APPENDIX K:
DEQ RESPONSE TO PUBLIC COMMENT

This appendix provides the comments, or in some cases a summary of one or more comments, received during the public comment period. After each comment is DEQ's response. Similar comments that can be handled via one response have been combined.

Comments Focused on Assessment (Sections 4 & 5)

Comment: Section 4.1, Par. 2. Regarding the Carlson Trophic State Index (TSI), the document states that the TSI range for mesotrophic lakes is between 35-45 and cites EPA as the reference. However, a review of http://www.epa.gov/bioindicators/aquatic/carlson.html indicates that the range of mesotrophic conditions is between 40 and 50.

> **DEQ Response:** The language has been modified, with updated references, to note that the TSI values that range between 40 and 50 indicate mesotrophic conditions.

Comments:

- Photo 4-1: The fine print says the photo is from the Stillwater River. It should not be in a document that discusses the Swan Lake Watershed.
- Section 4.1.2.1. Regarding historic logging practices, there was a splash dam and log drive in the lower Swan River Area in the vicinity of Lost Creek in the early 1900's. However, this is the only one I am aware of in the Swan. As such, I would not characterize this effect as "common."
- Photo 4-1. An extended caption should be added to this photo to explain that this pre-dates environmental regulation.

> **DEQ Response:** The photo provides a relevant example of the type of impacts from this type of activity since there was apparently no similarly documentation of impacts like this within the Swan River drainage. The photo caption has been modified as suggested, and the word "common" has been removed from the text.

Comment: Section 4.1.2.2, Par. 4. Rather than mention Haur (1991) research on the North Fork, it would be better to reference his work for the Swan in this same report. He examined long-term trends in peak flows in the Swan and did not find evidence of increased peak flows associated with long-term timber harvest records.

> **DEQ Response:** We see no need to make any changes to the document based on this comment. The point made in the Section 4.1.2.2 paragraph is that harvest has the potential to increase peak flows in some cases, not just in the Swan River, but also in its tributaries, and that historic harvest levels may have increased flows within one or more streams within the Swan Lake Watershed. The North Fork results are relevant to the Swan because they suggest a detectable peak flow increase in a relatively large river as a result, presumably, of harvest in its tributary streams. A measurable peak flow increase in a large stream such as the North Fork suggests an even greater magnitude peak flow

increase in some of the tributaries. Thus, the North Fork results suggest that increased peak flows possibly/probably have occurred in tributaries to the Swan as well given the similar levels of past management, even if the peak flow increases were not detectable in the mainstem of the Swan River. These increased peak flows could have increased erosion and increased the rate of transport of pollutants to Swan Lake as discussed in the document. Significant future harvest in a tributary watershed can still lead to these pollutant transport conditions due to increases in peak flows.

Comment: Table 5-1. This table well encapsulates the relevant studies that have been completed in the Swan. One significant study that DEQ failed to identify was included in Stanford et al. (1997), which included a 1995 synoptic study of low flow nutrient concentrations for eight tributaries to the Swan River (see pages 113-116 of Stanford et al. 1997). In examining these data, what strikes me is that Woodward Creek has the highest concentration of NDOC, and it also contains an extensive wetland habitat in its lower reaches that is not common to the other tributaries inventoried. It may well be that Woodward Creek also contributes a disproportionately high percentage of the NDOC load during higher flow periods.

DEQ Response: A new Section 5.6.7 has been added to include discussion of the Stanford et al (1997) study, including the author's conclusion that "the data strongly suggests that nutrient loads are substantially elevated in streams with significant timber management activities".

The above referenced link to wetland habitat is not included within the document for several reasons. For example, the author (Stanford) does not specifically discuss the elevated NDOC loads in Woodward Creek. Funding limitations did not allow for a full analysis of the significant road network and related timber harvest levels in Woodward Creek that could impact NDOC levels. Also, review of the Stanford et al. (1997) data indicates a correlation between the flow of each Swan tributary and higher levels of NDOC as well as other pollutants, consistent with studies that show higher levels of these pollutants with increased spring flows. It is interesting that Woodward Creek has what appears to be an uncharacteristically high summer flow similar to the spring runoff levels measured at about the same location during 2003 (M. Vessar, unpublished data 2003), whereas other streams do not show this same high flow condition. It almost appears as though there was a recent rain event at the time of the Stanford study sampling or a problem with the sampling effort.

Comment: A good point was made at the meeting last night about the Swan highway maintenance and snowplowing. Sidecasting of gravel mixed with magnesium chloride into Swan Lake and tributaries that intersect the Swan Highway is a potential cumulative threat to the watershed that should be addressed by the stakeholder group and perhaps incorporated into the TMDL.

DEQ Response: We agree that pollutant loading from road sanding along Highway 83 represents a significant pollutant load to Swan Lake and therefore must be added to the document. This includes a new source assessment section (Section 5.3.3) to determine pollutant loading values to Swan Lake, the addition of an allocation in Section 8.2 to

address the road sand load, and the addition of Section 9.2.5 to discuss water quality protection strategies as they relate to this road sanding.

Comment: Photo 5-3. It is not clear if this photograph was taken in the Swan River drainage or not. The caption should include a note about the general location of the washout. If it is not taken in the Swan, it should be removed from the document.

DEQ Response: It is an example of what a typical culvert failure can look like and how sediment loading can be significant from this source category. The text does not imply otherwise. It is difficult to use a photo from the Swan since there has been a lack of effort to track and document culvert failures within the watershed over time. Given the extensive number of culverts and documented failures in other watersheds, this picture is representative of the types of sediment loading that has probably occurred within the Swan Lake drainage over time.

