

No.	Comment	Reviewer	Date	Reference in doc sheet	Response/Next Steps
1	I don't think there is any justification provided for maximizing fish biomass or density as a target. The goal of CERP is not to increase fish density unless that parallels the landscape needs. Dynamic targets need to be established that capture a range of performance that is compatible with the larger suite of indicator species or community needs.	A. Gottlieb	10/8/09	Line 7	Please note that the target is to evaluate the densities of small-sized freshwater fishes. This target is provided based on the assertion that the health of small bodied fishes provide a general index of trophic conditions within the overall food web of the Everglades Ecosystem (Trexler et al. 2004). In addition, by setting the target to the maximum value, allows maximum sensitivity to hydrologic changes. Actual evaluation should always be done in conjunction with other system analysis tools. It may be true that a dynamic target is desirable, but the authors feel that the proposed target is reasonable and defensible, and that the information synthesis required to suggest a dynamic target for prey base fish has not yet been conducted.
2	It seems that this measure once refined can be applied more broadly. The current throw trap work is collected using a probabilistic design specifically to make these larger landscape generalizations. The lumping of separate water basins is not suggested (3A and 3B, N vs S 3A, etc) unless supported by the empirical data.	A. Gottlieb	10/8/09	Line 24	Logistic regression fits to the empirical data is what the model that drives this PM uses. Revision 1 of this PM (in progress) is an attempt to move from a pure statistical fit to a more mechanistic model which should allow for evaluation over a greater spatial area than the present PM.
3	Was analysis conducted to determine if 3A and 3B fit the same model given that hydroperiods and more so depths vary greatly between and across the regions. Similar question for N and S 3A.	A. Gottlieb	10/8/09	Line 64	Yes, According to Trexler (per com) the growth curves for WCA3A and WCA3B are the same. This just means that the increase of the fish density after a dry down is the same. However, the frequency of dry downs between the two areas may differ. Therefore, the model/PM evaluates WCA3A and WCA3-B separately.
4	Same issue as mentioned about target above on line 7. I am concerned that folks will confuse the minimum duration needed to maximize density (the asymptote) with the needs of the larger landscape. This entire piece is missing. I would say the asymptote is sort of the minimum for 3A/3B based on other needs in the system. Some context discussion is needed for application. Basically, the models note that areas that are currently wet don't need long hydroperiods (they will if we dry them to the asymptote) and areas that are dry need to be wet longer (Taylor slough curve). None of this indicates if these hydroperiod targets are appropriate for the landscape type, just to maximize fish density.	A. Gottlieb	10/8/09	Line 126	The targets for this PM are not absolute, and must be considered in the context of targets of other Performance Measures.

5	add text " and their relationship to landscape, community and population needs." or rephrase	A. Gottlieb	10/8/09	Line 253	The following text was added: "..., and potentially other factors."
6	Some discussion of how the model will likely change over time is needed. Remember all of this data was collected in a constrained system. What happens once we raise the trail or open up the L-67 or increase hydroperiods in TS. I think we need to take the time to explicitly build the ongoing feedback between monitoring and ET and explicitly test some of the hypothesis uncertainties.	A. Gottlieb	10/8/09	Line 252	A significant amount of text was added to the uncertainty section (4.4) in order to address this comment. The text may also help address comments #1, 2, 4, and 5. This is briefly addressed in section 4.4 of the document on line 274.
7	If wading bird numbers are a target (rather than location of nests/foraging, etc), some attempt to link bird numbers and fish biomass based on energetics would be helpful. At least a back of the envelope calc would help us understand the range of density and biomass needed in wet and dry years- relative to bird energetic requirements.	A. Gottlieb	10/8/09	Line 261	This is an interesting suggestion that may be discussed between the research groups who are focused on wading birds and prey base fish communities. In addition, this is really a question that falls into the wading bird venue. As a side note, at this time I don't believe there are any studies linking wading bird energetics and small fish biomass.
8	I am not sure the fish are any healthier under shorter durations of dry down if they are alive and not O-2 stressed??? I think the point is this measure is limited to fish density as documented. Again I would stress the context- can't use this measure alone if you don't understand the habitat needs. Look at proposed slough measure or even existing inundation duration targets for why context is critical.	A. Gottlieb	10/8/09	Line 274	This statement should be a given for all PMs and evaluations. Section 4.4 Uncertainty has been expanded to address the concern of putting the target for this performance measure into context. See line 265-268 for statement which supports your comment.
9	Did Joel work on the documentation sheet? If not I would not include him as a working group member. Personally I think we should reference our PI reports and manuscripts but leave them off the doc sheets unless they explicitly work on the document.	A. Gottlieb	10/8/09	Line 277	Dr. Trexler expressed his acceptance of listing his name on this documentation sheet in an e-mail on 5/14/2010. Jed Redwine is happy to provide that e-mail if necessary.

