

Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek

In January 2008, the Idaho Department of Environmental Quality (IDEQ) released their draft 2008 Integrated Report for public comment. In that document, IDEQ sought to de-list temperature for Hem Creek from Category 5 of Idaho's 2008 Integrated Report [aka. 303(d) list] (IDEQ, 2008a). EPA provided comments on the proposed de-listing (USEPA, 2008), and DEQ responded and submitted their Final 2008 Integrated Report to EPA in July 2008 (IDEQ, 2008b).

This document describes the temperature listing history and evaluates the evidence provided by IDEQ to de-list temperature for Hem Creek in their Draft and Final 2008 Integrated Report, Final Response to Comments. Additional information subsequently provided by the USFS regarding Hem Creek is also considered. The conclusion of this evaluation is that Hem Creek should not be de-listed for temperature, and it is recommended that EPA disapprove Idaho's removal of Hem Creek for temperature from Category 5 of the Idaho 2008 Integrated Report.

Listing History of Temperature in Hem Creek

Hem Creek (HUC 17060307; AU: ID17060307CL007_02b) was first included in Idaho's 303(d) list in 1994 for sediment (USEPA, 1994), and remained listed for sediment in 1996 (IDEQ, 1997) and 1998 (IDEQ, 1999). In Idaho's 2002 303(d) list, sediment was removed from 303(d) listing, and temperature was added (IDEQ, 2003). EPA approved the removal of sediment and addition of temperature for Hem Creek on Dec 20, 2005 (EPA, 2005b). In Idaho's draft 2008 303(d) list (IDEQ, 2008a); Idaho proposed to remove Hem Creek for temperature from the list. EPA provided comments raising concerns about the proposed de-listing on February 20, 2008 (USEPA, 2008). In Idaho's final 2008 303(d) list submittal (IDEQ, 2008b), temperature has been removed from listing for Hem Creek.

Applicable Water Quality Standards for Temperature in Idaho

The Idaho water quality standards which address temperature and are relevant to coldwater biota found in Hem Creek are as follows:

Idaho Administrative Code (IDAPA 58.01.02.250.02)

250.02. Cold water. Waters designated for cold water aquatic life are not to vary from the following characteristics due to human activities:

- b. Water temperatures of twenty-two (22) degrees C or less with a maximum daily average of no greater than nineteen (19) degrees C,
- f. Salmonid spawning: waters designated for salmonid spawning are to exhibit the following characteristics during the spawning period and incubation for the particular species inhabiting those waters:

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- ii. Water temperatures of thirteen (13) degrees C or less with a maximum daily average no greater than nine (9) degrees C.

Idaho water quality standards which address natural conditions, and are relevant to issues in Hem Creek are as follows:

Idaho Administrative Code (IDAPA 58.01.02- 003.68, 200.09)

03.68. Natural Background Conditions. No measurable change in the physical, chemical, biological, or radiological conditions existing in a water body without human sources of pollution within a watershed.

200.09 Natural Background Conditions. When natural background conditions exceed any applicable water quality criteria set forth in Sections 210, 250, 251, 252 or 253, the applicable water quality criteria shall not apply; instead pollutant levels shall not exceed the natural background conditions, except that temperature levels may be increased above natural background conditions when allowed under section 401.

[Section 401 has to do with allowances for temperature increases from point sources and is not relevant to temperature issues on Hem Creek.]

Idaho 303(d) Listing Policies Regarding Temperature and Natural Conditions Evaluations

The following excerpts were taken from the Final Department of Environmental Quality Working Principles and Policies for the 303(d)/305(b) Report (IDEQ, 2008b):

Natural conditions evaluations relevant to temperature (p. 27):

Waters to be Delisted Based on Natural Background

This section further defines the process by which AUs would be removed from Section 5 of the Integrated Report, based upon application of the Natural Conditions Provision in the WQS, for temperature exceedances. For an AU to be considered for this exclusion process, it must have biological monitoring data that indicates the beneficial uses are fully supported, and there must be a continuous temperature record indicating <10% exceedance of DEQ's temperature criteria.

Temperature evaluation: 10% rule (p. 19)

determining compliance with the WQS for other purposes. While necessary to target the current water quality criteria in drafting a TMDL, if the frequency of exceedance of the temperature criteria is less than 10%, and there is no other evidence of thermal impairment, then it is possible to propose de-listing.

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Temperature evaluation: critical period of evaluation for salmonid spawning (p. 20)

- Spawning often occurs when water temperatures are in a spring or fall transition. Therefore, for *salmonid spawning*, the critical period is the 22 days at the warmer end of the spawning period. For spring spawners, this will be at the chronological end of the period, while, for fall spawners, this will be at the chronological beginning of the period.

Partial data records (p. 21)

Idaho's listing policy includes extensive discussion of the use of partial data records, only a small portion of which is repeated here. In considering temperature data provided by the USFS, partial data records policies relevant to salmonid spawning (copied below) were followed to determine whether at a minimum 10% of measurements during the salmonid spawning period exceeded the salmonid spawning criteria.

If the partial data record includes all of the critical time period, it may be possible to infer that the frequency of exceedance is not more than 10%. For cold water aquatic life, if the partial data record includes the critical period from July 15 thru August 15, inclusive, and the frequency of exceedance is less than 10%, then it can be assumed the frequency of exceedance for the entire summer period of interest is less than 10%. Similarly, if the data record during *salmonid spawning* includes the warmest 22 days of the spawning period (end or beginning of the period, depending on whether spawning extends into spring or fall) and the frequency of exceedance is less than 10%, then it can be assumed that the frequency of exceedance is less than 10% for the entire spawning period.

Idaho's Proposal to De-list Temperature from Hem Creek in 2008 Integrated Report

In January 2008, IDEQ released their draft 2008 Integrated Report for public comment, which included the proposal to de-list Hem Creek for temperature. Table 1 lists the rationale provided by IDEQ to de-list this waterbody:

Table 1. IDEQ rationale for de-listing Hem Cr. for temperature.

ID17060307CL007 02b	Hem Creek	9.96	MILES
Temperature, water		State Determines water quality standard is being met	
<p>Hem Creek is a third-order tributary of Sylvan Creek, which then empties into French Creek, and thence into Orogrande Creek, and finally into the North Fork Clearwater River. Hem Creek heads on Hemlock Butte and flows in a northeasterly direction to its confluence with Sylvan Creek. Elevations range from 4,000 feet at the confluence to 6,000 feet on Hemlock Butte. The predominant landtypes are Moderate Relief Uplands, Mountain Slope lands, and Rounded Mountain Slope lands, all derived from granitics, metasedimentary schists, and undifferentiated rocks. The predominant mapped bedrock types are Wallace Formation schist, gneiss, and amphibolite. In addition, there is a small area of St. Regis Formation schist.</p>			
<p>BURP crews evaluated sites at the lower end of Hem twice once in 1997 and again in 1998 with very similar results. The 1997 reach is at 4,040 feet elevation, about 60 feet above the confluence of Joy Creek with Hem Creek, while the 1998 site is about 0.25 mile upstream from the confluence with Sylvan Creek at 5,020 feet. The 1997 site has a four percent slope which is on the low end of a Rosgen type A channel, and the 1998 site has an eight percent slope (Rosgen type A). Most of Hem Creek is a Rosgen type B channel, with an average slope of five percent. The measured discharge on August 7, 1997, was 10 cubic feet per second, while the measured discharge on August 5, 1998, was 6.7 cubic feet per second. Human activities affecting the reach include forestry and roads. DEQ 1996 WBAG results indicate that Hem Creek is fully supporting its beneficial uses because its 1997 MBI score is 5.34 (1998 MBI score is 5.55), its 1997 HI score is 105 (1998 HI score is 111), and it is supporting salmonid spawning as evidenced by three age classes of westslope cutthroat trout, including juveniles.</p>			
<p>Hem Creek is not listed by either federal regulations or the state’s bull trout problem assessment as a stream to be protected for bull trout. Therefore, the stream temperature was assessed using the cutthroat temperature standards shown in Table 5, where mean daily temperatures shall be less than or equal to 9 oC (48.2 oF) from April through July. As shown by the temperature data for Hem Creek in Appendix 3, mean daily temperatures at the mouth of Hem Creek begin to exceed 9 oC (48.2 oF) by early to mid-July and continue throughout Upper North Fork Clearwater River Subbasin Assessment and TMDLs October 2003 Final, Revised October 2003 the month.</p>			
<p>Therefore, Hem Creek water temperatures exceed the state’s numeric standard. However, there is a large degree of variability from year to year. Some particular conditions apply to Hem Creek. First, the time period and degree of temperature exceedance for Hem Creek is the least of any streams evaluated in the UNFCRS. Second, the Hem Creek watershed has only had a small amount of logging, and no trees were removed from the streamside zone (i.e., no shade has been removed from the SPZ), and it is in a nearly natural condition. The CWE model being used in this subbasin to determine the adequacy of stream shading to protect stream temperatures shows that Hem Creek has adequate canopy closure and shading (See Loading Allocation Map for Orogrande Creek, Appendix 4). Therefore, we conclude that the temperature exceedance in Hem Creek is a natural condition and no TMDL is necessary.</p>			

