gulf region. We
7 have used the biophysical model to predict larval transport in
8 the Gulf of Mexico and trying to predict recruitment strength of
9 red snapper.
10
11 We have also been able to estimate mortality, natural mortality,
12 due to red tide events, and that's been used in the assessment,
13 and our Galveston Lab has a great deal of research going on with
14 estuarine habitat characteristics and how that's related to
15 shrimp production. That has been informing assessments in that
16 region.
17
18 We can also use ecosystem information in a qualitative sense.
19 It doesn't necessarily have to be put into the stock assessment
20 model, and so this is a little pilot project. This is a
21 collaboration between the IEA group and council staff, and what
22 we're trying to do here is pull information from the ecosystem
23 status reports that are produced, and I will talk about those in
24 just a second, but trying to connect that information with the
25 single stocks, and so we did this pilot around the gray snapper,
26 to go along with the assessment that just occurred.
27
28 The idea here is to show some of the ecosystem information,
29 ecosystem trends, that might be affecting the stock, and this
30 could be useful for management conversations about stock trends,
31 and this was inspired by an example from Alaska, from the North
32 Pacific Council. They use these pretty extensively, these
33 species profiles with ecosystem information, in their decision-
34 making, and so this was a first stab at a pilot project for gray
35 snapper.
36
37 Baseline monitoring, when we are talking about an ecosystem
38 approach, maintaining the existing baseline monitoring is more
39 important than ever, because we need to be able to understand
40 current trends in light of past trends, and so maintaining those
41 existing activities is an essential part of ecosystem
42 management, and we do produce these ecosystem status reports for
43 the Gulf of Mexico. We have two reports so far.
44
45 There is one in 2013 and one in 2017, which I'm showing you here
46 off to the right, and the ecosystem status reports are a
47 collection of indicators, and so we show these trends in these
48 indicators, and we aim to capture everything from the physical,

1 the biological, all the way up to human well-being components of
2 the ecosystem and show what the ecosystem is doing.
3
4 For the 2017 report, we had a nice online web version, to try
5 and make this information more accessible to the public as well,
6 and we have several other merging sort of monitoring activities.
7 The Gulf of Mexico Marine Assessment Program for protected
8 species was recently expanded from the Atlantic to the Gulf of
9 Mexico, and we also recently completed a pilot ecosystem survey,
10 where we experimented with some new approaches for collecting
11 data and looking at environmental DNA and genetic techniques and
12 trophic data, and the idea was to try and use this pilot to get
13 a sense for what sort of information content they can get from
14 these new approaches.
15
16 Climate was another priority area that was identified. Going on
17 in the region right now, we have climate vulnerability analyses,
18 which should hopefully give us an idea of which species are more
19 likely to potentially -- Where we're likely to see changes in
20 these species under predicted future conditions, and we've also
21 done some work predicting the effects of climate change, for
22 example, on bluefin tuna spawning habitat, and one of the big
23 components of bumping up our capacity to do climate research is
24 working with our neighboring AOML, the Atlantic Oceanographic
25 and Meteorological Lab that we have on Virginia Key. This is
26 the NOAA research line office that we have, and so this below-
27 right is an example of some of the research that they're
28 producing, a recent paper looking at the impacts of El Nino on
29 plankton biomass in the Gulf of Mexico.
30
31 The next priority area that was identified was habitat
32 considerations, and, when we talk about habitat, we can talk
33 about both estuarine and pelagic habitat. We have done work
34 looking at the predicted preferred conditions for bluefin tuna
35 larvae, and this has informed that assessment. Also, again,
36 understanding estuarine productivity and how that relates to
37 shrimp and other species. There has been some work done in
38 Protected Species, additionally, looking at pelagic habitat and
39 tying that to mammal distributions using visual survey and
40 acoustic data.
41
42 Multispecies interactions is the next priority area, and,
43 obviously, we have a lot of bycatch issues to take into
44 consideration in our region. In terms of understanding trophic
45 interactions between our species, we do have a fair bit of work
46 going on that could inform this, and we have diet studies, and
47 we have the GoMexSI diet database that was pulled together,
48 which looks at the -- It's digging up all the historical data on