10	<p>The only concern I might have at this time is the use of yearly averages for fish density. Perhaps this should be broken down to seasonal averages (i.e., wet and dry seasons)? My fear is that an annual average would not adequately capture fish density during low water (fish are more concentrated during presumably a high wading bird use time) and high water (fish are more spread out, wading birds must work harder to find food and may be more dispersed). Depending on who is using these data and when, an accurate picture may not be presented. Maybe this isn't a concern. These folks have been doing this for a long time and I respect Joel Trexler's work, so I would defer to his expertise and Barron's on whether an annual average is an acceptable PM.</p>	T. Reinert (FWC)	10/5/09	General comment	<p>I think Dr. Trexler sufficiently addressed my issue, but I like that he remains open to a seasonal analysis, should it be necessary. There are wet and dry seasons, even within wet and dry years. That's the variability inherent in the system. Trying to capture that as best as possible should be important.</p>
11	<p>I don't understand why you are concerned with the small fish density in the Everglades. Your plan to restore the Everglades by removing all the canals and Levees in WCA 3 A & B will eventually kill all the mammals and fish in the Everglades. As life long South Florida Native I know for a fact that we have drought and flood stages in the Everglades. When the Everglades dries up, sure there are puddles, which the wading birds flock to and eat everything there and then move on to the next puddle, the alligators take care of the larger fish. When the rains come, there will be no high ground for the mammals to take refuge on, so they will drown. It will only take a couple of these cycles to finish the rest off, all this in the name of restoration. Won't we be proud of ourselves? Restoration at last !!! My only salvation is that I won't live long enough to see the fruits of your efforts. I can only pity future generations, because they won't be able to enjoy what I have enjoyed in the Everglades.</p>	Rick Persson, Joseph Jefferies (SAFER)	9/21/09	General Comment	<p>While we acknowledge your concern with respect to Everglades Restoration. However, this is a forum for discussing this small fishes performance measure and not a venue for stakeholder discussion of CERP strategy.</p>

12	<p>My concerns are primarily with the dependence on density estimates and throw trap data. In southwest Florida we have a more heterogeneous landscape than the WCAs and herbaceous systems of the Glades where Trexler has worked. In our region we have a mosaic of forested wetlands, wet prairies, deep marshes and hydric pine. It is often impossible to use throw traps because of the shrubs and trees where fish are often concentrated. We have also tested a variety of methods included activity traps including Breder traps, crayfish traps, hoop nets, minnow traps along with active sampling such as seines, cast nets, throw traps, dip nets, and backpack electroshocker (Ceilley 2007. Aquatic Fauna Supplement and Fish Figures above). We identified three major types of aquatic refugia in SW Florida landscape using fish community structure alone. From my experience, it is nearly impossible to effectively use throw traps in many wetland locations including Picayune Strand and equally difficult to eradicate sampling bias from data collection. My point is that the performance measure used by Trexler may be ideal for large expanses of homogeneous marsh, wet prairie where fish distribution is relatively uniform. However we found it has limitations for SW Florida while other methods have already been tested and proven to be excellent performance measures. I ask that you consider these methods for RECOVER when conditions preclude the use of throw traps such as we have here in Collier County. Feel free to contact me if you have any questions or would like additional information. <i>(comment abridged)</i></p>	David Ceilley (FGCU)	9/27/10	General	<p>We encourage your input on the development of appropriate attribute monitoring for CERP in southwest Florida. Currently, the MAP is funding large fish monitoring in the forested wetlands of southwest Florida, which may be the primary consumer of small-sized fish in that community.</p>
13	<p>I think that you should indicate that these small fish eat periphyton—mentioned later but should be up front.</p>	Martha Nungesser (SFWMD)	9/28/10	Page 1	<p>Development of a periphyton-specific performance measure is warranted, as are measures for organisms up the trophic chain as well. A complete suite of ecological measures would be ideal for evaluating restoration performance, and the CERP program intends to eventually have those tools.</p>
14	<p>Are the small fish eaten also by any amphibians (large frogs, amphiuma, etc.)?</p>	Martha Nungesser (SFWMD)	9/28/10	Page 1	<p>Amphibians have been added as consumers of small-sized fish to Section 1.0.</p>

