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## MEMORANDUM

TO: Delia Kaye  
FROM: Matt Ladewig  
SUBJECT: Response to WPAC and William Walker's comments on White Pond Watershed Management Plan  
COPY TO: Lori Capone (Concord DNR), Carl Nielsen (ESS)

DATE: December 12, 2014  
ESS PROJECT NO.: C596-000

Responses to the comments received on the White Pond Watershed Management Plan are presented in the following tables.

### RESPONSE TO WPAC COMMENTS

Comment Number	Comment	Response
1	No comment on the giardia outbreak in 2000	The Concord Health Department provided records of a suspected <i>Giardia</i> outbreak in 1999. This information will be incorporated into the report.
2	No comments on changes to the pond bottom from sandy to vegetated?	The source of this information is unclear. Review of existing data included review of DNR files, files provided by WPAC and many other publicly available sources (as detailed in Table A and Section 10 of report). Events or data not included in these sources were left out of the report. The majority of the pond bottom remains sandy and vegetation is scarce.
Unnumbered	Setting is too narrowly defined – there is no mention of proximate vernal pools, the heron rookery, Dunge Hole Meadow, Frost Farm.	The focus of this study was on the White Pond watershed with regard to its influence on White Pond. The report will be revised to acknowledge Frost Farm. Other features will also be considered for inclusion.
3	The report does not reference the WPAC 2008 report that points out the special nature of Sachem's cove	Reference to the special nature of Sachem's Cove will be incorporated into the report. The WPAC 2008 report was cited in Table A and Section 10. However, the citation in Table A mistakenly cites the year of the document as 2009. This will be amended to reflect the correct year (2008).



Comment Number	Comment	Response
4	Why were past issues of Ponderings not referenced?	Several attempts to access the website previously hosting issues of Ponderings were made. However, the website was not responsive during any of these attempts. We are aware that Ponderings is now available on the Google Group set up at <a href="https://groups.google.com/forum/#!forum/white-pond">https://groups.google.com/forum/#!forum/white-pond</a> . These can be cited in the report.
8	It should be noted when visits occurred and what the intended purposes were for each visit	The report will be updated to provide the dates of bathymetry mapping and sediment sampling in Section 3. The dates of all other visits to the pond are already noted in this section.
9	...limited to ESS's own observations...People who live in the area for years have certainly seen more varieties than were reported	This comment is acknowledged. It was not within the scope of this study to inventory fish, wildlife or other animals. However, if there is additional data available, it can be reviewed and incorporated into the report.
10	What should our response be for invasives such as starry stonewort?	This species (and numerous other invasive species) has not yet been reported from White Pond so prevention should be the primary response. See Section 6.4 for more information.
11	Why are there no brook trout? Is this an environmental issue?	Brook trout were not observed by ESS during visits to the pond. However, a fisheries survey was not within the scope of this study. Our observations were limited to what we either observed directly in the water or what anglers were able to catch while we were at the pond. Therefore, the absence of brook trout observations as part of this study should not be interpreted as absence of the species from the pond.
12	What about salmon? Are they no longer stocked?	Broodstock Atlantic salmon have been stocked intermittently in the past, but were not stocked in 2014. Due to cuts in federal funding, the program previously providing the broodstock salmon has ended. Therefore, White Pond may not be stocked with salmon again, at least for the foreseeable future.