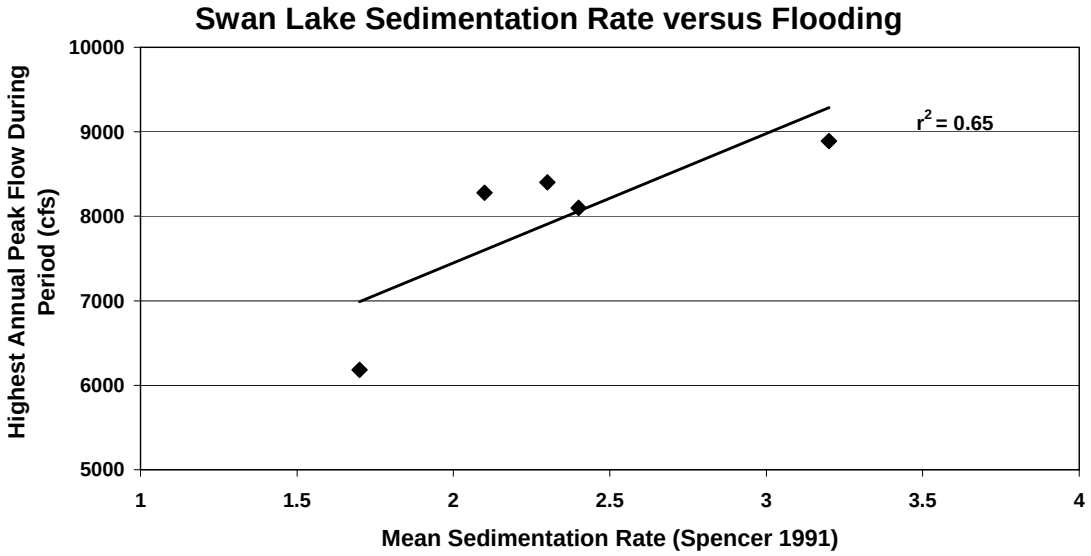
Comment: Section 5.7. The discussion would be strengthened by putting the results into context with the annual peak flow. During the EPA study, the annual peak flow in 1975 was 5410 cfs, which corresponds to about a 2- year recurrence interval. During the Butler study, the annual peak flow in 1993 was 5050 cfs, which also corresponds to about a 2-year recurrence interval. During the Ellis study, the annual peak flow in 1997 was 8520cfs, which corresponds to a 25-50 year recurrence interval.

DEQ Response: We agree that this is good information to include within Section 5.7 and have incorporated it.

Comment: Section 5.6.2. Par. 2. It is not correct to say that the changes in sediment levels were "attributed" to timber harvest. Rather, they were correlated with timber harvest. What Spencer did not thoroughly explore was the relationship of his sedimentation rates to peak flows. For each period that he examined sediment deposition, I determined what the peak flow was during that same period. I found that maximum peak flows explained 65% of the variability in mean sedimentation during his sampling period. This analysis is included below.

Time Period	Mean Sedimentation Rate (Spencer 1991)	Highest Recorded Discharge During Period (cfs)*
1922-1933	2.1	8280
1934-1946	1.7	6180
1947-1957	2.3	8400
1958-1972	2.4	8100
1973-1990	3.2	8890

*** USGS Station on Swan River (near Bigfork)**



DEQ Response: One of the primary mechanisms for sediment and other pollutant loading is increased flows. This applies to natural background sediment loading as well as sediment loading (erosion) from land management activities, particularly those lacking BMPs as would be anticipated for the years plotted. Therefore, it would be of no surprise that higher flows would lead to higher sediment loading, a substantial amount likely due to roads and other timber harvest activities where BMPs were lacking. DEQ, therefore, sees no need for any document changes based on this comment.

Comments Focused on Water Quality Goals, Targets, TMDLs and Allocations (Sections 7 & 8)

Comments:

- The stated goal for Swan Lake is to prevent any deterioration in water quality. However, the TMDL calls for a dramatic 40% reduction in sediment loading from roads. The document fails to document whether or not this huge reduction is feasible, and why it is necessary to achieve a goal of maintaining the existing condition of the lake.
- 40% Road Sediment Reduction TMDL Target Not Justified: TMDLs must be set at a minimum level to ensure protection of the beneficial use. In the case of Swan Lake, beneficial uses are currently supported. By logical extension, the existing level of loading is protecting the uses (it certainly has not been demonstrated otherwise). In light of this, for the Department to suggest a 40% reduction is needed is not appropriate. The TMDL target should be revised to reflect no additional increase in loading from forest roads.

DEQ Response: Although the Swan Lake POC and nutrient TMDLs are based on no reduction in loading, the Section 8.2.1 allocations for "road erosion" as well as "riparian and streambank protection" represent loading reductions as important component of the margin of safety identified in the Executive Summary (Table E-1 and Section 11.0). It

seems appropriate to pursue erosion protection where best management practices are apparently lacking and then apply this reduction as a margin of safety. The allocation for road crossings represents anticipated reductions due to BMP implementation for the top 70 sediment producing road crossings as discussed in Section 8.2.1.1. There is also the potential for additional reductions at other road crossings instead of, or in addition to, reductions from the top 70 sediment producing road crossings. This represents a reasonable and prudent allocation and TMDL development approach that is not at all dramatic.

Based on these comments, a sentence has been added to Section 8.2 to link these load reduction allocations to the margin of safety for the Swan Lake POC and nutrient TMDLs.

Comment: Swan Lake secondary target #2 should include road decommissioning in addition to just using BMPs. On page 34 culverts were considered a significant unmanaged sediment loading risk throughout the drainage. The draft documents the problems associated with culverts and road failures especially in areas with high road densities such as the Swan but stops short by not suggesting that road decommissioning is a viable option to reduce this risk.

DEQ Response: We agree that road decommissioning, including removal of culverts, is a viable option. Language has been added to the Swan Lake Secondary Target #2 discussion to suggest this as an option. This option is also noted within the undersized culvert discussion in Section 8.2.1.3, the Section 9.2.2 Bullet #1 recommendation for road sediment reductions, and within the Section 9.2.3 discussion for culvert failures.

Comments:

- DEQ states "no decreasing percent saturation DO in the bottom waters of Swan Lake and no increase in the spatial extent of the low DO area". This does not allow for natural variations in the DO content. We should not limit variation more than what could happen naturally.
- Swan Lake primary target #2 is no increasing trend of nutrient and chlorophyll a concentrations, no increasing trophic state index trends and no decreasing trends in Secchi Depth values in Swan Lake. Secondary target #1 is no increasing trend in phosphorus, nitrogen, TSS and organic carbon loads associated with human impacts entering Swan Lake from the Swan River. Please explain what constitutes an increasing trend and how many years of data are required to determine a trend. For example, the Bull Trout Restoration Team found that at least 15 years of data was necessary to determine trends in bull trout populations. The way these targets are worded seems to allow for increases in those parameters in some years which is probably not the intent.