15	"Trexler et al" should be revised to be "the Trexler research group" or something more appropriate.	Martha Nungesser (SFWMD)	9/28/10	Page 1	"Trexler et al... data" has been replaced by "monitoring... data"
16	Last 3 lines ". . . output post-processed with a higher resolution 55 meter (m) . . . solely from the coarser SFWMM 2x2 output."	Martha Nungesser (SFWMD)	9/28/10	Page 1	Modified slightly for clarity.
17	Map should be enlarged (map area relative to the box). Why is ENP colored and WCA-3 not? Doesn't make sense.	Martha Nungesser (SFWMD)	9/28/10	Page 2	This is a full sized map. A more detailed view is presented in Figures 4a and b. ENP is only meant to be distinguished from WCA-3 for reference.
18	Days since last dry down—what else accounts for sampling variation? Perhaps wading bird feeding activity should be mentioned here.	Martha Nungesser (SFWMD)	9/28/10	Page 3	The intent of the performance measure is to be as informative as possible while maintaining a degree of simplicity. Given that the equations are a statistical fit to empirical data, it would be expected that effects such as wading bird feeding would be caught within that analysis.
19	Are responses in -3A and -3B so similar they can be represented by one equation? Please indicate what differences there are between these areas, if any.	Martha Nungesser (SFWMD)	9/28/10	Page 4	See response to comment 3.
20	Figures should use long enough time frame on x axis to compare—Figure 3c doesn't extend to stable point. How long until it stabilizes? If you use different lengths of time, make them appropriate for each plot (say, 250 days, 1200 days, and 1500 days).	Martha Nungesser (SFWMD)	9/28/10	Page 4	Thank you for the suggestion.
21	Is a daily estimate at all reasonable with all the potential sources of error? Why not monthly or even weekly? Daily implies way too much confidence in the calculations.	Martha Nungesser (SFWMD)	9/28/10	Page 5	The input hydrology uses a daily time step. More importantly, the metric is <i>days</i> since last dry down. By default, that is a daily time step. In some of the results, the data is aggregated over both space and time, however, daily is the native time step for this model and PM.

22	How do the depths relate to the EDEN data for those same dates?	Martha Nungesser (SFWMD)	9/28/10	Page 6	This question is unclear.
23	Codes are highly confusing—WCA 1 and WCA 2 are in WCA-3A? Please develop better codes for these sites.	Martha Nungesser (SFWMD)	9/28/10	Page 6 – Figure 4A	These are the codes used by the Trexler team. While they may seem confusing to you, I thought it best that we use the same codes in the model.
24	Using the asymptotes of the best fit model curves relates densities to current conditions, not optimal or preferred conditions. And these are probably not closely related to restoration conditions. If there are such diverse responses, why not target faster recovery based upon preferred conditions?	Martha Nungesser (SFWMD)	9/28/10	Page 7	Please note that the target is to maximize the densities of small-sized freshwater fishes that characterized the pre-drainage Everglades Ecosystem and are less than ~ 8 cm in length. This target is provided based on the assertion that the health of small bodied fishes provide a general index of trophic conditions within the overall food web of the Everglades Ecosystem (Trexler et al. 2004). Section 4.4 Uncertainty has been expanded to address the concern of putting the target for this performance measure into context.
25	Figure legend is unclear –“maximum value”? The following text doesn't clarify that set of results. Please revise.	Martha Nungesser (SFWMD)	9/28/10	Page 8	Thank you for your suggestion.
26	Hydrologic changes large enough to affect the small fish occurred far beyond the last few decades—it's been over a century now.	Martha Nungesser (SFWMD)	9/28/10	Page 9	It is arguable at what point human impacts significantly changed the hydrology to impact small fish densities. The phrase “over the last several decades” has been deleted.
27	You state that this PM focuses on both the Total System and R&S models. However, it focuses on both Taylor and Shark River Sloughs as well—where do these fit? Is there a TS or SRS PM that should be included here? If not, why is the information about these sites included? A bit of clarification should be included.	Martha Nungesser (SFWMD)	9/28/10	Page 9	The section is referring to the Conceptual Ecological Models as published in the December 2005 issue of the journal <i>Wetlands</i> , not any RECOVER performance measures.
28	Do the hypotheses clusters have references? If so, please include these in section 3.0	Martha Nungesser (SFWMD)	9/28/10	Page 9	Thank you for your suggestion.