Comment Number	Comment	Response
13	Why is the Table C list limited? Was it limited by budget?	The intent of the study was not to inventory all wildlife using the pond. Therefore, the list was limited to observations made directly by ESS. It is acknowledged here and in the text that many additional species would be expected to use the pond at some point.
14	Why is there nothing on mammals?	No mammals were observed directly using the pond during field visits. It is acknowledged that mammals do make use of the shoreline and watershed. The report will be revised to note that mammals such as white-tailed deer, coyote, red fox, gray squirrel, eastern chipmunk, raccoon, and striped skunk are expected to be found in the watershed.
15	Why is there nothing on aquatic invasives?	No aquatic invasives were observed at White Pond by ESS and no evidence of their presence was found in the literature reviewed. However, the topic of aquatic invasives is covered under the “Algae and Macrophytes” subsection of Section 4.1.
16	Temperature and oxygen readings are much more dramatic than Sprott/Walker data indicates	The intent of this comment is not clear. The observations of temperature and dissolved oxygen collected during this study are well within the range of data reported by Sprott/Walker.
17	September readings are only graphed to 36 feet – why?	The profile collected on this date was truncated. However, it can be seen that dissolved oxygen levels were close to zero at 36 feet and would continue at this level to the bottom of the pond.
18	Where did they take the readings?	The water quality readings were taken where water depth is deepest in the pond (i.e., the “deep hole”). See Figure 2 and Appendix A.
19	They didn’t describe the consequences of such (phosphorus) releases on “permissible” loading	The release of phosphorus from the sediments does not impact the permissible load calculation, which is a function of the pond’s depth and flushing rate.

Comment Number	Comment	Response
20	What kind of a pond would that approach (allowing much more phosphorus loading before reaching a “permissible” limit) give us?	The consequences of exceeding the permissible load are described in Section 4.4.
21	Why is the pond described as oligotrophic? Why isn’t it mesotrophic due to the amount of productivity?	The observed water clarity is described as characteristic of an oligotrophic lake. No categorical classification of the pond’s trophic status was made.
22	Very little historical data on water quality	A large database of historical data was reviewed, as described in Section 3. These data were acknowledged and used to supplement the results and conclusions of the report in multiple parts of the narrative.
23	Why were there no measurements in June or July?	The field visits included in the scope of work were distributed across multiple seasons, including spring and summer. A substantial amount of June and July data is available for multiple years in data sources cited in Table A.
24	“...would appear to indicate that pumping of the White Pond wells is not a primary cause for the current drop in water levels”. This point seems arguable. For example, how much did Walden levels drop? A more detailed analysis is needed since decreasing levels “squeeze” the size of the trout habitat	The relationship between Walden Pond and White Pond water levels is discussed on page 22.
25	The explanation did not show any pump rate calculations	Monthly pump rates were provided by the Town Water and Sewer Division. The only calculation conducted was to add the monthly rates together for an annual rate.
26	Are the implications of the pond being a Great Pond limited to only public access to fishing?	As described in Section 2, page 2, Great Pond status provides for the preservation of access for fishing, fowling and navigation.

Comment Number	Comment	Response
27	Why was there no count of swimmers at White Pond Associates beach “on the hottest summer days”. That number is much, much larger than “25 people...at Sachem’s Cove”.	White Pond Associates beach was included in the counts of swimmers. However, no swimming was observed at this beach during ESS’s visits, which included a visit during a hot day on a late summer weekend. It is acknowledged that, on some days, the beach receives more swimming use than was observed in this study. Records on actual swimming usage are not available from White Pond Associates. If these data exist and can be shared and verified, they could be incorporated into the report.
28	There are two other “beaches” used by swimmers: Dover St beach and Stone Root beach.	This comment is acknowledged, as is the fact that individual private property owners abutting the shoreline may choose to wade, swim, fish or boat from their properties.
29	The report does not point out that the public access points (2 out of the 3 are private ways) are in a private neighborhood.	The comment is acknowledged.
30	Nothing is mentioned about private property rights (such as at Frost Farm)	The comment is acknowledged.
31	The report omitted that two towns are involved – Sudbury and Concord	The report acknowledges that the White Pond watershed extends into Sudbury in several sections of the report. It also addresses the easement for pedestrian access to White Pond from Sudbury.
32	Why is there confusion about whether swimming is allowed from town land when...2 official documents (WP Reservation Rules & deed for White Pond reservations parcel 3416-1) prohibit it?	The White Pond Reservation Rules were approved for one year by Board of Selectmen vote in 2001. It is does not appear that authority was extended or renewed at a later date. The deed prohibits Sudbury residents access for the purpose of swimming but does not appear to prohibit swimming for Concord residents.
33	What does it mean “...these activities have been presumed illegal...”	Posted signage and review of available documents indicate a perception that swimming and wading from shore on Town land is illegal.