Idaho’s de-listing rationale concludes that the documented temperature criteria violations are a natural condition, and no TMDL is necessary. Although not explicitly stated, IDEQ implies that Hem Creek temperature conditions are consistent with provisions of IDAPA 58.01.02.200.09, aka. “natural conditions” provisions.

EPA provided comments on the de-listing rationale for Hem Creek on February 20, 2008 (EPA, 2008a). EPA commented that review of aerial photographs from 1998 and 2004 provided evidence that timber harvest and road construction in the watershed may influence temperature, and these conditions would need to be evaluated in more detail to determine whether anthropogenic activities had influenced stream temperature. EPA also commented on IDEQ’s suggestion to use the CWE model to evaluate natural conditions, as EPA had previously reviewed this model (USEPA, 2001), and determined that it was only acceptable to use in a very limited manner for TMDL purposes. EPA had never condoned its use in evaluating “natural conditions”. Since 2001 DEQ has discarded the use of CWE model for TMDL purposes, so it seemed inappropriate that it would be used for purposes of evaluating natural stream temperature conditions for Hem Creek. IDEQ’s reliance on CWE as part of their de-listing rationale was subsequently dropped, as described below.

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IDEQ provided the following response to EPA comments in their final 2008 list submission:

1997 and 1998 Beneficial Use Reconnaissance data applied in the Waterbody Assessment Guidance (WBAGII, Grafe, 2002), show the highest condition rating scores for the stream macroinvertebrate index, stream fish index, and stream habitat index (3.0). The condition category is above the 25th percentile of reference condition for this assessment unit. Additionally, macroinvertebrate samples were comprised of 22.7% obligate cold water bugs, and the Stream Fish Index contained 100% cold water fish (salmonids). Samples also included >150 Tailed Frog tadpoles, and Pacific Giant Salamanders. The Clearwater National Forest staff recommended Hem Creek as a reference stream for DEQ's Beneficial Use Reconnaissance Program monitoring.

Observation of human activities does not equate to a WQS violation.

Hem Creek is within the Clearwater National Forest and required to be managed by the Federal Inland Native Fish Strategy (INFISH) (USFS, 1995). INFISH is implemented to address excess heat loading regardless of original cause. INFISH could be considered equivalent to or meeting potential natural vegetation desired canopy cover.

DEQ is not citing CWE as a de-listing rationale. DEQ is stating that mandatory INFISH 300' setbacks are observed on the entirety of Hem Creek and those no entry setbacks achieve a far higher canopy closure than any PNV based TMDL could. Further DEQ is not stating that INFISH is a defacto WQS rather that this AU was evaluated *in the TMDL process and due to its extraordinarily high biological scores coupled with the 300' setbacks no action was deemed needed.*

DEQ maintains Hem Creek is fully supporting its beneficial uses and will be appropriately found in Section 2.

Federal requirements to evaluate de-listing from the 303(d) list

In order for impaired waters to be de-listed from the 303(d) list, the State must demonstrate a good cause to de-list (40 CFR 130.7(b)(6)(iv)). Specifically, in order for impaired waters to be de-listed from Category 5 of the 303(d) Integrated Report,

“each State must demonstrate good cause for not including a water or waters on the list. Good cause includes, but is not limited to, more recent or accurate data; more sophisticated water quality modeling; flaws in the original analysis that led to the water being listed in the categories in 130.7(b)(5); or changes in conditions, e.g., new control equipment, or elimination of discharges (40 CFR 130.7(b)(6)(iv)).”

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In addition, each State must provide

“A rationale for any decision to not use any existing and readily available data and information for any one of the categories of waters as described in 130.7(b)(5)”. (40 CFR 130.7(b)(6)(iii)

EPA also describes the interpretation of these regulations in the report, “Guidance for 2006 Assessment, Listing, and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act (USEPA, 2005a)”.

EPA's Evaluation of the Proposed Temperature De-listing of Hem Creek

To evaluate whether the proposed temperature de-listing is appropriate, EPA assessed the information DEQ provides to support the de-listing (40 CFR 130.7(b)(6)(iv).

IDEQ's Rationale for De-listing

Idaho used five lines of evidence in its Draft 2008 303(d) Integrated Report, Final 303(d) Integrated Report, and the Final Response to Comments to support its proposal to de-list Hem Creek for temperature.

In 2003, IDEQ completed the Upper North Fork Clearwater River Subbasin Assessment (SBA) and TMDLs (IDEQ, 2003). The SBA concluded that bull trout temperature criteria were not relevant to Hem Creek, but that data collected by the USFS did demonstrate exceedances of the salmonid spawning temperature criteria applicable to cutthroat trout from April through July in this waterbody (IDEQ, 2003; p. 63). IDEQ concluded that although exceedances occurred, temperature in Hem Creek represented natural conditions.

Although not explicitly stated, it is clear that IDEQ believes that temperature in Hem Creek is consistent with natural conditions provisions under IDAPA 58.01.02.200.09. In 2003, Idaho developed a guidance document to assist staff in implementing natural conditions provisions of the Idaho water quality standards (IDEQ, 2003). Sections of this document regarding evaluation of natural temperature conditions are referenced and repeated in IDEQ's 2008 Working Principles and Policies for the 303(d)/305(b) Report (IDEQ, 2008b). While these sections of Idaho's natural conditions guidance and listing policies are not referenced in IDEQ's rationale for de-listing Hem Creek, EPA considered recommendations in this guidance in assessment of IDEQ's de-listing rationale.