1 diet that's been collected for both the U.S. and the Gulf of
2 Mexico, to try and get a handle on how diets have changed over
3 time, and we also have some ecosystem modeling capacity.
4
5 We have a new RESTORE project that was just funded, where the
6 goal is to integrate information on ecosystem stressors and
7 predator-prey interactions into the assessment and management of
8 fisheries in the Gulf of Mexico.
9
10 The next priority area that was identified was connectivity, and
11 regional connectivity is a big question. I know the stock ID
12 issue is always coming up, and we have some work that can inform
13 this. We have been doing, again, the larval transport modeling,
14 and we can estimate the connectivity of larvae between different
15 regions, and so we have some work going on to estimate
16 connectivity between -- Within the Gulf of Mexico, but also
17 between the Gulf of Mexico and its adjacent management
18 boundaries in the South Atlantic.
19
20 We have been able to do some work in putting these outputs into
21 advanced stock assessment models, where we look at the impacts
22 of understanding this connectivity on the stock assessment
23 outcomes, and then there is other tools we have at hand, such as
24 otolith microchemistry and shape analysis, to sort of
25 groundtruth some of the results that we're seeing from the
26 physical modeling.
27
28 When we talk about connectivity, we can talk about connectivity
29 from land to open ocean as well. Obviously one of the big
30 issues in our region is hypoxia, and, in 2017, we saw the
31 largest hypoxic zone that was measured on record, and there is a
32 fair bit of work going on in the center to understand hypoxia
33 effects on habitat, vital rates, fisher behavior, and shrimp
34 prices. Here, we are looking at some impacts of the hypoxia on
35 gonad sizes and then looking at the habitat loss in brown
36 shrimp.
37
38 You can see the different in shrimp distributions from a low
39 hypoxia to a severe hypoxia year, and then the big management
40 question is how do these effects on the vital rates -- How do
41 they translate up to the population level, and then,
42 subsequently, does hypoxia bias the management advice from stock
43 assessments, and so that's active research going on.
44
45 Then, also in regard to connectivity and land use changes, one
46 of the big coming proposed projects is this sediment diversion
47 project, and so they are proposing to poke a hole in the
48 Mississippi River to stem the land loss in coastal Louisiana,

1 and, obviously, there is concerns about not only the biological
2 and fishery impacts of this, but also the social and cultural
3 impacts of the river diversions, and we are doing some work with
4 the IEA group, using an expert-driven Bayesian network model
5 approach, to try and look at some of the potential outcomes of
6 this river diversion project.
7
8 Finally, the last priority area that we identified was the human
9 dimensions and the social and economic sciences, and there is
10 ongoing work to track changes in human well-being and also to
11 understand how different management actions may affect fishing
12 behavior and location choices using some of these tools, such as
13 FishSET and the BLAST conceptual model.
14
15 Now, these tools have been around for a long time, and we have
16 been doing this type of work for a long time, and so it's not to
17 say that we need an EBFM approach to look at the social and
18 economic dimensions of the system, but what I think I would
19 really like to highlight is that there is a need to incorporate
20 the social and economic sciences with the biology, and so there
21 is important feedbacks from socioeconomics back onto the biology
22 that aren't currently accounted for, and so this is a call to
23 provide that greater integration between the different ecosystem
24 considerations.
25
26 Then, finally, I wanted to look at what a Gulf EBFM success
27 looks like, and we've had a lot of success with integrating red
28 tide into management, and so I will go over quickly why I think
29 that was a success.
30
31 First of all, we had an ecosystem effect that really couldn't be
32 ignored, and so, starting from 2005 to 2006, we saw
33 approximately a 50 percent decline in red grouper indices of
34 abundance, and we had reports of -- We knew that it was a strong
35 red tide year, and we had reports of dead floating grouper, and
36 so the link from the environment to the biology was very clear.
37 It was clear that these fish were being killed off by red tide.
38
39 The Science Center did some work to estimate the strength of red
40 tide based on a statistical model that was developed from the
41 satellite data, and, based on that work, we were able to create
42 an index of red tide severity, and there are several years of
43 work that went into looking at how this index was best
44 incorporated into the stock assessment, and so it currently is
45 incorporated into the red grouper and gag stock assessments.
46
47 Then the question came up of, well, we know that these -- Based
48 on this work, we know that red tide has severe impacts on the