Comment Number	Comment	Response
34	What does it mean "...appear to restrict swimming..."	See response to Comment 33.
35	What does "permissible load" mean? ...first shows up on page 31... "permissible load" in an old concept	As used in the report, permissible load is simply a nutrient threshold, past which problems are almost certain to arise in the pond. It is not a management target for White Pond and this can be clarified in the report text.
36	Where did they get the data for the decrease in trout habitat?	Historical trout habitat volume was obtained from Division of Fisheries and Wildlife surveys and memoranda issued during the years indicated. The source of this information will be clarified in the narrative.
37	"Sanitary facilities are available to users of the White Pond Association Beach". True, but this is only during the summer; there is nothing outside the high season	This comment is acknowledged and the text can be updated to indicate that facilities are only seasonally available.
38	What are the expectations for the growth of the numbers of trail users?	This is difficult to project and beyond the scope of this report. Estimates of the potential increase in users due to completion of the BFRT were included in the report. These estimates are based on existing data for other sections of the BFRT and could certainly be improved with additional data.
39	Should there be a goal of protecting the watershed?	One of the expressed goals was to improve water quality in the pond, which includes actions within the watershed.
40	Who will pay the bill for all of this?	The implementation of the plan, as a whole, will require both public and private action, including financial contribution. The source of funding varies by action.
41	Who will take responsibility for trail maintenance, cleaning catch basins, doing erosion control	These responsibilities vary by action and whether the trail, catch basin or eroded area is on public or private land.
42	How should the number of bikes be managed relative to access to the pond or to town land (given the steepness) around the pond?	Recommendations of this report are limited to suggesting groups of trails with highest priority for attention (closure or maintenance). A trail management plan is necessary to fully address this question.

Comment Number	Comment	Response
43	"The town should consider the possibility of increased demand on trails through White Pond Reservation due to the implementation of Phase 2C of the BFRT". This is a very weak recommendation – how about some specifics?	Several priority recommendations regarding trails were included in this study. A trail management plan is necessary to fully address the specifics of trails planning with regard to the BFRT.
44	Who will take responsibility for maintaining sanitary facilities?	The responsibility for maintaining sanitary facilities will vary by whether they are on public or private land and whether any other agreements are in place that address the maintenance of the location or facility. The report suggests that availability of sanitary facilities would be desirable on both public and private land.
45	Who is/should be responsible for maintaining the catch basins?	The catch basins are on private land in an area jointly managed by the state OFBA and White Pond Associates, Inc. Further evidence of responsibility for maintaining the catch basins (Memorandum of Understanding, etc.) was not encountered as part of this study.
46	The report underestimates the number of swimmers quite a bit.	The uncertainty of the estimate of swimmers is acknowledged in the report and the report can be revised to incorporate information (a video of swimmers at the pond) submitted separately by Christine Gerzon. A conservative approach was used in doubling the observed number of swimmers and applying this number as an <i>average</i> (not a maximum) over the entire summer period.
47	When were the swimmer counts taken?	The swimmer counts were taken during each visit to the pond. An additional count was taken on a hot weekend afternoon (August 17, 2013) in an attempt to capture the upper end of the number of swimmers present.
48	There is very little in this report about enforcement	The comment is acknowledged.

Comment Number	Comment	Response
49	ESS presents its data as more positive about the state of the pond than the changes in the pond in recent decades and our water quality data tell us	The report makes use of available water quality data from recent decades and does indicate a historical reduction in water quality. Notwithstanding, from a water quality perspective, White Pond remains among the upper echelon of water bodies in developed portions of eastern Massachusetts.