The following are the main points in IDEQ's rationale as to why temperature conditions are natural, and EPA's review comments:

- 1. Hem Creek has the least temperature criteria exceedances of any stream in the Upper North Fork Clearwater River (UNFCR) subbasin.***

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EPA agrees that Hem Creek may have fewer temperature criteria exceedances than other streams in the UNFCR subbasin. However, it is unclear how this comparison relates to IDEQ policy or applicable water quality standards regarding natural conditions. A key provision of Idaho's listing policy is that in order for a water to be eligible for evaluation of natural conditions, "... there must be a continuous record showing < 10% exceedance of IDEQ's temperature criteria ..." (IDEQ, 2008b; p. 27). Data presented in the UNFCR SBA demonstrate > 10% exceedance of the cutthroat spawning criteria in years when sufficient data are available (1997, 1998). In addition, this pattern of >10% exceedances is repeated in data readily available from the USFS (USFS, 2008a) for the years 1994, and 2000 – 2007 (See Attachment A). The pattern of criteria exceedances appears to preclude further evaluation of the waterbody for natural conditions provisions, according to IDEQ's listing policy. Although Idaho's listing policy suggests it is not appropriate to evaluate Hem Creek for natural conditions provisions, EPA considered other information presented by IDEQ regarding natural conditions.

Idaho's comparison of Hem Creek to other UNFCR watersheds, many of which are heavily managed, does not provide any direct evidence that temperatures in Hem Creek are natural. Timber harvest activity (logging, road construction) has been extensive throughout most of the other waterbodies evaluated in the subbasin, with 20% – 60% of timber harvested in many watersheds (IDEQ, 2003). Because these other watersheds have significant anthropogenic impacts, it is unclear whether the less frequent temperature exceedances in Hem Creek are because temperature conditions are natural, or simply because temperature has been increased in the other comparison watersheds due to timber harvest related activities. A more informative evaluation might be to compare Hem Creek to a similar watershed with no management history, or to directly evaluate the effects of timber harvest and road construction activities which have occurred in Hem Creek.

2. Only a small amount of logging has occurred in the watershed, and no shade was removed from the Stream Protection Zone

EPA agrees with the first part of this statement, that only a small amount of logging has occurred in the watershed. Data readily available from the USFS indicate that only 7.3% of the watershed has been logged (USFS, 2008b). In general, this falls below Idaho's recommended screening threshold of 20% (IDEQ, 2003); a point at which hydrologic changes resulting from timber harvest may begin to affect stream temperature. However, the location where this harvest occurred is important, and warrants further evaluation.

Idaho's statement that no shade was removed from the SPZ (stream protection zone) is somewhat ambiguous since they do not define the SPZ width. EPA compiled aerial photos of Hem Creek, and evaluated timber harvest proximity to Hem Creek in Attachment B. As can be seen from Figures 3 and 4, timber harvest was evident in the 1998 and 2004 photos in the lower watershed, and appears to be near the stream channel in some locations.

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In evaluating whether a waterbody is in a natural condition, Idaho's natural conditions guidance provides the following recommendations, including a recommendation regarding proximity of harvest to stream channels, as follows:

1. No forest harvest impinges riparian areas¹;
2. No riparian roads are present and few road crossings exist; and
3. No evidence of sources of sediment delivery that are associated with road fills or timber cuts, and
4. No water withdrawals are present;

then, stream temperature may be presumed to be natural.

IDEQ provides further clarification regarding the first criteria in Footnote 1, essentially establishing 300' as the minimum riparian zone width. A 300' setback distance line has been overlaid in red on Figures 3 and 4 in Attachment B to help evaluate this guideline. It is apparent that timber harvest occurred some time in the past well within the 300' setback distance both on the mainstem of Hem Creek, and on a small tributary to the south. This finding is further supported by data readily available from the USFS (USFS, 2008b), which states that harvest occurred within the 300' buffer along 1.4 miles of Class 1 (fish bearing) streams in the Hem Creek watershed. This represents 39% of all fish bearing stream miles in the watershed².

In summary, EPA believes that only a small amount of logging has occurred in the watershed. However, some of the logging is located within the riparian zone as defined in IDEQ's guidance as a 300' setback distance, and at times has been very close to Hem Creek and tributaries based on air photo analysis. Idaho's natural condition guideline for evaluating harvest impacts specifies no harvest within a 300' setback distance. According to the USFS, harvest has occurred within this buffer zone in 39% of fish bearing stream miles, which is evidence that this guideline is not met. A more detailed evaluation of shade loss due to harvest activities is described below.

¹ For this purpose, for fish-bearing streams riparian areas are recommended as consisting of the Stream and the area on either side of the stream to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of the two site-potential trees, or to a 300 feet slope distance extending to both sides of the stream channel, whichever is greatest. Tributaries are recommended to have similar definitions except that widths would be less, depending if they were permanent, non-fish bearing streams or intermittent streams. Recommended widths were taken from USFS (1995). Because in this context, intact riparian widths are recommended as one factor in a rebuttable presumption of natural stream conditions, these riparian width recommendations are broad. While narrower riparian widths may in some cases be sufficient for natural stream conditions, that should not be presumed and would need to be demonstrated on a case specific basis.

² Calculated as the product of (1) 1.4 miles of "Impacted" stream miles (amount of miles within the impacted buffer zones) (2) divided by 3.63 miles of Class 1 streams in the basin.

Additional shade-impact analysis conducted by EPA

To further evaluate the potential impact of clearcut and thinning harvest areas, EPA analyzed air photos and conducted a modeling analysis, as described in Attachment B. Riparian disturbance in forested conditions can lead to water quality changes, including (but not limited to) sediment delivery changes, sediment transport changes through changing hydrography, and temperature load changes through reduction of shade conditions. Previous research has shown that reduced riparian shade often results in increases in river/stream temperature conditions.

The impacts of harvest were evaluated using shade modeling and GIS sampling tools developed by Washington and Oregon, respectively. Assumptions used in the analysis are presented in Table 2, Attachment B. The results of the analysis, shown in Figure 7, illustrate that several areas within the lower reach of Hem Creek may have reduced shading resulting from harvest activities. While some areas appear un-impacted, other areas may have reductions in shade of up to or greater than 20%. In addition to not meeting IDEQ's riparian harvest guideline, impacts to stream temperature due to the loss of shade from harvest are probable based on stream heating dynamics described in the paragraph above, and therefore Hem Creek temperature conditions cannot be considered to be "natural".

3. Biological scores were very high in sampling conducted in Hem Creek.

EPA agrees that macroinvertebrate, fish and habitat scores in samples from Hem Creek were high as evaluated via Idaho's Waterbody Assessment Guidance (WBAG) process (IDEQ, 2002). Idaho uses this information to evaluate the beneficial use portion of Idaho's water quality standards. Idaho's temperature criteria and natural conditions provisions of the water quality standards apply independently of the beneficial use provisions of the standards. Both beneficial use and criteria portions of the standards must be met. Idaho's WBAG recognizes this independent applicability, and considers criteria violations as a first step in determining the support status of a waterbody. If numeric criteria (including temperature) are exceeded (with consideration of the 10% exceedance policy), a water body is considered to be not fully supporting and subject to 303(d) listing, regardless of the outcome of biological, physicochemical and habitat data (See Figure 6.2, IDEQ 2002). While it is encouraging that biological scores are high, they do not over-ride temperature criteria exceedances, nor provide direct evidence that stream temperature conditions are natural.

4. The Clearwater National Forest Recommended Hem Creek as a reference stream for BURP monitoring.

EPA agrees that management does not appear to have occurred in the upper portions of Hem Creek, and upper Hem Creek could be considered as a reference stream. However, anthropogenic activity in the lower portion of the watershed which could affect stream shade is evident. While EPA acknowledges that the USFS may have recommended Hem Creek as a BURP monitoring reference site, this recommendation

does not provide any specific information about whether existing timber harvest and road construction have affected stream temperature.