DEQ Response: We agree that the DO target, as presented in the public comment document, could imply no changes even due to natural variability. To address this concern, a "Target Applicability Considerations" sub-section has been added for the Swan Lake DO target (Primary Targets #1) as well as for the Primary Target #2 parameters. This additional language will note that any final target compliance considerations must take natural variability into account, while at the same time also considering land use changes throughout the watershed

An increasing trend is typically considered a statistically significant change in one or more of the parameters of concern indicating a reduction in water quality. An analysis of nutrient trend detection capabilities of a water quality sampling network in the Clark Fork River revealed that the detection of statistically significant trends would require 5 to 10 years of monthly monitoring (Land and Water, 1995). The detection of trends in nutrient loading is, in part, a function of the variability in nutrient concentration. Unfortunately, this variability cannot be reliably estimated in Swan Lake and Swan River with the existing data. However, the Clark Fork example probably provides a reasonable approximation of what will be required to detect water quality trends in the Swan Watershed.

Additional language added to Section 7.0 Swan Lake primary targets applicability also states that the number of years needed to make a claim concerning target compliance will be a function of the level of sampling and the desired level of certainty in making such a determination. As suggested in the above paragraph, the effort should also include tracking land use indicators and significant natural disturbance events such as large fires within the watershed. Input from stakeholders can help with these decisions about the extent of sampling and desired certainty. Until more data is available to make trend related conclusions, Swan Lake will be considered a threatened waterbody. This approach is protective of water quality and does not hinder land use activities within the watershed since the Table 8-1 allocations are reasonable water quality protection expectations.

Comments:

- The TMDL fails to include an allotment for future growth in the planning area. With the demonstrated trend in increasing human habitation around the lake and in the watershed, this would seem to be a mandatory inclusion in the TMDL.
- We believe that the TMDL must include an allotment for future growth, which is inevitable in the Swan Valley and along Swan Lake. We believe that this can be accommodated in the existing TMDL load allocation because the goal for the lake is no further declining trend in water quality (i.e., not improvement), and because trends in riparian and upland conditions in the Swan Lake watershed trends are for improvement (e.g., recovery of riparian areas impacted by historic unregulated activities, Plum Creek's efforts to get critical lands into public ownership, little or no activity on Forest Service). In consideration of all these factors, we believe there is room in the allocation for future growth and still meet the TMDL goal of no declining trend in water quality.

DEQ Response: The allocations in Section 8.0 effectively address future growth considerations since they limit existing pollutant loading impacts and effectively set upper limits for future pollutant loading impacts for the identified sources of concern. This language has been added to the Section 8.0 allocations for Swan Lake, Jim Creek and Goat Creek.

Comment: The TMDL target for Swan Lake titled "Other Timber Harvest Impacts" should be removed because it is vague, the existing condition relative to this loading source is unquantified (though believed small), and landowners cannot clearly demonstrate compliance.

> **DEQ Note:** There are not any targets in the document with this title; it appears that the comment is geared toward a TMDL allocation and the below response is, therefore, based on this assumption.
>
> **DEQ Response:** There are a significant number of pollutant-loading pathways represented by this allocation as identified in Table 8-1. These "other timber harvest impacts" have been significant sources in the past, such as in Jim Creek (Appendix B). Existing contributions may be relatively small and possibly within the range of "naturally occurring" in many drainages. Given that this is a major land use activity with significant potential for pollutant loading, it is required that an allocation is in place to at least address future growth potential, consistent with some of the above comments and responses. Unfortunately, it can be difficult to demonstrate compliance with most allocations, not just the allocation for this particular source. We believe that large landowners can help demonstrate compliance through methods such as monitoring water quality, tracking harvest activities, documenting implementation of BMPs and other water quality protection measures, documenting success of these management efforts, and documenting corrective approaches where unexpected pollutant loading occurs due to BMP failure or other circumstances.

Comment: The TMDL target for Swan Lake related to road erosion should be revised to state the reduction is applied over the entire Swan Lake watershed. Otherwise, it could be construed to apply to every given road segment, most of which are fully meeting BMPs and are not significant sediment sources.

> **DEQ Response:** The only target associated with roads is Swan Lake Secondary Target #2 that specifically applies to given road segments found to be a problem. Assuming that the comment is actually geared toward the "road erosion" TMDL *allocation* in Table 8-1, we agree that the above clarification is desirable and have changed the wording in Table 8-1. The new wording applies the allocation to road stream crossings (as defined by Section 5.2.1) to avoid the type of misinterpretation identified by the comment.

Comments:

- Some of the secondary targets for Swan Lake are for parameters that are not direct measures of beneficial uses or aquatic habitat, but rather are very closely tied to implementation. This includes requirements that action be taken at very specific locations, and defining a threshold level of riparian impact. We believe this unduly treads on the non-regulatory mechanism the state has in its Nonpoint Source Management Plan and is inconsistent with state law that requires the Department recognize established programs and practices for controlling nonpoint source pollution. Both of these targets should be eliminated.
- Targets" in Section 7.1 Should Only Be Set for Inlake or Instream Conditions: Targets are appropriate for instream conditions (e.g., percent fines, nutrient export trends, etc.) as a means to articulate a "goal" condition that may provide an expectation about how narrative

water quality criteria will be evaluate in the future. However, the road sediment loading and riparian streambank vegetative health "secondary targets" for Swan Lake proposed in Section 7.1.2 are inappropriate because they appear to nearly dictate an implementation threshold that may not be well correlated with the underlying beneficial uses. The state Nonpoint Source Management Plan is the implementation vehicle for this water quality restoration plan, not DEQ and EPA's dictated "targets."