#### **RESPONSE TO WILLIAM WALKER'S COMMENTS**

Number	Comment	Comment Response
1	Is this a final report? It is not labeled as a draft. Suggests that DNR has approved it and is satisfied that contents are consistent with the ESS proposal. Were any elements dropped or added during the course of the study? If so, on what basis?	This is a draft report, which will be finalized in early February.
2	While the report paints a rosy picture of the existing pond water quality and sensitivity, the overall conclusions and recommendations are good. It does a good job documenting the impacted watershed and need for erosion controls. These are concrete things that will be beneficial.	The comment is acknowledged.
3	There should be a follow-up plan to develop cost-effective implementation plan, funding, and schedule. Substantial input from the local community will be useful.	The comment is acknowledged and is consistent with the recommendations in the report.



Number	Comment	Comment Response
4	<p>The water quality sampling design is inadequate for a complete assessment. There were no samples collected between late May and late August, the period with lowest transparency, highest recreational use, and highest risk of algal blooms. That is not a basis to conclude that the pond is in great shape and has the capacity to absorb additional nutrient loads.</p>	<p>Given the long record of water quality data collection at White Pond to use as context, the design proposed for this study was developed as a cost-effective means of assessing the pond. An additional round of seepage and in-pond water quality sampling was added to the scope of work to help address data gaps identified over the course of the study.</p> <p>A Quality Assurance Program Plan (QAPP) document was developed for this study (Appendix A) and acknowledges the role of existing data to support the assessment. However, the primary water quality conclusions of the report are based on water quality data collected in accordance with the approved protocols under the QAPP.</p> <p>The data collected as part of this project are not inconsistent with the Spratt/Walker dataset.</p>

Number	Comment	Comment Response
5	Community observations of algal blooms and other impairment are dismissed as anecdotal. The fact that ESS did not observe algal blooms is consistent with the fact that samples were not collected in the peak algal growth season. Algal blooms are episodic anyway and difficult to detect without frequent monitoring (at least weekly).	<p>The intention was not to dismiss community observations but to indicate the value of collecting additional information on the algal community in White Pond, particularly during blooms.</p> <p>This report did confirm the presence of an algal lens at depth during stratified conditions, an observation that has been made by Dr. Walker in past reports. We did not encounter data regarding the species composition of this lens or prior reported blooms and how these change seasonally. These are important data gaps to address and more detailed investigation was recommended as part of the monitoring program going forward in Section 7.</p>
6	Lay monitoring has become a cornerstone of lake management programs in many states. For example, the phosphorus standards for Lake Champlain were based partially upon correlations between water quality measurements (P, chlorophyll-a, transparency) and subjective assessments of suitability for recreation and aesthetic qualities related to algal blooms, color etc. made by trained lay monitors.	This comment is acknowledged, as is the long record of successful citizen monitoring at White Pond.
7	As described in my 1989 report, the pond is mesotrophic (or moderately-enriched), based on phosphorus levels and oxygen depletion, even though the transparency has generally been in the oligotrophic range (except during episodic algal blooms and after larger storm events). The moderate enrichment supports the fishery, even though there is a delicate balance between the benefits (food) and risk (water quality impairment).	Defining the categorical trophic state was not a primary focus of this investigation. Dr. Walker's classification of the pond as mesotrophic in his 1989 report is acknowledged.