29	Hyp. 1—which aquatic prey populations (examples) are affected by salinity and site nutrient status?	Martha Nungesser (SFWMD)	9/28/10	Page 9	The language is directly lifted from the MAP, and should not be altered. Please see discussion in the System Status Report for monitoring data that supports the various adaptive assessment hypotheses.
30	Ref. needed about responses being “known” to be logistic functions—from Joel’s work?	Martha Nungesser (SFWMD)	9/28/10	Page 9	Dr. Joel Trexler, per comm.
31	I understand the need for comparable data between alternatives, but starting from a daily estimate seems overkill. Are averages the best metrics, or would medians or other metrics be more appropriate? Are annual averages a reasonable time frame, or would seasonal values be more appropriate to restoration goals?	Martha Nungesser (SFWMD)	9/28/10	Page 10	See response to comment 21. Dr. Trexler remains open to a seasonal analysis, should it be necessary. There are wet and dry seasons, even within wet and dry years. That’s the variability inherent in the system. Trying to capture that as best as possible should be important.
32	Again, the data are based upon current conditions, not optimal or preferred. Can Joel develop preferred reasonable targets rather than depending on recovery rates that are based on the over-dry conditions in the Park? Improvements from base conditions are good for comparing alternatives, but targets based on best conditions should be developed.	Martha Nungesser (SFWMD)	9/28/10	Page 10	It may be true that a dynamic target is desirable, but the authors feel that the proposed target is reasonable and defensible, and that the information synthesis required to suggest a dynamic target for prey base fish has not yet been conducted. See response to comment 1.
33	Why use NetCDF format? Is that to relate to EDEN? Please specify reasons for using this format.	Martha Nungesser (SFWMD)	9/28/10	Page 11 – Sec. 4.3	Because the CERP modeling community has agreed that this will be the output format of choice for all CERP models. This also the format for the RSM hydrologic model, for example.
34	Good to point out uncertainty of fish density and biomass per unit area, but there is just as much uncertainty for daily values of these metrics.	Martha Nungesser (SFWMD)	9/28/10	Sec 4.4	See response to comment 21.
35	Re-evaluating “these shapes”—specify shapes of what? The model output curves?	Martha Nungesser (SFWMD)	9/28/10	Page 12	Shapes” has been changed to “models.

36	Again, what other conditions are related to fish density besides DSLDD?	Martha Nungesser (SFWMD)	9/28/10	Page 12	See response to comment 18.
37	Use of objective targets depends on how these are determined (e.g., based on current water management is "objective" but not necessarily reasonable for fish recovery. Original system probably rarely if ever dried out to the bottoms of the sloughs, so using a metric based on what was a very rare phenomena is arguably not reasonable given a goal of restoration of natural hydropatterns.	Martha Nungesser (SFWMD)	9/28/10	Page 12	Targets are actually based on a determined carrying capacity of small fishes, which is reached at some point based on days since last dry down. This carrying capacity is based on observational data and should not be affected by the hydrology itself. Although if significant habitat changes occur, it may be reasonable to reassess these targets.
38	"Prey base fish populations" isn't a clear identity. I think this means these small fish serve as the prey base for piscivorous fish and other carnivores. Are these the same species as these small fish or a broader suite of species?	Martha Nungesser (SFWMD)	9/28/10	Page 12	The justification of this performance measure is that the small fishes are an important component of the prey base for higher-level predators including wading birds and alligators, both of which are indicator species for Everglades restoration.
39	Is the red-yellow-green a reference to Fig. 5 or to the Trexler and Goss paper? Can you provide a bit more description here of how that would be implemented? If not, I look forward to seeing its application soon.	Martha Nungesser (SFWMD)	9/28/10	Page 13	Referencing the Trexler and Goss paper. Other papers in that same issue of <i>Ecological Indicators</i> also utilize the "stoplight" approach to evaluation. Note that this is included as a reference as opposed to a part of this PM, and was part of the System Status Report, it is not part of this PM.
40	State the recommendations in 5.2.1 as hypotheses, if that's what they are intended to be.	Martha Nungesser (SFWMD)	9/28/10	Page 13	They already were.
41	Based on the extreme difficulty in getting a water quality model working, I believe that the lack of models to explicitly predict soil, periphyton, and water column nutrient concentrations is an enormous barrier—efforts have been underway for well over a decade and such models are still not available.	Martha Nungesser (SFWMD)	9/28/10	Page 14	Agreed.
42	What data do you have that suggest what the fish population characteristics of the pre-drainage Everglades were? What is the current site that seems to represent this condition now? It's not discussed in this PM. Such a site might be worth a further look.	Martha Nungesser (SFWMD)	9/28/10	Page 17	This falls under the general topic started in Comment 1, continued under several other comments and has already been answered.