DEQ Response: The use of these parameters or indicators for target development is consistent with EPA guidance (EPA, 1999a), where riparian and hillslope indicators are discussed within the context of target development for sediment TMDLs. As defined in the introduction to Section 7.0, the main purpose of these secondary targets is to "help track progress toward meeting primary targets and as additional indicators of watershed and lake health". These secondary targets are not applied as primary targets and do not represent a regulatory requirement. Because of the uncertainty around even the primary targets, these secondary targets are important to track as part of the adaptive management. The consequences of not meeting any of these targets are defined in such a way that does not unduly tread on the voluntary approach that applies to many land use practices and the selection of the secondary targets is consistent with and recognizes established programs and practices for controlling nonpoint sources. These existing programs and practices include or should include application of BMPs on forest roads and protection of riparian areas.

Comment: Riparian health indicators are defined in the document as "no reductions in overall average canopy density for significant stream segment, and no increases in the spatial extent of the riparian zone in which canopy density is less than 50%". Is there an exception for salvage? The SMZ law allows removal of more than 50 percent of a canopy in the case of salvage logging and on all operations along Class 3 streams. The DEQ target for canopy cover is more restrictive in some cases than the SMZ law which has worked well to protect streams. This also presents the problem of measuring the canopy coverage along a burned stream where there is no canopy.

DEQ Response: In responding to this comment, it is important to recognize the implications of not meeting this Swan Lake Secondary Target #3. As stated in the document "not meeting this target, especially in major streams or multiple streams, represents a potential increased threat to Swan Lake water quality and represents the need to investigate the land use activities that have led to this condition." Salvage work focused on burned streams would probably result in negligible change to a stream's average canopy density, especially where burned trees lacking canopy or soon to be lacking canopy are involved. In fact, the document further states: "potential canopy density impacts from natural events such as fire will need to be taken into account."

Since many segments with canopy densities less than 50% have increasing canopy densities due to recovery from riparian harvest, and since the target is based on 1997 conditions, there is built-in allowance for some canopy density reductions. To trigger the secondary target indicator, a stream segment that is above 50% would need to be reduced to less than 50% due solely to human activities – these types of efforts should be closely scrutinized. Because the canopy density is also an indicator of LWD recruitment, salvage

efforts should take localized impacts into account as well as considering overall stream impacts and continued recovery from potential upstream historical riparian harvest. Where a stream has had significant reductions in canopy cover due to human activities or due to a fire, the rate of harvest along this stream where the canopy is healthier, as allowed by the SMZ law, will need to consider cumulative impacts to ensure full protection of beneficial uses and to assist with stream recovery.

We do agree that there could be some salvage activities, such as thinning of small trees to reduce fuels or removal of some trees where it is necessary to control a beetle infestation, which would seem inconsistent with the language in the document. Under these conditions, it is worth remembering that the target only triggers additional investigation and possible assessment of potential impacts to the stream's water quality. Nevertheless, we have added language that specifically notes that certain salvage work may help prevent larger water quality impacts even though the activity appears inconsistent with the Swan Lake Secondary Target #3.

Comments:

- Proposed instream habitat targets for Jim Creek are inappropriate. The target relating to fine sediment in spawning gravel is unattainable given that conditions in Jim Creek identically mirror those of the reference stream Lion Creek over the past decade. The target relating to woody debris and pools are inappropriate because these parameters are widely variable in nature. Available information on woody debris levels in undisturbed streams indicates that half of reference streams would fail to meet the target. Information on reference conditions for pools is not provided, so an evaluation of attainability is not possible.
- Jim Creek Targets Inappropriate: As we demonstrated above, all evidence suggests that Jim Creek is fully supporting its uses. The percent fines target is unattainable because Jim Creek is at its physical potential as evidenced by how closely it mirrors Lion Creek conditions. Regarding the LWD target, we believe LWD is well within the range of natural variability in un-managed systems and the unique circumstances of the reach that DEQ surveyed. Based on Light et al. (1999), DEQ proposes a target that 50% of reference streams cannot achieve which is simply not justifiable.

DEQ Response: DEQ agrees that the achievable levels of fines in Jim Creek could be consistent with Lion Creek as discussed in Sections 7.2, 7.5.1, and 10.1.1. Removing Jim Creek from the sediment impairment listing will require a higher level of certainty from additional years of data since there is a record of high fines in Jim Creek that could take several years or more to flush through the system. This is consistent with Watson et al. (1998) conclusions that high levels of sediment loading could take years or decades to flush through these streams. Macroinvertebrate results also need to show full support in the lower sections of Jim Creek where high levels of fines from past harvest activities could be contributing to impairment conditions.

- Many of the pollutant parameters that this document has to deal with are highly variable in nature, but the data from the upper portion of Jim Creek supports an impairment determination due to low levels of woody debris and impacts to pool and habitat quality. Table 5-6 provides sufficient data for % pools with cover for all other

streams assessed, including those that could be used as a reference. The 50% target value was purposely chosen as a value that all other stream reaches assessed currently meet (reference Table 5-6 and Section 5.14.2.2 discussion).

- The Appendix J data on large woody debris shows that all higher elevation "B" or "B/C" type streams reaches (Goat 16, Piper 14 and Piper 10) have large woody debris and/or aggradate totals in excess of 50, with median and average values above the public review draft target level of 80. Based on the results of similar stream types in the watershed, the target has been reduced to "greater than 50 pieces of large woody debris and/or aggregates" to address variability between streams and overall target achievability. The current level of 13 pieces and 0 aggragates per 1000 feet in the upper part of Jim Creek is still well below this new target condition.

Comments:

- The proposed target for Goat Creek relating to suspended sediment does not directly relate to any beneficial use as they do not respond to instantaneous levels of suspended sediment. As the current target is worded, it could be exceeded for only one minute on a single day and that would constitute it remaining on the list. This is not right.
- Goat Creek Targets Inappropriate: It is inappropriate to set an absolute instantaneous threshold for a non-toxic pollutant such as TSS. TMDLs are designed to control "loads" not instantaneous concentrations. Additionally, there is no evidence that the one observation of 45 mg/L TSS in 1997 had any impact whatsoever on beneficial uses in Goat Creek.