Number	Comment	Comment Response
8	Unfortunately, the nutrient modeling leaves the false impression that there is some "slack" (i.e. the pond can absorb more nutrient loads before there is a water quality problem) because a highly uncertain estimate of the existing load (13 kg/yr) is lower than a highly uncertain estimate of "permissible" load (22 kg/yr). I am concerned that this could be used as an argument to justify deferring or scaling back the investments in watershed controls that are urgently needed to protect the pond.	The concept of the permissible load has previously been used to determine how much pollution could be absorbed by a water body, given the assimilative capacity. However, as presented in the report, permissible load is simply a nutrient threshold, past which problems are almost certain to arise in the pond. The report clearly acknowledges the need for action to prevent this from happening (See Section 6.8).
9	The "permissible load" concept has been used as a basis for setting an initial management goal for restoring lakes that have already been severely impacted, not as tolerance limit for protecting high-quality lakes. Applying that concept to White Pond would violate the Clean Water Act and state water quality standards for protecting high-quality water bodies, which have explicit anti-degradation requirements.	See response to Comment 8 regarding permissible load.  The recommendations in this report are consistent with the state Generic Environmental Impact Report for Eutrophication and Aquatic Plant Management in Massachusetts (Mattson et al., 2004).
10	There is no discussion of the applicable water quality standards. White Pond would clearly classify as "High-Quality" water body under the state standards. That designation should be established as a cornerstone for the management plan. The other standards related to cold-water fisheries, Great Pond, etc.	This comment is acknowledged. Additional language acknowledging the regulatory status of White Pond can be incorporated into the narrative. The recommendations of the report are already consistent with White Pond's regulatory status.
11	My PhD was in lake nutrient modeling and I have worked in that field for >30 years. I have trouble following the assumptions and logic of the spreadsheet model. I have never seen these types of models applied backwards and forwards at the same time. The ESS estimate of 13 kg/yr for the existing load appears to be based upon the average result of several models that were developed decades ago based upon limited data from Europe, Canada, and throughout the US. It is no surprise that the range of estimates is very wide ( 3 to 22 kg/yr). This is on top of the factor-of-two accuracy for each of the individual models.	The model suite and approach used in this study has also been used by MassDEP to develop Total Maximum Daily Loads (TMDLs) for Massachusetts waterbodies. The limitations of the models were acknowledged in the report, as well as the need for caution in proceeding with activities that could increase loading to White Pond.

Number	Comment	Comment Response
12	Some of the model calibration datasets include large turbid reservoirs and pothole prairie lakes in the midwest. Normally we would selected the best model based upon regional criteria and lake characteristics. ESS used one model (Reckhow, 1977) that was based primarily on data from the northeast and north-central US. I am very familiar with its derivation because Reckhow and I were in graduate school together. That estimate (22 kg/yr) is identical to the one that I developed in 1989 and to ESS's estimate of the "permissible load". Despite limitations and high uncertainty, the ESS results are consistent with other evidence (e.g., declining in transparency, response to storm events, observation of algal blooms, depletion of oxygen and phosphorus buildup in the bottom waters, etc. ) indicating that the pond's status is much more critical than conveyed in the ESS report.	Please see responses to Comments 8 and 11.
13	The impact of swimmers, dogs, horses on the nutrient loads needs to be estimated, however uncertain. More accurate swimmer counts are obviously needed. The direct comparison of Walden and White Pond in terms of Kg/Yr is misleading. White has a much lower assimilative capacity because of its smaller size.	<p>An attempt to estimate the impact of swimmers on nutrient loading was included in the report. Dogs and horses are acknowledged to also contribute to the load and an estimate can be included in the report.</p> <p>It is acknowledged that White Pond has a much lower assimilative capacity than Walden Pond. The comparison of Walden and White Pond was intended to illustrate the order of magnitude difference in usage by swimmers between the two ponds. The estimated increase in loading is placed in the context of the assimilative capacity of White Pond.</p>

Number	Comment	Comment Response
14	Aside from nutrients, microbial contaminants (bacteria, protozoa) link land management, recreational use, and animal control to water quality and public health. There are documented cases of giardia etc. Another reason for controlling dogs, not to mention the horses.	This comment is acknowledged. The benefit of preventing contamination from dogs and horses is also acknowledged. However, humans are the primary reservoir of many waterborne diseases, including giardiasis (the illness caused by <i>Giardia lamblia</i> ), as indicated by the Massachusetts Department of Public Health.
15	The reference to my recent analysis and historical reports is incomplete. The correct link is <a href="http://www.walker.net/whitepond">www.walker.net/whitepond</a> . I will create a PDF of the website to serve as a more permanent record.	The comment is acknowledged and the report will be updated to reflect the full link.
16	One of my reports is not in the ESS references. It is a fairly concise summary of my assessment based upon work prior to 1991: Water Quality Considerations - Proposed Purchase of Unysis Land <a href="http://www.walker.net/whitepond/reports/wp_unisys_1991.pdf">http://www.walker.net/whitepond/reports/wp_unisys_1991.pdf</a> . My opinions haven't changed much. Unfortunately, now I would have to update that to point out the decreasing trends in transparency over the past decade, increased erosion, correlation between between turbidity and antecedent rainfall, and climate changes that put the pond further in jeopardy.	The comment is acknowledged and the citation will be included in the report.