5. *INFISH applies and is equivalent to meeting a natural vegetation canopy cover, since it results in “no entry” 300’ stream setbacks.*

INFISH (Inland Native Fish Strategy) are a set of interim guidelines established in 1995 for management of federal lands within the Columbia basin for protection of resident native non-anadromous aquatic fish (USFS, 1995). These guidelines provide specific protections for riparian habitat conservation areas (RHCAs) intended to protect aquatic species. In particular, the provision IDEQ refers to establishes setback distances within which activities such as timber harvest, road construction, etc. are very limited³. For fish bearing streams, the setback distance is 300’, and the setback is 150’ for permanently flowing non-fish bearing streams.

EPA agrees that the Clearwater National Forest is currently managing these lands utilizing INFISH riparian standards and guidelines, and we fully support these prescriptions. EPA agrees that over time this management strategy could result in relatively natural vegetation levels along Hem Creek as trees and other vegetation re-grow, although it would likely take many decades to restore a mature vegetative state where harvest and road construction has occurred. However, these guidelines do not change the impact of harvest which has already occurred, some of which is within the INFISH setbacks, as is evident in photos and USFS documentation described above. While we fully agree that use of INFISH and other similar riparian protections are very beneficial approaches to help the watershed recover from past harvest, they do not have any bearing on whether the current condition of stream temperature is natural.

EPA evaluation of good cause for de-listing

EPA also considered IDEQ's basis for proposed de-listing in the context of federal regulations pertaining to good cause for listing (40 CFR 130.7(b)(6)(iv)), which read as follows:

“...each State must demonstrate good cause for not including a water or waters on the list. Good cause includes, but is not limited to, more recent or accurate data; more sophisticated water quality modeling; flaws in the original analysis that led to the water being listed in the categories in 130.7(b)(5); or changes in conditions, e.g., new control equipment, or elimination of discharges...”

1. *More recent or accurate information.* Hem Creek was originally listed for temperature in Idaho's 2002 list, which was approved by EPA in 2005. Idaho does not present any

³ For example, with limited exceptions, timber harvest is prohibited within 300’ of fish bearing streams, 150’ of permanently flowing non-fish bearing streams, etc. Other restrictions regarding roads, recreation minerals management and other activities also apply.

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new or more accurate data than was available at that time in their de-listing rationale. However, it appears that information discussed in their rationale (lines of evidence 1- 5 above) may not have been thoroughly reviewed or considered at the time Hem Creek was included on the list in 2002 (no such review can be found in the record for the 2002 list). EPA has reviewed IDEQ's five lines of evidence above, and has concluded that they do not constitute good cause for de-listing, either individually, or as a whole.

Additional readily available temperature data, management history information, and air photo documentation of management history was compiled by EPA. The temperature data confirms that temperature exceeds salmonid spawning criteria in Hem Creek, as explained above. In addition, air photos indicate that timber harvest and road construction has occurred in lower Hem Creek which has likely reduced shade, which can result in stream temperatures which are not natural. This additional information does not support the conclusion that Hem Creek meets Idaho's temperature criteria or natural conditions provisions, and therefore does not constitute good cause for de-listing.

2. *More sophisticated water quality modeling.* Idaho did not rely on modeling in its original listing of Hem Creek, or propose new modeling to justify de-listing. To support review of Idaho's proposed de-listing, EPA conducted additional modeling of the impact of timber harvest on stream shade, as described in Attachment B. These results indicate that stream shade in the lower reaches of Hem Creek has likely been reduced as a result of timber harvest, and may have resulted in temperature conditions which are not natural. This additional modeling does not support the conclusion that stream temperatures in Hem Creek are natural, and does not constitute good cause for de-listing.

3. *Flaws in the original analysis that led to the water being listed in the categories in 130.7(b)(5).* Hem creek was initially listed for temperature in Idaho's 2002 303(d) list, which was submitted to EPA on July 23, 2004. Idaho's publicly accessible assessment database documenting assessment and listing information for 2002 identifies the coldwater biota beneficial use as being fully supported and the salmonid spawning beneficial use as not being fully supported, with thermal modifications (i.e. temperature) as the pollutant (see Attachment C). The Upper North Fork Clearwater SBA is identified as a reference document. Under Assessment Comments, the following information is provided:

Assessment is based on 97, 98 burp data. AU within a roadless area, and is a federally protected bull trout watershed. USFS temp data indicate this AU does not meet the federal bull trout water temperature standard. E. coli results = 8/100 ml.

It appears that there were flaws in the assessment statements noted above. First, Hem Creek is not identified in EPA's list of waters for which federal bull trout criteria apply⁴, and therefore the federal bull trout water temperature standard is not applicable. Second, the assessment statement fails to mention that Hem Creek did not meet the Idaho salmonid spawning criteria for cutthroat trout, as was documented in the Upper North

⁴ See 40 CFR 131.33(a)(2)(xxxv), waters within the Upper North Fork Clearwater Basin protected for bull trout spawning and rearing.

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Fork Clearwater SBA, referenced in the assessment. While it appears that it was a mistake to reference non-compliance with the federal bull trout criteria as a basis for 303(d) listing in 2002 for temperature, it was also an error to overlook salmonid spawning temperature criteria violations, available at the time, which would have been a basis for 303(d) listing. Consequently, these flaws cannot be considered a good cause basis for de-listing Hem Creek for temperature in 2008.

4. *Changes in conditions, e.g., new control equipment, or elimination of discharges.* Idaho did not present any information that conditions have changed or that sources of heat loading had been eliminated. Temperature data collected by the USFS during 2000 - 2007 indicates that the temperature conditions, i.e. salmonid spawning criteria exceedances, have not changed since 1999, the most recent data cited in the UNFCR SBA and de-listing rationale. Consequently, there is no evidence that conditions have changed or that heat loading sources have been reduced such that Hem Creek complies with temperature criteria or natural conditions provisions of Idaho water quality standards.

EPA evaluation of “existing and readily available information” requirements

In its de-listing rationale provided with the final 2008 303(d) list, Idaho referred to temperature data in the UNFCR Subbasin assessment and TMDL for the years 1996 - 1999. However, Idaho did not consider additional temperature data for the years 1994, and 2000 - 2007, which are readily available from the USFS. These data demonstrate that temperature criteria were exceeded in each of these years in Hem Creek, considering the State's 10% exceedance and minimum data records policies. While the bulk of IDEQ's rationale focuses on whether temperature conditions in Hem Creek are natural, it appears Idaho did not fully consider readily available data regarding more recent temperature measurements.

Conclusion

EPA reviewed IDEQ's de-listing rationale in the context of “good cause” provisions for de-listing established under 40 CFR 130.7(b)(6)(iv). Our review has concluded that none of the four good cause provisions are supported by rationale provided by IDEQ, by data available from the USFS, or by additional analysis conducted by EPA.

EPA also considered federal requirements under 40 CFR 130.7(b)(5) which indicates that States must consider all existing and readily available data and information in making listing decisions. EPA's review found that Idaho did not fully consider existing information available from the USFS which consistently documents exceedances of temperature criteria.

Finally, EPA reviewed Idaho's rationale that stream temperatures and criteria exceedances are natural, and therefore consistent with Idaho water quality standards. Our finding is that the rationale does not support the conclusion that stream temperatures are natural, nor is it consistent with IDEQ listing policies regarding natural conditions, as

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provided in the Final Department of Environmental Quality Working Principles and Policies for the 303(d)/305(b) (IDEQ, 2008b), and therefore de-listing of temperature for Hem Creek is not consistent with Idaho water quality standards.

Recommendation

It is recommended that EPA not approve IDEQ's proposal to de-list Hem Creek for temperature, and that Hem Creek should remain in Category 5 of the Idaho 2008 Integrated Report for temperature.