DEQ Response: The target is linked to aquatic life beneficial uses and is consistent with Montana's Water Quality Standard as well as water quality standards in several other western states (Rowe et al., 2003). Sufficient linkages to standards and impairment determination are provided in Section 6.4.1. Data is representative of what are arguably several weeks of elevated TSS concentrations (Ellis 1999b), which may have been even higher than the 45 mg/l measurement if more sampling had occurred.

- There are rarely enough resources to support continuous sampling during runoff, and a given sample must be used as an indicator of water quality for the time period between samples. The 1997 data supports a conclusion that suspended sediment values were elevated for several weeks during runoff. It is anticipated that any further data showing a value exceeding the 30 mg/l target could represent several days of elevated suspended sediment load depending on the sample design. Nevertheless, wording has been added to the "Target Applicability Considerations" part that allows for consideration of duration and magnitude of any sample results greater than 30 mg/l under circumstances where a very large data set indicates values less than 35 mg/l occur over a duration of less than one week, or values less than 40 mg/l occur over a duration of less than two days.

Comment: Targets and Allocations for other drainages not on the 303(d) list: The DEQ establishes targets and allocations for drainages not on the 303d list at this time. I think this is outside the scope of this TMDL, which should only deal with the currently listed streams.

DEQ Response:

Targets:
Only primary targets are applied to 303(d) listed stream segments and waterbodies. Secondary targets are applied to some individual streams as a method to help track progress toward meeting primary targets and to help with adaptive management decisions, consistent with EPA guidance (1999a) for the application of hillslope indicators for target development.

The "Additional Target Conditions" are defined as "indicator parameters or conditions that can be used as the basis for additional impairment determinations in Swan Lake and in tributary streams within the Swan Lake Watershed." Given the high percentage of available nonpoint source resources going toward TMDL development, it is reasonable to identify potential water quality protection goals that could apply throughout the watershed. Providing this information represents a prudent use of taxpayer's money to share information learned as part of the TMDL and water quality planning effort in a way that could help identify and possibly prevent future water quality problems and provide further guidance toward Clean Water Act compliance. This is consistent with the State's nonpoint source program, for which the TMDL and water restoration planning process is a major component.

Allocations:
Allocations are only applied to existing or potential future pollutant loading sources that are linked to the TMDL. The TMDLs are only applied to the 303(d) listed waterbodies impaired or threatened by a pollutant. This necessitates applying allocations at a watershed scale where a downstream waterbody is impaired or threatened. This can be done by source categories or at the tributary scale consistent with EPA guidance (1999a). Both approaches are used within Section 8.0.

Comments Addressing Multiple Sections

Comments:

- The document does not discuss state regulatory mechanisms for reviewing proposed septic tanks. While the document does summarize some existing county floodplain regulations, the omission of any discussion regarding regulatory mechanisms for septic tanks is glaring.
- TMDL Should Better Document Existing Regulatory Mechanisms: The document fails to describe provisions under state law for evaluating impacts of septic systems under the non-degradation statute and possibly other state laws. A description of these existing regulatory mechanisms should be added to Sections 5.12, Table 8-1, and Section 9.2.4. These existing regulations should be cited in Table 8-1 as the mechanism for achieving the TMDL load allocation for septic systems.

DEQ Response: Language referring to state laws that address septic systems has been added to the document in Sections 5.11, 8.0, and 9.2.4. This language is consistent with the above comments, although Table 8-1 still includes other methods, such as septic maintenance, to help achieve allocations.

Comments:

- The document fails to describe Montana's Streamside Management Zone (SMZ) law. This law is the implementation tool for forest landowners to ensure protection of streams and achievement of the TMDL.
- TMDL Should Better Document Existing Regulatory Mechanisms: Additionally, the document fails to mention or describe Montana's Streamside Management Zone (SMZ) law, which is a primary TMDL implementation tool for forest landowners.

DEQ Response: The SMZ law is discussed in several locations of the public comment document, including Sections 4.1.2.2, 5.5.1, 5.13.3, 6.6, and 9.2.1. Some additional descriptive language has been added to Section 4.1.2.2 to better describe this law as suggested in the comments. Based on this comment, the SMZ law has been added as a "Method to Achieve Allocation" for the "Riparian and Streambank Protection" allocation within Tables 8-1, 8-2, and 8-3. Language has also been added to the Section 8.2.1.2 discussion for this allocation.

Comments Focused on Jim Creek Impairment Determination

Comment: Available macroinvertebrate data indicate the stream is fully supporting aquatic life. Table 5-9 indicates that the Jim Creek macroinvertebrate sample was collected just below the Wilderness boundary, but this is not the case. As provided by Plum Creek to the Department, this site was sampled at the 888 Road Crossing of Jim Creek in the SE1/4, NW1/4, Sec. 32, T22N, R17W, Lake County. This sample reach is located 2 miles above the mouth of Jim Creek and below most forest management activity.

DEQ Response: Regarding the macroinvertebrate sampling location, the document has been corrected in Section 5.19, Section 6.3.1 and Section 7.2. The macroinvertebrate data, even taking the corrected sample location into account, does not appear to represent conditions along the whole stream segment. Until further analysis is performed, Jim Creek will remain impaired for both cold water fish and aquatic life consistent with other impairment determinations within the Swan Lake Watershed

Comments:

- The available long-term record of spawning gravel quality (1988 to present) indicates that Jim Creek has virtually identical fine sediment levels as Lion Creek (which DEQ has previously determined to be fully supporting its uses). This is not particularly surprising since the inventory of road sediment sources by Land and Water in 2001 found that sediment delivery rates in Jim Creek were only 2% above background.
- Much of the discussion on Jim Creek (especially Section 8.2.2.1.1) appear to make a good case that the stream meets all beneficial uses and is not impaired. It is hard to imagine a problem when the road related sediment is only 2 percent above natural background.

DEQ Response: Sediment transport can take years or decades from the time it enters a stream and is transported from the system (Watson et al, 1998). Therefore, it would not be unusual to have a low existing input of sediment load and still be dealing with

historical loads that are causing impairment to beneficial uses. This condition is specifically recognized within the Table 8-2 and Section 8.2.2.1.1 road sediment delivery allocation.