#### **RESPONSE TO CHRISTINE GERZON'S COMMENTS**

Number	Comment	Comment Response
1	<p>On page 39, there is a statement regarding the possibility that the "No Swimming" signs at the cove might have been placed illegally.</p> <p>Please see the attached photo of a <i>Ponderings</i> newsletter (published by the Friends of White Pond) from 1989 which documents that the "No Swimming" signs at the cove were indeed installed by the town of Concord. I also have a hard copy that I will send you.</p>	The "No Swimming" signs at the pond were put in place by the Town, but there is a question whether they were allowed to be put in. It seems that there was a one-year vote in 2001 to restrict swimming from the Reservation land, which doesn't appear to have been extended beyond that timeframe.

Number	Comment	Comment Response
2	<p>On page 26, the estimate for the number of swimmers is listed as 25 people. On September 6, 2014, I took a video of swimmers at the pond and counted approximately 50 people plus several dogs. This figure represents a more accurate count based on the observations of many residents of White Pond who can see the swimmers in the cove from their homes every day. Here is a link to that video.</p> <p><a href="https://www.youtube.com/watch?v=Nckhzqigcik">https://www.youtube.com/watch?v=Nckhzqigcik</a></p>	<p>The report acknowledges that there may be higher numbers of swimmers, and this provides additional evidence, which will be reflected in the revised report.</p>
3	<p>The special nature of the cove area deserves further details since this area is the most shallow area of the entire pond and the one where people swim when they visit town owned land. There is a sandbar which means that the water in the cove is more likely to be affected by higher temperatures and by human and dog urine. This creates a greater challenge for maintaining the water quality of the pond.</p>	<p>It is acknowledged that surface circulation in Sachem's Cove may be more restricted than the rest of the pond, particularly when water levels are low. The report notes the shallower areas at Sachem's Cove and the White Pond Associates beach. The recommendations of the report provide options for maintaining the water quality of the pond, which include addressing erosion concerns adjacent to Sachem's Cove and providing sanitary facilities among other options. Monitoring can also provide a useful tool for tracking the impacts (positive or negative) of the actions taken, as well as identifying future management needs at Sachem's Cove.</p>

#### **RESPONSE TO PETER TOBIESSON'S COMMENTS**

Number	Comment	Comment Response
1	<p>I've read the report, and it looks like they did a reasonable job on their assigned task--looking at the hydrology. But they seemed a little casual about the biology.</p>	<p>The comment is acknowledged. See response to WPAC comments 9 to 15 regarding biology.</p>
2	<p>I'm not that familiar with the P loading models they used, but to state that doubling the current load wouldn't have a detrimental effect on the lake is a hard to believe.</p>	<p>It is agreed that doubling the current phosphorus load would almost certainly have a detrimental effect on the lake. This is consistent with the report findings.</p>

Number	Comment	Comment Response
3	They do conclude that every effort should be made to cut down on the surface runoff inputs, and that work on the algae dynamics is worth the effort. I agree.	The comment is acknowledged.
4	The thought of a significant algal lens at the thermocline that apparently makes its way to the surface is interesting and needs more understanding. Are they blue-green algae?? You don't want those. We have a similar thermocline algal lens in Sacandaga, but it occurs only in the spring. The report suggests that it is present for a long time in WP, but show no data for it.	The comment is acknowledged. The presence of a persistent summer algal lens is supported by citizen monitoring data cited in the report.