References

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IDEQ, 2005. Principles and Policies for the 2002 Integrated (303(d)/305(b)) Report. Idaho Department of Environmental Quality. September 30, 2005.

IDEQ, 2008a. Draft Department of Environmental Quality Working Principles and Policies for the 303(d)/305(b) Report. Idaho Department of Environmental Quality. January 2008.

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USEPA, 2001. Letter from Christine Psyk, EPA Region 10, to David Mabe, Idaho Department of Environmental Quality, Re: Approach for developing temperature Total Maximum Daily Loads (TMDL) for Idaho waterbodies on 303(d) List. October 12, 2001.

USEPA, 2005a. Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b), and 314 of the Clean Water Act. July 29, 2005.

USEPA 2005b. Letter from Michael F. Gearheard, EPA Region 10, to Barry N. Burnell, Idaho Department of Environmental Quality, Re: Approval of Idaho State Final Integrated Report 2002 (303(d) List and 305(b) Report) submitted for approval July 23, 2004. December 20, 2005.

USEPA, 2006. Memorandum from Diane Regas re: Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. October 12, 2006.

USEPA, 2008. Letter to Michael McIntyre, Surface Water Quality Division, IDEQ, from David Croxton, Watershed Unit Manager, EPA re: U.S. Environmental Agency (EPA) Comments on Idaho's Draft 2008 Integrated Report. February 20, 2008.

Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek

USFS, 1995. Inland Native Fish Strategy Environmental Assessment. Decision Notice and Finding of No Significant Impact. USFS. Intermountain, Northern, and Pacific Northwest Regions. July 28, 1995.

USFS, 2008a. Hem Creek temperature data provided in an Excel file as an email attachment by Patrick Murphy, Forest Fisheries Biologist, Clearwater National Forest. November 24, 2008.

USFS, 2008b. Hem Creek Watershed – 17060307070203. Harvesting and road impact statistics. Provided as an email attachment by Patrick Murphy, Forest Fisheries Biologist, Clearwater National Forest. December 2, 2008.

ATTACHMENT A

Hem Creek - USFS Temperature Data

1994 to 2007

	# days T recorded during cutthroat spawning window (April 1 - July 31)	% measurements exceeding daily average of 9° C	% measurements exceeding daily max. of 13°C
1994	51	71	67
1996	14	79	57
1997	37	19	0
1998	31	100	84
1999	12	75	25
2000	41	63	46
2001	41	80	54
2002	54	41	35
2003	63	49	41
2004	73	49	32
2005	75	48	39
2006	73	51	44
2007	61	64	77

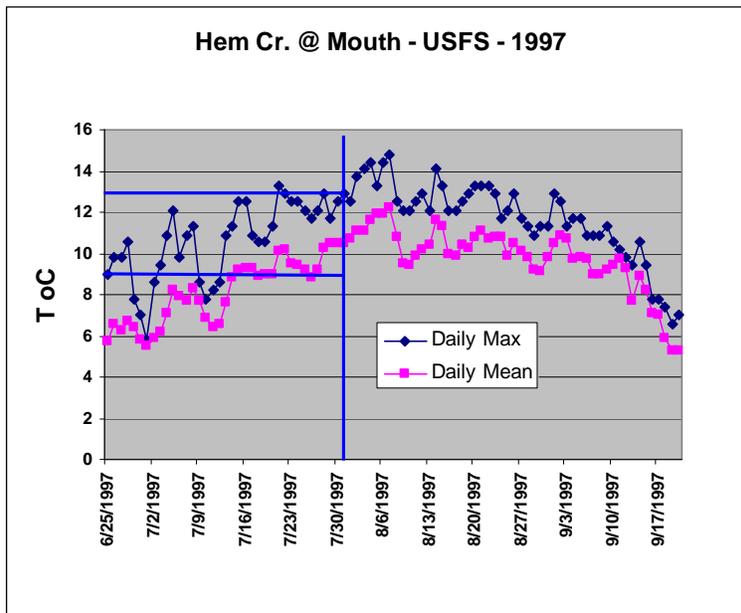
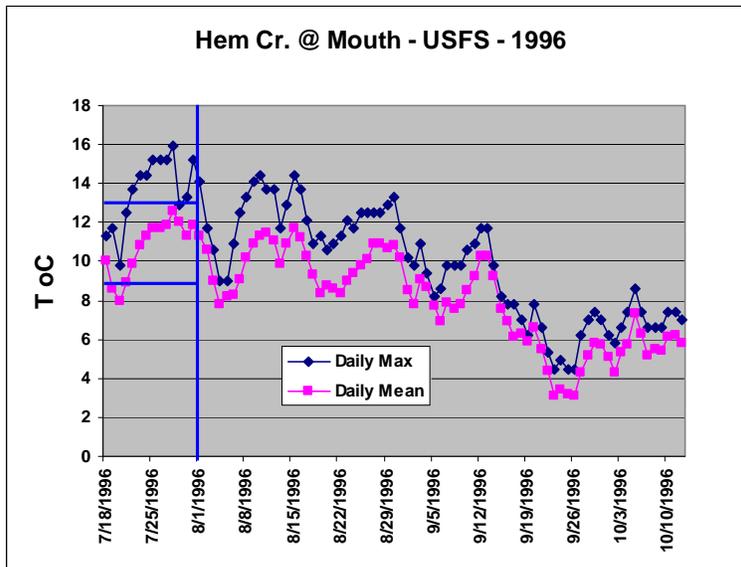
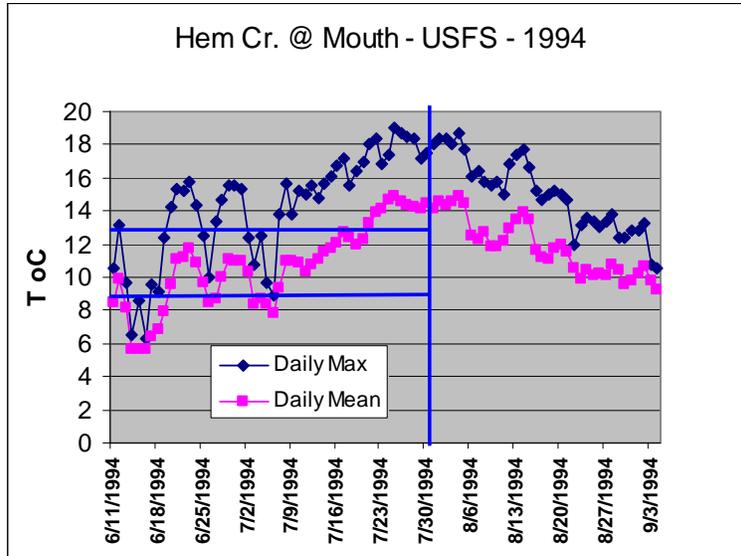
Data provided electronically by Patrick Murphy, USFS Fisheries Biologist, Clearwater National Forest. November 24, 2008.