Comment: In examining DEQ's report titled Riparian Assessment and Characterization of the Swan River and Select Tributaries (Pipp 2002), about 2 miles of upper Jim Creek riparian area (in the vicinity of Jim Lakes) was identified as being impacted by historic timber harvest. Only one of these segments was selected for field review in 2002 (Segment 24). In examining this reach, DEQ found relatively low levels of LWD (13 pieces per 1000 feet). While the mid-1970's harvesting by Plum Creek certainly reduced recruitment rates, it should be recognized that this reach has a gradient of 8%, a bankfull width of 18 feet, and drains 8 square miles of high elevation alpine terrain that receives tremendous annual snowfall. This translates to tremendous stream power in this reach and would make it very difficult for wood to accumulate. Additionally, because this reach is located just below a series of natural lakes, it is unlikely that it receives much LWD input from upstream sources. As such, we do not believe that historic LWD levels were likely very high in this reach. And this level of LWD is not outside the range of natural variability. Data summarized by Light et al. (1999) 1 found that about 15% of unmanaged streams have LWD levels below 20 pieces/1000 feet.

DEQ Response: The assessed portion of this reach was in a lower gradient section of the overall reach, and the LWD and pool cover was lacking when compared to other similar assessed reaches within the watershed. Riggers et al. (1998) found significant quantities of woody debris in the steeper Rosgen "A" type channels across the Lolo National Forest in western Montana streams. Table 4 from Light et al. (1999) identifies Cascade type streams with gradients greater than 6% as having low channel sensitivity relative to LWD, but then also notes the following: "pool-forming processes are significant in the absence of LWD, although there is evidence that LWD can increase pool frequency and provide other significant habitat elements". It is the loss of these significant habitat elements attributed to historic harvest and supported by adequate reference condition information that supports the impairment determination in upper Jim Creek.

Nevertheless, Section 7.5.1 does acknowledge that "it is possible that the natural potential of some streams will preclude achievement of a target". Furthermore, the target monitoring compliance criteria within Section 10.1.1 states: "Future monitoring should evaluate upper impacted reaches above and below Jim Lake. This data can be used to evaluate potential natural impacts that Jim Lake may have on downstream woody debris recovery." Based on this comment, there is no need for significant document changes, although language addressing target achievability and Jim Lake considerations, similar to the language in Sections 7.5.1 and 10.1.1, has been added to the Section 7.2 "Target

1 Light, J., M. Holmes, M. O'Connor, E.S. Toth, D. Berg, D. McGreer, and K. Doughty. 1999. Design of effective riparian management strategies for stream resource protection in Montana, Idaho and Washington. Native Fish Habitat Conservation Plan Technical Report No. 7. Plum Creek Timber Company, Columbia Falls, MT.

Applicability Considerations" sub-section for the pools and LWD target (Jim Creek Primary Target #2).

Comment: DEQs field assessment of Upper Jim Creek (Segment 24) found very low levels of fine sediment (<10% fines). This is not surprising since this reach is 8% gradient and is located immediately below a large sediment sink (i.e., Jim Lake). DEQ also noted that stream banks were stable. As a final observation, this reach of Jim Creek goes dry as it traverses a coarse glacial moraine (Flathead NF Landtype 23-8) at the foot of the Jim Lakes cirque basin and thus naturally provides little or no fish habitat (and certainly no bull trout habitat). However, it is fortuitous that it does go subsurface so that it can re-emerge as cool groundwater at bull trout spawning and rearing areas downstream.

Regarding the Jim Creek fishery, it supports a good population of bull trout. Data since 1991 average about 60 bull trout redds per year. Redd counts were lower in the late 1980's because bull trout could not access habitat due to a beaver dam in the lower reaches of the stream. FWP removed this dam in the late 1980's to allow upstream passage. Recently, the beaver dam has come back and is believed by FWP to be inhibiting upstream migration. They are currently considering removing it again (Tom Weaver [FWP] Personal Communication with Ron Steiner [PCTC]).

Development of a TMDL should logically "connect the dots" between an activity, delivery of a pollutant, impact to habitat, and impairment of a use. In the case of Jim Creek, DEQ has found that mid-1970's logging was identified as a potential impact. However, based on the data in the TMDL document this potential source has **not** manifested itself in unstable streambanks, delivery of sediment from roads, impact to surface or intergravel fines, unexplainably low levels of LWD, impacts to macroinvertebrates, or fish. The data that have been provided indicate full support of fisheries and aquatic life. Current regulatory mechanisms (BMPs, SMZ Law) and Plum Creek's Native Fish Habitat Conservation Plan will ensure that it continues to fully support its uses.

The data presented in the document fail to demonstrate impairment of Jim and Goat Creeks. Rather, the available information strongly suggests otherwise. In evaluating the available data for Jim Creek, we cannot follow the Department's technical argument that this stream is impaired. The data simply do no support this conclusion.

DEQ Response: Section 6.3 provides adequate rationale for an impairment determination for Jim Creek, including the fact that percent fines in bull trout spawning gravels, pools with cover in upper reaches, and large woody debris numbers in upper reaches all deviate from reference/target conditions. This determination is supported by land use impacts linked to the impairment conditions throughout the document. The above arguments only support the fact that there are limited impairment causes and in some cases the impairment is limited to a given reach. We agree that this is a close call, similar to the close calls for the conditions where we determined that Piper was no longer impaired and that most of the pollutant and habitat alteration conditions in Goat Creek were no longer significant enough to justify an impairment determination.

Comments Focused on Goat Creek Impairment Determination

Comments:

- Available Data do not Support an Impairment Determination for Goat Creek. In reviewing DEQs impairment determination for Goat Creek, it appears that the sole reason for listing is that during the Ellis et al. (1999b) study they observed a maximum TSS concentration of 45 mg/L whereas Lion Creek had a maximum concentration of around 20. DEQ's explanation for this difference is that Goat Creek has had 22% of its watershed harvested in the past 40 years (which is characterized as "extensively harvested" by DEQ in Section 5.6.4) whereas Lion Creek above the sample site was unharvested. We are troubled by the apparent use of this snapshot measurement of TSS for several reasons.