1 grouper stocks, but we can't predict red tides, at least not in
2 terms of a year or two ahead and the scales that management
3 would really be interested in, and so we carried out some
4 management strategy evaluation work to try and understand how to
5 best manage for these grouper species in the face of red tide.
6
7 For example, we looked at some of the tradeoffs between reactive
8 management, and so adjusting for after a severe red tide has
9 occurred, versus buffering slightly for a number of years in
10 preparation for a potential red tide, and we were able to
11 quantify some of the potential tradeoffs between those
12 strategies. Again, I think red tide has been a great success,
13 an EBFM success in our region.
14
15 Then, finally, I wanted to touch a little bit on stakeholder
16 engagement, and, really, when we talk about ecosystem-based
17 fisheries management in the Gulf of Mexico, it quickly becomes
18 very overwhelming, because there are so many different species
19 and so many potential different interactions and factors that we
20 need to account for, and so we really need to find a way to
21 refine the priorities, and it's one of those big leverage points
22 or issues that we really need to research, particularly given a
23 very limited budget to do this kind of activity.
24
25 What I am showing you here is a -- This is what I call
26 participatory ecosystem modeling, and this is the result from a
27 pilot breakout group that we did at the last Marine Resources
28 Education Program a couple of months ago, and what I am showing
29 you here is an ecosystem model that was created with a group of
30 about ten fishermen and a group of stock assessment scientists
31 sitting in a room together, and this was created in about an
32 hour, and so it's by no means a final result, but it's just to
33 give you an idea of some of the information that we can put
34 together by doing this sort of activity.
35
36 Now, these ecosystem models can range from qualitative to
37 quantitative. On the bottom here, I am showing you that this is
38 some of the quantitative information that we were able to get
39 from the fishermen, and so this could be actually sort of a
40 quantitative ecosystem model, and we see a lot of strength in
41 this type of approach for figuring out how we're going to
42 advance EBFM in our region.
43
44 First of all, this puts all types of information in the same
45 currency, and so we can better integrate anecdotal information
46 into our modeling efforts. This kind of modeling could also be
47 used to guide management strategy evaluation, again, one of
48 those major issues or those major leverage points that we need

1 to figure out how to manage.
2
3 We can perform risk assessments, and this type of modeling might
4 be able to better help us predict the outcomes of management
5 alternatives, and so I really see stakeholder engagement as a
6 key part of figuring out how we're going to move forward with
7 EBFM in our region.
8
9 Then, finally, I just want to point out that, like all forms of
10 innovation, be it the smartphones or the self-driving cars,
11 successful EBFM is going to require some failures. It's going
12 to have some ups and downs, and this is a hype cycle that was
13 first proposed by an IT firm, and so what they showed is that,
14 for any sort of new technology, you're going to have this peak
15 of inflated expectations, followed by some failures, before you
16 can get to that new plateau of productivity.
17
18 If you're all thinking that I am way too optimistic about this
19 EBFM thing, don't worry, because it just means that I am going
20 to self-destruct and fall into a pit of disillusionment very
21 shortly, but that's just to say that it's going to require some
22 risk taking, and it's going to require some failures, because we
23 can find a level of productivity with EBFM.
24
25 Then the next steps, as Morgan alluded to earlier, is I'm hoping
26 for comments, and you can go on and give your public comments on
27 the EBFM roadmap, and what I am really hoping for is for you to
28 provide some guidance on what are these priority EBFM questions
29 that we need to look into, and I will just leave you with this
30 sort of open question of how can our science better support your
31 management in marine resources in this complex system. Thank
32 you again for your time.
33
34 **CHAIRMAN SHIPP:** Madam Chair.
35
36 **MS. BOSARGE:** Thank you. That was an excellent presentation. I
37 especially liked your graphic about the hypoxic zone, the dead
38 zone. That is something that this council has talked about in
39 the past, and it's one of my little pet projects, I would say,
40 if you can call the dead zone a pet project, but I would say, as
41 feedback to you, that is something that we're very interested
42 in, that connectivity between the nutrient runoff upstream in
43 the Mississippi River and how it affects us and our fisheries
44 down here.
45
46 Here a while back, we had a conversation in our Sustainable
47 Fisheries Committee, I think it was, about it, and the council
48 actually asked us to write some letters, and we did send those