Footnotes:

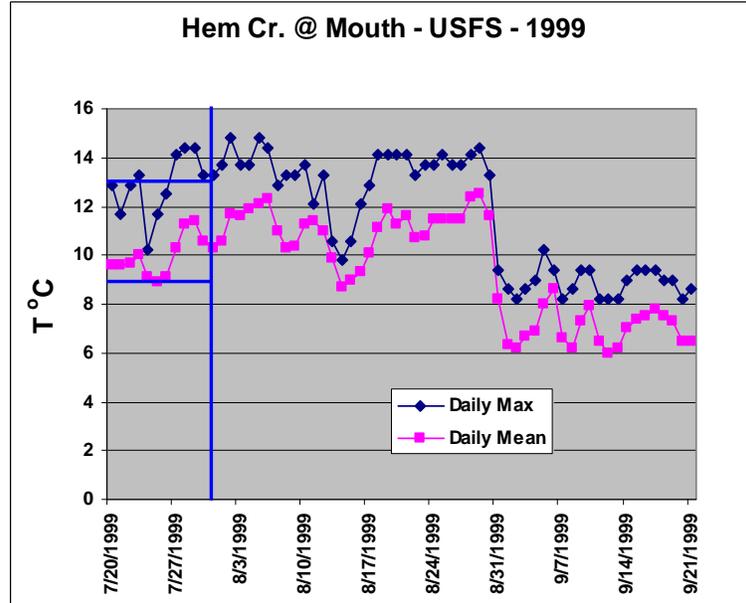
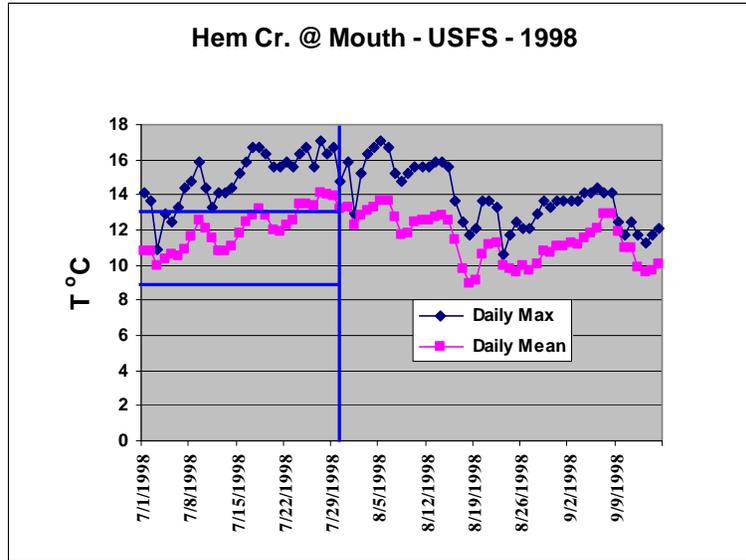
Daily average and daily maximum measurements were compared to Idaho criteria of 9°C and 13°C respectively to determine if >10% of measurements exceed criteria, per IDEQ policy.

Two years (1996, 1999) have <22 days of data within the warmest portions of the cutthroat spawning period, therefore there is insufficient data to evaluate criteria exceedances in these years, according to IDEQ policy.

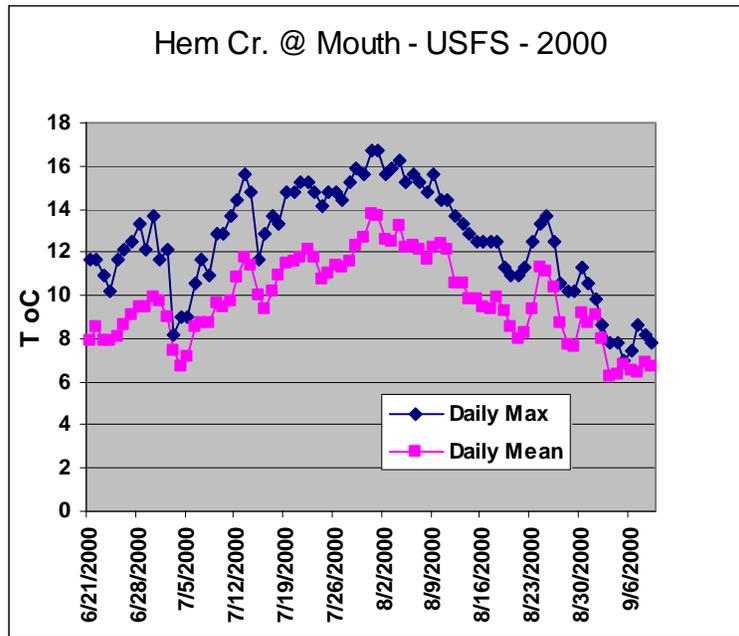
Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek



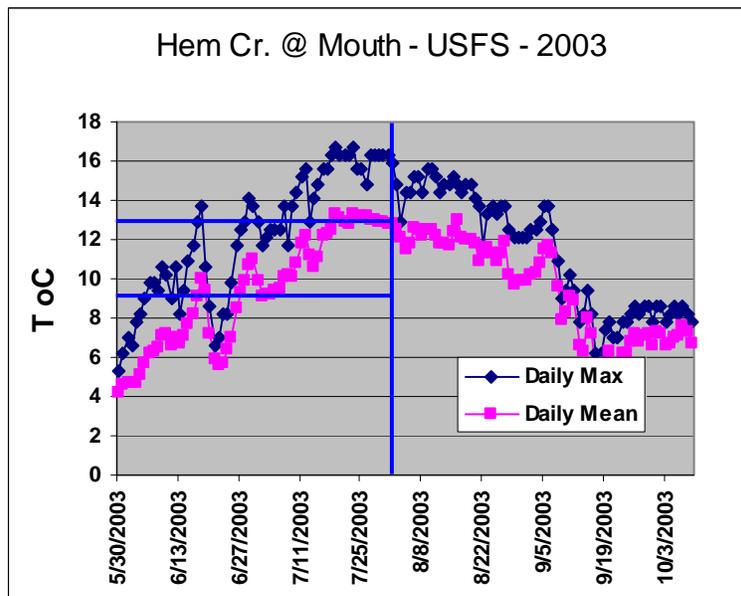
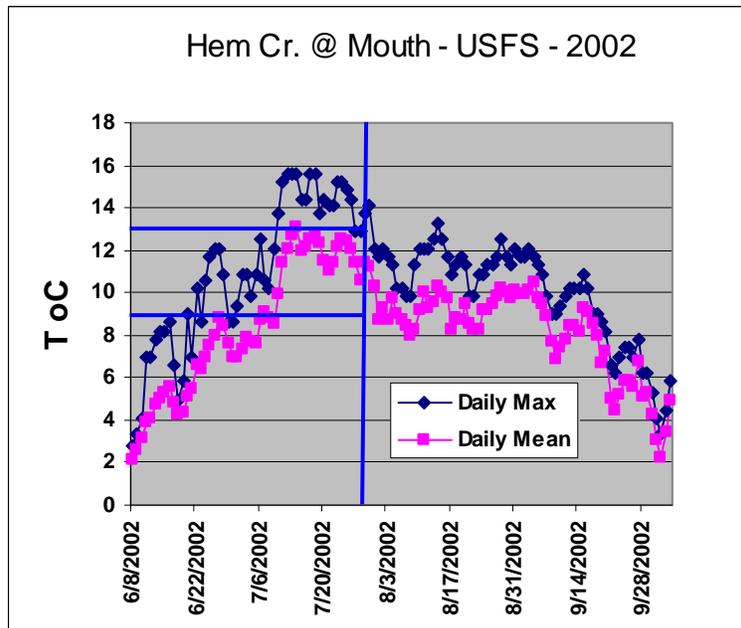
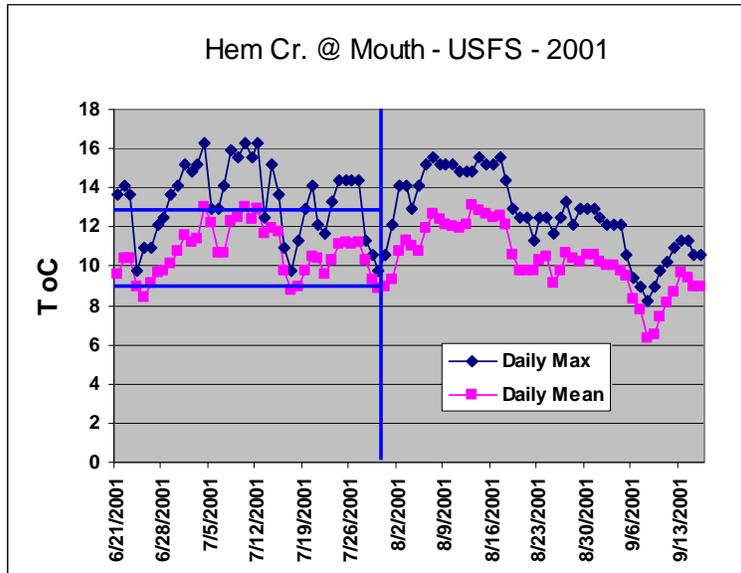
Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek



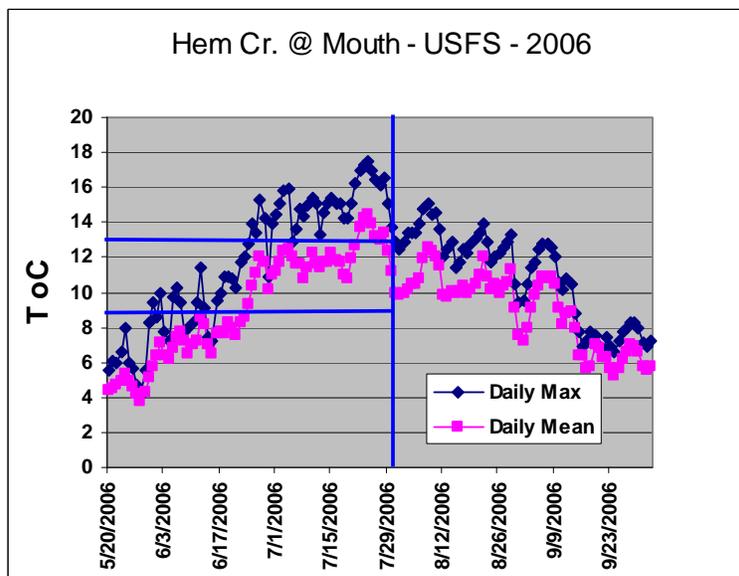
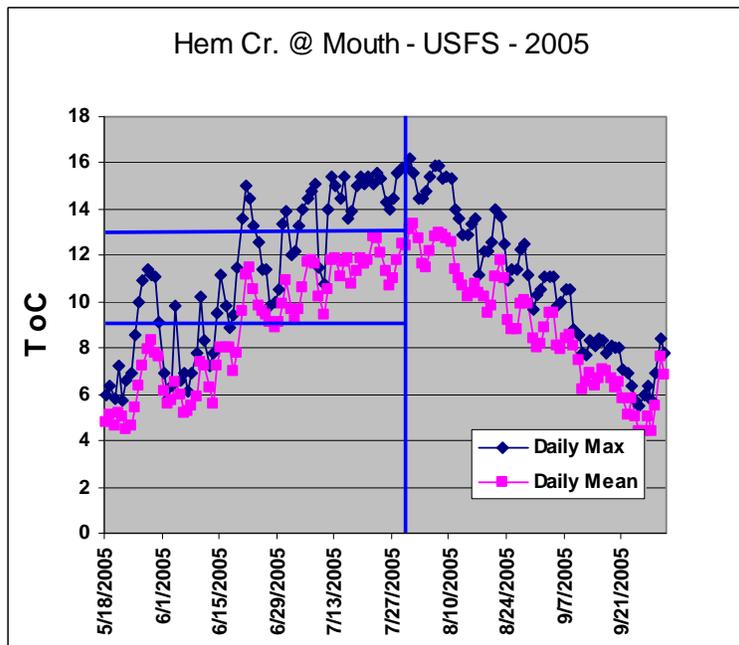
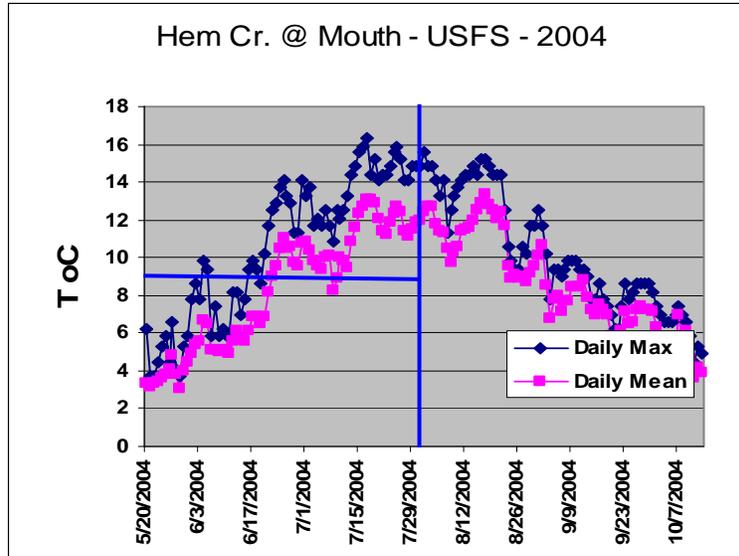
Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek



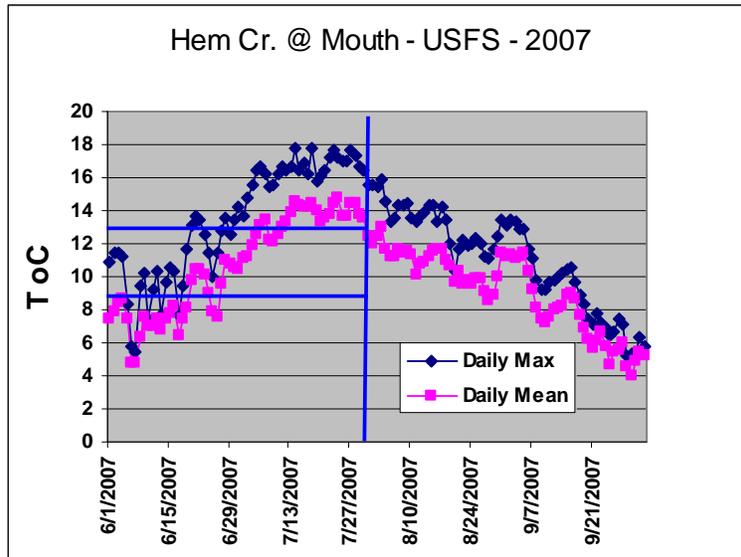
Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek



Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek



Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek



Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek

Memorandum**December 12, 2008****To:** File**From:** Peter Leinenbach, USEPA Region 10**Subject:** Description of current conditions for Hem Creek Idaho.

The watershed area for Hem Creek is illustrated in **Figure 1**. In addition, the topographic (i.e., "hill shade") relief for this watershed is illustrated in this image. Several clearcut harvest and thinning harvest areas have occurred in the lower portions of this watershed (**Figure 2**). Road building in support of these harvest activities has also occurred in this lower portion of the watershed.

Table 1 presents a summary statistics for the Hem Creek watershed developed by the Clearwater National Forest (CWNF) staff. This table shows that road development occurred in 1982, and forest harvest soon followed. Locations of these harvest activities are illustrated in **Figures 3, 4, 5, and 6**. These images show that harvest activities continue in this basin¹. In addition, these figures show that harvest has occurred within a 300 foot buffer of the stream. Similarly, the CWNF reported that 52.1 acres in this basin have been harvested within the stream buffer (300 foot) (See **Table 1**). In addition, the CWNF indicated that 39%² of "Class 1" stream miles in this basin have buffer conditions which are "impacted" by harvest activities.