- First, suspended sediment concentrations can vary dramatically over short time periods. Bunte and MacDonald (1999)2 reported that: "…short term fluctuations commonly extend over a factor of three or more." Second, inspection of Ellis et al. (1999b) Figure 11 shows that Goat Creek was sampled near it's annual peak discharge (or far up the rising limb of the hydrograph), while Lion Creek was sampled on the falling limb of it's first spring peak. Because of this, it is likely that the Lion Creek peak TSS was missed. Third, except for that one observation on Goat Creek, other TSS concentrations throughout the spring runoff period are remarkably similar between Goat Creek and Lion Creek. Lastly, Ellis et al. (1999b) state "*The only biophysical factors that we measured that could explain the differences observed in the water quality attributes were the harvest legacy in Goat Creek.*" The authors evidently forgot that earlier in their report (See page 2 paragraph 1) they stated that "….*Goat Creek traverses more of the glacial deposits than does Lion Creek. In addition, the glacial deposits on Goat Creek extend up the stream corridor a greater distance than in Lion Creek*." It is interesting that this possible factor was overlooked by the authors, since their concurrent study on the Swan River (Ellis et al 1999a) found that the amount of glacial deposits within a catchment was a significant factor in explaining TP concentrations (which is usually highly correlated with TSS).
- It is inappropriate to rely on a single snapshot measurement of TSS in 1997, a year that the Swan experienced a 25-50 year recurrence interval flood, and over-ride information we know about the status of beneficial uses in this watershed.
- A fine suspended sediment reduction of 33 percent during peak flows is based on the readings in 1997. This was a high water year and that could represent an extremely high reading for Goat Creek. It is difficult to know if this is a reasonable TMDL.

DEQ Response: DEQ notes many of the above concerns and realizes that not only do suspended solids concentrations vary naturally, but are also sensitive to land management activities such as timber harvest, which have the potential to significantly increase suspended sediment concentrations. DEQ decided that Goat Creek would remain listed as

2 K. Bunte and L. MacDonald. 1999. Scale considerations and the detectability of cumulative watershed effects. Technical Bulletin No. 776. National Council of the Paper Industry for Air and Stream Improvement, Inc., Research Triangle Park, N.C.

impaired for suspended sediment to ensure protection of the resource, and feels that proper justification, including consideration of natural background conditions, was provided. This justification includes the following considerations not fully explored in the above comments: (l) all data for a two-month period showed TSS values higher in Goat Creek than Lion Creek, even though Lion Creek had significantly higher flow conditions; (2) elevated suspended sediment concentrations in Goat Creek are not only higher than Lion Creek, but also higher than other potential reference streams of Dog and Cat Creek (Section 5.6.4); and (3) with the existing timber harvest sources such as road sediment (Section 5.2.3) and others discussed throughout Section 5.0, it is probable that a watershed with a higher level of erodable soils would be more susceptible to impacts from roads and other timber harvest activities, especially under high runoff conditions.

Nevertheless, we have set targets in a manner that could be satisfied if sampling continues to indicate TSS runoff concentrations similar to the 2003 results which showed that, in spite of the high amount of glacial deposits noted above, Goat Creek has the potential for low suspended solids results similar to reference streams. The allocations are consistent with the Swan Lake allocations and application of forestry BMPs and other practices consistent with water quality protection. Therefore, no changes are made to the document based on the above comments.

Comment: Information we have on beneficial use support in the Goat Creek watershed indicates full support. Available macroinvertebrate data score very well (see Table 5-9). Goat Creek is a premier bull trout stream (~60 redds per year over past decade). And spawning gravel quality is good.

DEQ Response: The impairment determination for Goat Creek was based on a suspended sediment condition where water quality standards were not satisfied. Previously listed causes of impairment, such as habitat alterations, nutrients, and siltation were no longer considered a significant concern for some of the above noted reasons.

Comments Focused on Implementation and Monitoring Strategies (Sections 9.0 and 10.)

Comments:

- I suggest that a database be set up that tracks new road construction and logging activities. This would help identify potential areas to monitor and could possibly be some sites to test the effectiveness of BMPs. Because of the Swan Valley Conservation Agreement for grizzly bears logging and road construction are concentrated into three bear management subunits at a time that are rotated every three years. The effects of doing this on water quality and bull trout were not fully known when this Agreement was developed so this might be a good opportunity to test it. This could also be why in watersheds such as Woodward/South Woodward road problems were found because that bear management subunit was open for concentrated activities between 2000 and 2002.
- I suggest that a schedule of priorities be developed which would include the 70 worst road sediment contributing sites, the agency/entity responsible, the monitoring to be done and when the repairs were made. This would help to track that target to see whether the goal is

being reached. This information may already be in the draft TMDL but the appendix containing the road assessment data was not operating on DEQ's website.

DEQ Response: The above concepts are essentially captured via the recommendations for complying with the "Other Timber Harvest Impacts" allocation within Section 8.2.1.3, and within the Section 10.1.2 implementation monitoring recommendations. Language consistent with the above recommendations, and similar to language in Sections 8.2.1.3 and 10.1.2, has also been added as part of the recommended strategy for timber harvest activities (Section 9.2.1) and reducing forest road sediment loading (Section 9.2.2). Wording has also been added to Section 6.5, which discusses the potential for impairments in other tributaries in the watershed. This additional Section 6.5 wording stresses the importance of tracking land use activities throughout the watershed.

We stress the fact that the additional language within Sections 6.0 and 9.0 provides recommendations, versus requirements, for TMDL implementation and water quality protection within the watershed.

Comment: There does need to be a mechanism for concerned citizens to report violations of lakeshore protection and other regulations that is acted on by the enforcement agencies.

DEQ Response: A DEQ enforcement division handles citizen complaints where potential state water quality regulations are violated. Also, citizens can report potential violations of local regulations to the appropriate county authority.