1   off to Mr. Scott Pruitt at the EPA and then Ms. Laurie Rounds
2   with Open Ocean Trust, I think is what it is. Anyway, we were
3   hoping to stimulate a little more discussion about that, and I
4   see one of your points in your slide was to clarify regional
5   priorities and to facilitate collaboration, and so, yes, we
6   could definitely use some help in that realm.
7
8   I am sure that, between you and Glenn, maybe the breadth would
9   be enough to stimulate some activity. We would love to see some
10 more research and hopefully some actual mitigation upstream, and
11 so we would love some help there, and that's definitely, I
12 think, a priority for us, or certainly for me at least, and let
13 me say that. Did anybody else have anything they wanted to say?
14 If not, I will go on.
15
16 **CHAIRMAN SHIPP:** Dr. Stunz.
17
18 **DR. GREG STUNZ:** Thanks, Dr. Karnauskas. This was a very good
19 presentation, and, as an ecologist, I am really glad to see that
20 we're having these discussions and building it in, but I do have
21 just some general questions.
22
23 To give you an example of where I'm coming from, we were just
24 having this discussion about gray snapper yesterday, where some
25 of these issues that you -- In fact, you even used it as an
26 example in one of your slides, where that really could inform
27 some of the decisions that we're struggling with here, but I
28 guess my real question is -- So you would envision -- Let me
29 back up.
30
31 Sometimes, when we get the assessments and things, we're dealing
32 at this level of allocations, and sort of the ecosystem-based
33 level things are not part -- We're just trying to deal with how
34 to distribute the fish or seasons or things like that, and so
35 you're envisioning that this type of activity would occur at the
36 level of the Science Center and the assessment process with our
37 SSC and then it make it to us, or I guess also we inform you of
38 potential things, like the dead zone or issues we perceive or
39 how -- I mean, mechanically, how does this really work to where
40 we can help you guys?
41
42 **DR. KARNAUSKAS:** That's a great question, and I will be honest
43 that I'm not sure I have an answer. The directive from the
44 Headquarters level was to be sure that we're working with
45 councils in the development of these plans and in moving forward
46 with EBFM, but I really don't know the best mechanism for making
47 that happen, and so I think I will defer to folks, Clay or
48 others, who have been around for longer, to provide some

1   guidance on that.
2
3   **CHAIRMAN SHIPP:** Go ahead, Clay.
4
5   **DR. CLAY PORCH:**   Thanks.   This is definitely an evolving
6   process, but I think the key thing to remember is most of us are
7   pretty small partners in the big Gulf of Mexico, and the
8   Southeast Fisheries Science Center is a total, including
9   contractors, of 400 people, which is less than some states have,
10 and so we're going to have to all work together if we're going
11 to make progress, and it's not like we have enough resources in
12 the federal system to solve all these problems, and so it's got
13 to be state, academic, and federal partners all working together
14 and pooling resources and developing synergies and all that good
15 stuff you've heard before, but it has to happen that way or we
16 won't make much progress.
17
18 Having said that, the approach that we're taking, as Mandy
19 already mentioned, is to try and identify some high-priority
20 issues where it's sort of bite-sized chunks that we know will
21 actually contribute in a tangible way to ecosystem-based
22 management, like working on issues related to the dead zone or
23 the contribution of menhaden to the MSYs of other stocks and
24 those sorts of high-profile issues, where we think, with a few
25 years of investment, we could actually have maybe an answer that
26 is useful to inform management.
27
28 **CHAIRMAN SHIPP:** Paul.
29
30 **DR. PAUL MICKLE:**   Thank you, Dr. Karnauskas.   I really enjoyed
31 the presentation. I'm an ecologist, or I guess I used to be. I
32 don't get to do much anymore, as a manager, but I do want to
33 bring up -- I have a question.   We discuss gray triggerfish
34 quite a bit on the council, and we have brought up sargassum and
35 the correlation that maybe there was a relationship there.
36 Would this potentially fit in, or has there already been some
37 discussion?
38
39 I have talked to Frank Hernandez and Glenn Zapfe at the Gulf
40 Coast Research Lab, and they seem to have started down this
41 road, and I haven't been updated on it, but this -- In the sense
42 of what you have discussed here today, this almost seems like a
43 simple thing to take on, which I know it's not, but I know there
44 is the ability to at least look at the hypothesis that I think a
45 lot of people have brought up, at least at this point, to try to
46 increase the confidence in the recruitment data that's going
47 into the model that I think everyone is struggling with, at
48 least with the last assessment that came through.   Is there any