43	In general, this is an excellent concept, but one that is not far enough along to be included as a performance measure in evaluating the various modeled alternatives.	Peter Rawlik (SFWMD)	9/30/10	General Comment	The subteam respectfully disagrees. While the performance measure does not qualify as an accurate predictive ecological model, it is argued that there is no such thing. However, a simple model that captures what has been shown to be the single most important variable in predicting the density of small fishes, is justified as an evaluation tool. Ecological models are in demand for evaluating restoration alternatives. They will never be comprehensive and completely accurate, but they are still useful. RECOVER must publish models for use when they are proven to be informative enough for comparing alternative scenarios.
44	"The desired restoration condition is to maximize densities of small-sized freshwater fishes . . ." There is no supporting information for this statement, I am not aware of any document that states this as a restoration goal. Furthermore it would be relatively easy to maximize small fish densities by obtaining a completely unnatural Everglades biogeochemical state, thus this statement is suspect on its face. There is no supporting evidence presented that suggests that the existing small fish densities should be used as restoration targets, and it is likely that the pre-disturbance numbers were significantly different than they are today, whether that is higher or lower is a completely different question.	Peter Rawlik (SFWMD)	9/30/10	Section 1.0	Please note that the target is to maximize the densities of small-sized freshwater fishes that characterized the pre-drainage Everglades Ecosystem and are less than ~ 8 cm in length. This target is provided based on the assertion that the health of small bodied fishes provide a general index of trophic conditions within the overall food web of the Everglades Ecosystem (Trexler et al. 2004). It may be true that a dynamic target is desirable, but the authors feel that the proposed target is reasonable and defensible, and that the information synthesis required to suggest a dynamic target for prey base fish has not yet been conducted. See line 267 for text that addresses this comment.
45	". . . the model application is limited to those locations where Trexler et al. monitoring data has been collected." This creates a problem in that the measure can't be applied or evaluated in other areas. How would we know that improvements in modeled areas did not also result in losses in non-modeled areas.	Peter Rawlik (SFWMD)	9/30/10	Section 1.1	See response to Comment 48.
46	The authors freely admit that the model does not account for immigration and emigration but is the result of phenomological fit. Other work by the same researchers has previously suggested that immigration post flooding is an extremely important to these small fishes. This needs to be integrated into the model and proposal.	Peter Rawlik (SFWMD)	9/30/10	Section 1.1.1	This is one of the main goals of the next version of this PM. However, if we waited until everyone was happy with every aspect of a PM, it would never get finished. This one, however imperfect, can be used. It is also far better than the 2X2 HSI it replaced.

47	<p>The authors recommend that the density targets be the asymptotes of the best fit models. This creates an interesting dilemma. Based on this statement the target for WCA2 would be about 17 fish/M2, which is achieved after approximately 100 days of flooding. The target for Shark Slough would be 15 fish/m2 which is achieved after 600 days of flooding. The target for Taylor Slough is 12 fish/M2 which is achieved after 1000 days of flooding. Is it the intent then to maximize fish densities at the expense of the natural annual cycle of flooding and drought?</p>	Peter Rawlik (SFWMD)	9/30/10	Section 1.1.2	<p>Dr. Trexler remains open to a seasonal analysis, should it be necessary. There are wet and dry seasons, even within wet and dry years. That's the variability inherent in the system. Trying to capture that as best as possible should be important.</p>
48	<p>The authors suggest that continued field work would assess the model results and aid in the refinement of models being used for this PM. This appears to be a roundabout way of inserting this work not only into the modeling assessment of alternatives, but also into the post project evaluation. If the measurement of actual fish densities is going to be a project performance measure then it must be applicable to more than just a few sites. Additionally, it should be noted that additional field work that helps to refine the density model will not aid in the refinement of the PM models being used to evaluate alternatives. Once an alternative is chosen it is unlikely that any changes to the density model will change a course of action.</p>	Peter Rawlik (SFWMD)	9/30/10	Section 1.2	<p>As I'm sure you know, use of a regression fit outside of the data sample domain is invalid. Therefore, I constrained the spatial domain of this model to areas surrounding the field sites.</p> <p>Assessment measures do not necessarily need to be the same as evaluation measures. While there could easily be overlap, assessment should mirror project objectives, while evaluation measures act as a surrogate, or best available model to evaluate alternatives based on project objectives. For example, if the project objective is to increase wading bird nesting success, then that is what is measured post-construction. During the planning phase, increase in the density of the prey-base can act as a meaningful measure of projected success of the objective. There is no need to use evaluation models to assess project performance in an adaptive management context, only to try and predict project performance in a conceptual planning analysis.</p> <p>Also see the response to comment 46.</p>
49	<p>Doesn't the restoration of natural hydrologic conditions run counter to the stated desire to obtain high fish densities which can only be obtained through extended hydroperiods?</p>	Peter Rawlik (SFWMD)	9/30/10	Section 3.2.1	<p>See response to comment 45.</p>
50	<p>Hypothesis 1 implies that marsh fish abundance is related to time since last dry down and length of time the marsh was dry. This second factor is not presented in any of the models presented in the performance measure.</p>	Peter Rawlik (SFWMD)	9/30/10	Section 3.2.1	<p>The data to this point suggest that days since last dry down explain most of the variation in fish density. A multivariate model including other parameters could be developed, but it would be at the expense of simplicity and ease of use by managers and practitioners.</p> <p>See response to comment 18.</p>