Comment: Blatant violations of Lake County Lakeshore Protections Regulations and the Montana Streamside Management Zone Law are being allowed to take place on the west Shore of Swan Lake in the Bug Creek area. These violations are having a significant negative impact on Swan Lake water quality and need to be addressed by the Department of Environmental Quality.

Specifically, two recent incidents illustrate the problems. A road cut was constructed on Swan Shores Estates Tract 2 (Easton) in or about 2002. We understand that Lake County initiated enforcement action and required remediation after the fact in this case. A similar road cut was constructed on adjacent Tract 3 (Zac) last Fall-apparently in connection with other onsite excavation for the building foundation, utility trenching and installation of the well and septic system. In the latter case, Lake County Planning apparently issued the septic construction permit as well as a Zoning Conformance Permit for the development of the property. We have contacted Don Wood of Lake County Planning, and Mr. Wood visited the site yesterday, March 23.

We recommended that DEQ require Lake County to take proactive action in connection with all future lakeshore projects as follows:

- As part of any Permitting activity (including but not limited to septic and zoning conformance permits) each property owner and contractor working on site be required to sign an affidavit acknowledging their receipt of copies of all relevant regulations affecting

protection of the lakeshore and adjacent lands-and, acknowledge the likely enforcement consequences of any violations.

- Each property owner and contractor at time of any permits being granted should be required to clearly and prominently mark (and maintain throughout the course of development of the site) the appropriate lakeshore protection, "setback", "buffer zone", Streamside Management Zone (SMZ), or other boundaries against which regulatory conformance can be measured. Specifically stakes with pre-printed signs provided by Lake County should be placed at intervals of no less than fifty (50) feet, including at each property line.
- A sign should be installed at the start of West Swan Shores Road containing a message similar to the following:

Lakeshore Protection Regulations Strictly Enforced

Properties In This Area Are Subject To:
Lake County Lakeshore Protection Regulations
Bug Creek Zoning Regulations
Montana Streamside Management Zone Law
And other regulations

Attention Property Owners and Contractors
You Will Be Held Personally Financially Liable
For Any Violations, Including Fines and Remediation Cost
For Requirement and Permits Contact:

Lake County Planning Department
(406) 883-7240

DEQ Response: Lake County Planning personnel have appropriately addressed the above two noted incidents. There are significant efforts underway in Lake County, as well as other counties, to address the above noted violations along Swan Lake as well as preventing similar violations or water quality threats along any stream or lake. In Lake County, these efforts specifically include educating realtors and equipment operators on zoning requirements as well as the licensing of septic contractors.

Unfortunately, violations do still sometimes occur. DEQ however, has no authority to force a local authority to enforce their zoning regulations. In addition, DEQ has no authority to enforce the requirements of the state's Streamside Management Zone (SMZ) act, as that authority rests exclusively with the Montana Department of Natural Resources and Conservation. Although the above comment implies that the SMZ law applies to private property development, the law only applies to commercial "timber sales" as defined in Section 77-5-302(9), MCA.

Many of the recommendations, including the sign, are consistent with Lake County efforts to educate the appropriate personnel about water quality protection, and are taken into consideration. Given stretched resources, a local watershed group can sometimes help accomplish many of the water quality educational and awareness goals represented by the above suggestions.

The concerns brought out by this comment are consistent with the document's focus on subdivision and other private land development as a significant future growth concern potentially affecting water quality. We hope that these future growth issues can be resolved with the help of concerned citizens and voluntary efforts, along with adherence to Lake County zoning requirements, the Natural Streambed and Land Preservation Act (310 Law), and state and federal water quality protection regulations. Education will be an important part of this effort.

Comment: In order to determine whether the goal of reducing sediment into Swan Lake is being met a coring should be done now and in an appropriate time frame (perhaps 5 years).

DEQ Response: This suggested monitoring is part of the Section 10.2.2 "Medium Priority Monitoring and Assessment Recommendations." Input from the Swan Lake TAG or other circumstances could lead to a higher priority rating for this or other medium priority recommendations, as suggested within Section 10.2.2.

Comments Noted

- In general, we think this draft TMDL and watershed protection plan represents an improvement over what was presented to stakeholders in late 2002. We appreciate that many of our earlier concerns were heard by the Department and incorporated into the public review draft. In the current document, DEQ does a good job of reviewing the available information and rendering reasoned and defensible arguments for delisting some previously listed stream segments, including Elk and Piper Creeks and some pollutants for Goat Creek. We also believe that DEQ has acknowledged the significant uncertainties in our scientific understanding of the linkages between land management activities and the low DO levels present in a portion of Swan Lake. We also applaud DEQ for documenting that naturally low DO levels have been observed in other low-productivity mountain lakes, and recognizing that the low DO in Swan Lake may be an entirely natural phenomenon. Lastly, we support the proposal that the goal for Swan Lake is one of preventing further degradation rather than requiring improvement. It is clear from everything we know about Swan Lake that it currently fully supports its beneficial uses.

- We do not have many substantial concerns about the content of the water quality protection plan. It is a good document that should provide improved water quality within the watershed.

- Section 5.2. We appreciate DEQ funding such a detailed road sediment inventory in the basin.

- Section 6.1. We agree that Elk Creek is an excellent resource and that it is fully supporting its beneficial uses. Elk Creek is one of the premiere bull trout streams in the United States. In recognition of this, Plum Creek is actively working to get company land along Elk Creek into Public ownership.

- Section 6.2. We support the Departments decision that Piper Creek is not impaired. Plum Creek conducted an extensive watershed analysis in the Piper Creek drainage and found it to

be in excellent condition. Information we learned in Piper Creek analysis included the importance of protecting not only where the stream is today, but where it might be tomorrow (e.g., channel migration zones). We have since incorporated this concept into our Native Fish Habitat Conservation Plan on all of our lands in Montana.

- The first review draft that went out to the stakeholders suggested that DEQ would use water yield as a target or allocation. This caused concern because modeling results are only approximations of what is going on in a watershed and because of the lack of good data to set thresholds. Fortunately, water yield is not a part of the target or allocation in the draft document.