1 gossip on that topic, or is it coming out of the blue, or do you
2 have any information on how would that fit into EBFM, if it
3 could?
4
5 **DR. KARNAUSKAS:** The apparent recruitment declines with
6 triggerfish came up, definitely, in our conversations within the
7 lab a few years ago, and Jeff Isely was doing the assessment,
8 and I did do some sort of broad exploration to see if there were
9 any apparent patterns, again looking at, for example, the
10 ecosystem status report and were there any obvious trends, but,
11 really, as Clay mentioned, we largely lack the capacity to
12 investigate all of these factors.
13
14 The only ongoing project that I know of that's really looking
15 into it is that Hernandez RESTORE project, and I am familiar
16 with it. I'm actually the technical monitor on that project,
17 and so I keep in good contact with Frank and Glenn, but, yes,
18 that's an academic project with some NOAA participation, and
19 that is a really good model for trying to get at some of these
20 issues, because, largely, we lack the capacity, and so we do
21 need to leverage our academic collaborators on that.
22
23 **DR. MICKLE:** Thank you for that, and I appreciate that. It
24 sounds like -- I have discussed it a little bit with him, and it
25 sounds like multispecies as well, and so they're taking on a
26 good approach to look at this correlation here, and so thank you
27 for that.
28
29 **CHAIRMAN SHIPP:** Any other comments or questions for Mandy?
30
31 **MR. GLENN CONSTANT:** I just wanted to address a couple of points
32 that Leann mentioned earlier, like the dead zone, and Paul with
33 the other environmental issues, like sargassum, or those top-
34 priority issues that could contribute into this modeling effort,
35 and I think those are important, like the letter the council
36 wrote for support in moving forward with science that will
37 address things that the council is interested in and embraces.
38
39 The question about how this ultimately fits into stock
40 assessments and into management decisions is also important, I
41 think, in embracing or approaching those folks who are going to
42 fund the kind of research that would feed your model, and so the
43 equation -- Understanding that is not a question that we're
44 going to answer in the near future, and maybe through back and
45 forth and finding the right place to incorporate an
46 environmental component into fisheries management helps those
47 folks connect the dots with new science and research that
48 actually benefits the council and the managers.

1
2 The equation you had early on, where MSY kind of leads to an OY
3 with some sort of environmental consideration, I think is a good
4 place to start, just showing that equation and letting the new
5 science understand that it does have a place somehow, and not
6 directly to Clay's point, but how does this work, and there is
7 an existing infrastructure on how fisheries management is done,
8 and this is a new kind of add, but I think finding a place for
9 them to fit into that helps, and that's just a thought moving
10 forward.
11
12 **DR. KARNAUSKAS:** Thank you. If I could maybe comment that, even
13 in the single-species assessment approach, the environment, even
14 though we don't explicitly account for it, it's been
15 incorporated for years, because fish track their environment,
16 and we have high and low recruitment years, and we see those,
17 and we might not have a reason behind them, but we manage for
18 them, and we move on, and so it's not to say that environment
19 hasn't been included in management thus far. It's just that
20 we're pulling in more explicit considerations.
21
22 **MS. BOSARGE:** The other thing that I have kind of been
23 interested in that I guess falls into this realm that maybe, as
24 you all were talking about guiding and organizing the different
25 research, is the changes in our water temperatures and our pH,
26 and I have read some literature on it here in the Gulf versus
27 maybe what's happening on other coasts, maybe in the Atlantic,
28 and the way that our waters are changing versus theirs, you know
29 bottom temperature and surface temperature and things like that.
30
31 I was just wondering how many different stations do we have
32 along the Gulf here for our body of management that are
33 measuring and tracking those changes, and maybe where are they
34 located, like offshore or more coastal, and things like that.
35
36 **DR. KARNAUSKAS:** I don't know the exact number of stations. We
37 have a number of monitoring programs, and a lot of those are run
38 through the Atlantic Oceanographic and Meteorological Lab.
39 There is also cruises, video cruises, every year to look into
40 ocean acidification. They do transects from nearshore to
41 offshore to try and understand the variability.
42
43 In terms of temperature, understanding temperature changes,
44 really satellite data are the best bet, because you get a
45 synoptic look at the changes across space and time. The
46 monitoring stations are pretty few and far between, and they
47 don't necessarily allow you to -- You can groundtruth using
48 those, but you don't get a really synoptic view of what's going

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 1  on with the monitoring stations, and so I can definitely send
 2  out some information on those, and there are -- We do have
 3  indicators of temperature changes and ocean acidification in the
 4  status report, if you're interested in looking at how those have
 5  changed over time.
 6
 7  CHAIRMAN SHIPP:  Anyone else?  Thank you, Mandy.  That was
 8  great.
 9
10  DR. KARNAUSKAS:  Great.  Thank you very much.
11
12  CHAIRMAN SHIPP:   Is there any other business before the
13  committee?  Hearing none, I will turn it back, and we are about
14  ten minutes behind schedule.
15
16  (Whereupon, the meeting adjourned on June 20, 2018.)
17
18                              - - -
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