51	Hypothesis 2 implies that in order to create high density patches there must be drawdown, which runs counter to the suggested extended hydroperiods.	Peter Rawlik (SFWMD)	9/30/10	Section 3.2.1	No it doesn't. The condition described in Hypothesis 2 is unsustainable.
52	There needs to be a caveat on this PM. For many years WCA2 was held as a lake for water supply and would have met the requirements described in this PM for extended hydroperiods. However small fish densities did not increase in the long term because there was a delayed rise in large bodied predators as well, which lags behind the rise in preyfish productivity.	Peter Rawlik (SFWMD)	9/30/10	General Comment	This is a specific instance. As you pointed out, right now this PM is limited to specific spatial areas, and those areas at this time and for the near future will not be held as virtual lakes. This is one interaction that may be included in a version update for this PM. However, this interaction is fairly localized and may have far less predictive power than other upgrades we are presently developing.
53	The overall title of this document "Greater Everglades Aquatic Trophic Levels" gave me an impression that this report is about research on trophic levels in the Greater Everglades. The subtitle is small-sized fish density performance measure. Readers who are not familiar with the CERP program may have difficulties to understand the relationship between trophic level and small fish density. Trophic levels or food chain length depends on ecosystem size or ecosystem productivity. I suggest the title be more specific.	Ben Gu (SFWMD)	10/5/10	General Comment	Thank you for your suggestion.
54	Typically consumer biomass or fish density is primarily dependent on ecosystem productivity driven by nutrient supply, predator pressure (density) and habitat conditions such as water depth and flow pattern and duration. In the Everglades, hydrology alone can explain a large amount of variance in fish density. However, since the Everglades was an oligotrophic system, any level of the increase in nutrients may lead the change in system productivity and biodiversity.	Ben Gu (SFWMD)	10/5/10	General Comment	This is an interesting point. I hope at some point we will have data on this.
55	One to 2 sentences or citations are needed here to explain or support the desired restoration condition for small-sized freshwater fishes (less than approximately eight centimeters (cm) adult standard length) that characterized the pre-drainage Everglades ecosystem.	Ben Gu (SFWMD)	10/5/10	Section 1.0	This target is provided based on the assertion that the health of small bodied fishes provides a general index of trophic conditions within the overall food web of the Everglades Ecosystem (Trexler et al. 2004). It may be true that a dynamic target is desirable, but the authors feel that the proposed target is reasonable and defensible, and that the information synthesis required to suggest a dynamic target for prey base fish has not yet been conducted. See section 4.4 for text that addresses this comment.

56	How do you know the current prey density has reduced compared to the pre-drainage condition and how do you determine the maximal density? Does the observed or modeled maximal density reflect those of pre-drainage condition? This PM recommends the small-sized fish density at the asymptote of the best fit model curves shown in Figures 3a - 3c be used as the PM targets for each respective monitoring region. How do you know the small-sized fish density at the asymptote of the best fit model curves is the pre-drainage density?	Ben Gu (SFWMMD)	10/5/10	Section 1.0	We don't, and never stated that it was pre-drainage.
57	Is r the growth constant for the entire prey fish community or a single species or the major species? How was r derived? based on literature value or growth experiment?	Ben Gu (SFWMMD)	10/5/10	Section 1 – Table 1	This was derived by Dr. Trexler by fitting the empirical data to a logistic regression. One thing we are working on in the PM update is to move to away from a pure statistical fit and to a more mechanistic model.
58	Is the small-sized fish density under different water depth regimes the observed density? If wading birds and piscivores significantly affect these prey fish, then the realized small-sized fish density supported by different hydrological regimes is the observed density plus those consumed by the top predators. If the model output is based on field data, the fish density is likely underestimated. The observed biomass is typically lower than the potential biomass due to losses from predation and animal emigration.	Ben Gu (SFWMMD)	10/5/10	Figure 3a, 3b, 3c	<p>General reply for comments 58-62. First, there are references in section 2.0 for pre-drainage. There are many questions that are unanswered with respect to prey based fishes. Most if not all these have been discussed by the PM development team. Yes, it would be nice to have this information and incorporate into the model/PM. However, that is just not realistic. We need tools for evaluation now. That was why this update/upgrade of the SFWMM small fishes HIS was created. It was designed to provide some guidance for projects and system wide analysis. It is not perfect, but it is a significant step up from what had been used.</p> <p>We are presently working on a more mechanistic small fishes model. If you or your colleagues at SFWMD would like to obtain data for the suggestions you have and craft that data into information that can be used in a mechanistic model such as parameters and equations, we would encourage you to do so. (Remembering the basic constraints imposed by the lack of a working/accepted WQ model and a natural systems model that has far more assumptions in it than this PM.)</p>

59	There is no evidence given here to justify the current biomass and prey availability are low compared to the pre-drainage condition. If we do not understand the pre-drainage condition for small-sized fish, how can we establish target density? Decreases in wading bird population and rookeries may be due to decreases in prey density, but may also result from other factors such as simply higher water depth which affects prey availability. Conversely, higher water depth might lead to the increase in prey density.	Ben Gu (SFWMD)	10/5/10	Section 2.0	Agreed. As you know, ecological knowledge is imperfect as best. Therefore, we are using our best scientific knowledge within the constraints of the requirements for developing this PM. (See response to comment 58.) Also note that this is a small fishes PM, not a wading bird PM, so what portion of the wading bird's success is based on the small fishes is an issue for a wading bird PM.
60	Fish density and invertebrate productivity might have increased at present as a result of the increases in nutrient supply from EAA runoffs. However, the changes in hydrology are detrimental to consumer productivity. There is no information in this document on the net changes in consumer biomass as the consequences of abovementioned counter-effects.	Ben Gu (SFWMD)	10/5/10	Section 2.0	This is a good point. However, at this time we don't have the data to explore this. Again, we would be pleased if you and your colleagues were able to develop this information.
61	Therefore, there is a need to obtain critical information on the pre-drainage condition. This information may be obtained using reference ecosystems which mimic the pre-drainage conditions (hydrology, nutrient level, vegetation and predator population size etc) of the Everglades and paleoecological studies. These studies may help construct prediction models based on the relationship between small sized fish density and pre-drainage hydrology, nutrient status or wading bird/ piscivores population dynamics.	Ben Gu (SFWMD)	10/5/10	Section 2.0	This is way out of the scope of this PM.
62	I feel that these logistic models only predict the prey fish density under CURRENT hydrological condition which does not necessarily reflect the pre-drainage conditions which are dominated by sheet flow, oligotrophic nutrient level and diverse vegetation community.	Ben Gu (SFWMD)	10/5/10	Section 2.0	This is true. However, as stated in previous responses, we do not have this information.
63	Page 3, line 3 of 2 nd para: change "off of" to "on"	Ben Gu (SFWMD)	10/5/10	Section 2.0	Done

64	"Assessing the health of small-bodied fishes..." I probably know what you mean, but the health of fish generally refers to the physiological condition of fish.	Ben Gu (SFWMMD)	10/5/10	Section 2.0	Health" changed to "population status" in section 1 and 7.
65	Equation 1: I am not sure why the same equation is presented twice in the same box.	Ben Gu (SFWMMD)	10/5/10	Section 2.0	One is an easy way to see it as an entry into a model and the other is an easier way to view the equation structure.
66	Re: "Assessing the health of small-bodied fishes". Assessment is based on marsh fish densities, not fish health	Mac Kobza (SFWMMD)	10/6/10	Section 1.0	See reply to comment #64
67	Any single RECOVER model cannot represent all conditions, particularly when considering that the Everglades Ridge and Slough structure differs substantially across the landscape, or is non-existent in vast areas. Therefore, the utility of the Fish HSI is much improved by limiting application of the model to the sample locations, at a higher resolution, for which a long term data set is available. Deriving a target small fish density provides a more intuitive output for planning and application. It is notable that many of the Trexler monitoring sites are within foraging distance of many wading bird nesting sites, adding to the approaches restoration value.	Mac Kobza (SFWMMD)	10/6/10	Section 1.1	Exactly.
68	Although the grouping of small fishes is well defined (<8cm), the sampled size-structure and species composition of these fishes should be considered when this PM is applied to higher-level consumers. Over-representation by juveniles (<15mm), small-adult sized species (i.e. least killifish), or underweight dominant species (i.e. mosquitofish), if present, may not serve as useful prey items to larger consumers, and yet the proposed target density can be strongly influenced by these small fishes.	Mac Kobza (SFWMMD)	10/6/10	Section 1.1.1	Fair comment.

69	The tremendous complexity of the data set and having success using a phenomenological fitting approach lend credence to using a logistic model. It should be made clear in the PM implementation that this model cannot be interpreted to describe classic population growth; however, future gains in our understanding of immigration and emigration of Everglades animals should be considered in subsequent iterations of this PM.	Mac Kobza (SFWMD)	10/6/10	Section 1.1.1	Agreed. An explicit combination of local population growth with emigration/immigration is the main goal of our model upgrade.
70	The target small-sized fish density is derived from the asymptote of the best fit model curves for the three monitoring regions over three years since drydown. While it is generally found that 3 years is required for the small fish population density to recover, it may be useful to incorporate the influence of constant inundation beyond 3 years, such as was described in the text of the prior HSI. Piscivore density increases as post-drought time increases and small fish density declines when recurrence of a drydown event exceeds 7 years. This may influence modeling results from the longer hydroperiod sites such as in southern WCA3A.	Mac Kobza (SFWMD)	10/6/10	Section 1.1.1	We should discuss this. One of my questions is what water depths are required to sustain a predatory fish population. Does the water depth requirement make this a localized phenomena, or can it be wide spread, say across all of WCA3A?
71	Additional evaluations run with other restoration projects, particularly those that alter hydroperiod, such as Decomp & Sheet Flow Enhancement (Decomp), will provide useful guidance on the potential impact of restoration actions on wildlife and should be conducted if feasible.	Mac Kobza (SFWMD)	10/6/10	Section 4.1.1	A soon as I can confirm that my translation of the RSM grid to a 500m grid is working correctly, this will be done for decomp.
72	This is an important caveat, and consideration of these factors will aid in the utility of future re-evaluations of this Fish PM. Although DSDD accounts for a significant fraction of the variability in small fish density, 30-40% of that variability is not yet explained and worth pursuing.	Mac Kobza (SFWMD)	10/6/10	Section 4.4	Agreed.
73	The derivation of objectively determined targets, based on a large set of observed data, is a strength of this PM. This PM meets the RECOVER Performance Measure Criteria and is well-suited to aid in the selection of hydrologic management measures that are of greatest importance to ecological processes and wildlife populations simulated in ecological models such as ELM or ATLSS	Mac Kobza (SFWMD)	10/6/10	Section 4.4	Agreed.

74	<p>The role of eutrophication and the influence of landscape type are important factors to add to this PM, particularly as the influence of eutrophication is widespread in the Ridge and Slough landscape, and little is known about prey fish productivity or density in some landscape types (i.e. ridge). It is predictable that advances in knowledge will occur in these areas, and those results should be incorporated in the future small-fish PM.</p>	<p>Mac Kobza (SFWMD)</p>	<p>10/6/10</p>	<p>Section 5.2.1</p>	<p>The performance measure assumes no significant water quality differences from present conditions. However, it is RECOVER's hope that such effects become integrated within this performance measure eventually, or are explicit in a separate measure to be evaluated alongside this one. However, data is needed before this could be accomplished.</p>
75	<p>This comment is more geared towards the Biannual Report to congress; however, it references the performance measure for fish and macroinvertebrates so I thought it applied. On page 27 of the report the figure shows two out of nine monitoring sites in Water Conservation Area 3A do not meet targeted levels, though on page 28 the current status of WCA3A is given a "green light" or at expected levels. The same applies to the Shark River Slough region. How many red lights does it take to trigger at least a caution? Are some sites weighed heavier than others?</p>	<p>Rory Feeney (Micosukee Tribe)</p>	<p>10/6/10</p>	<p>General Comment</p>	<p>Regional stoplights were estimated by ranking the stoplights (1 = green, 2 = yellow and 3 = red) and taking the average rank for all sites in a given region. The overall diagnosis for each region was determined by choosing the stoplight type that appears in the majority of years in the time series. (Trexler and Goss, 2009) However, this was not done using this model/PM and the "stoplight" simplification would be something that would need to be post-processed.</p>