Riparian disturbance in forested conditions can lead to water quality changes, including (but not limited too) sediment delivery changes, sediment transport changes (through changing hydrography), and temperature load changes (through reduction of shade conditions). Previous research has shown that reduce riparian shade conditions often result in increases river/stream temperature conditions. It is important to note that data collected on this river has shown that temperature conditions are above the water quality criteria (described in another document). Accordingly, a quick analysis was developed in order to determine if harvest activities along Hem Creek mainstem could have a "potential" to reduce stream shade conditions (**Table 2**). Results from this analysis indicated that areas along the mainstem Hem Creek may have lower shade conditions as a result of the historic riparian harvest (**Figure 7**).

¹ The CWNF analysis appears to represent approximately 1994 conditions. Harvest has occurred in the basin since this time (see Figure 3 and 4).

² Calculated as product of (1) 1.4 miles of "Impacted" stream miles (amount of miles within the impacted buffer zones) (2) divided by 3.63 miles of Class 1 streams in the basin.

Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek

Figure 1. Watershed boundary and topographic relief for the Hem Creek Watershed.
[Yellow line represents the watershed boundary and thick blue line is the Hem Creek mainstem.]

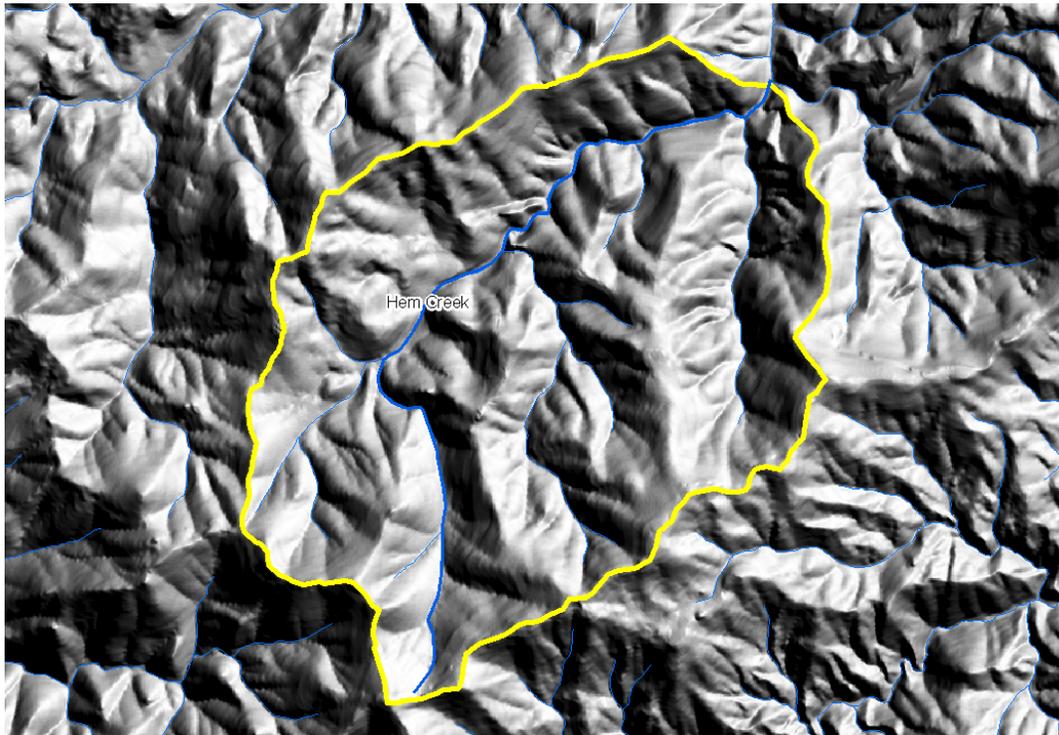
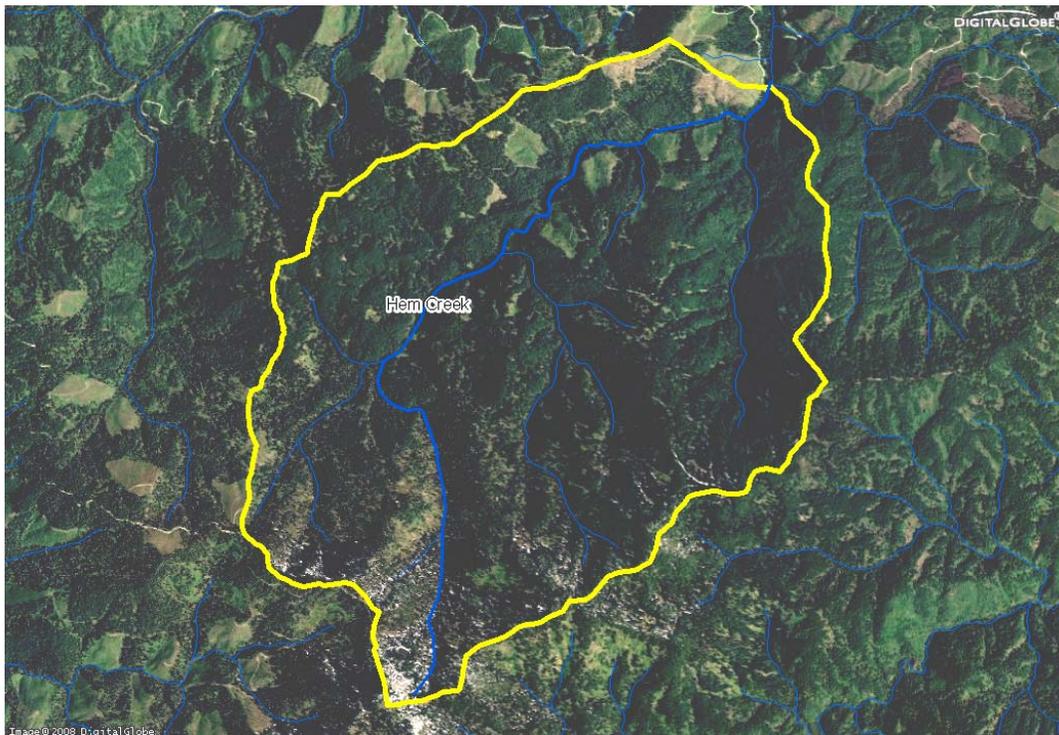


Figure 2. 2004 Photograph of the Hem Creek Watershed.



Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek

Table 1. Summary statistics calculated by the CWNF for the Hem Creek watershed.

Hem Creek Watershed - 17060307070203	
Harvesting and road impact statistics	
• Watershed Size:	4723 acres
• Stream Habitat:	20.2 miles of streams (GIS layer mileage)
Class 1:	3.63 miles
Class 2:	16.58 miles
• Harvested Acreage:	347.7 acres (7.3%)
Clearcut:	200 ac.
Partial Cut:	147.7 ac. (no more than 24% standing volume harvested)
• Impacted Buffers (amount of acres of harvest within the buffers)¹	
Within Clearcuts:	18.4 acres class 1 9.1 acres class 2
Within Partial Cuts:	16.8 acres class 1 7.8 acres class 2
• Impacted stream miles (amount of miles within the impacted buffer zones)	
Class 1:	1.40 miles
Class 2:	0.53 miles
• Miles of Roads: 9.67 miles	
Class 1 crossings:	1 (Hem Creek)
Class 2 crossings:	2
• Harvest Years:	1985-86, 1994
• Road Construction:	1982 (1930 for the 547 road)

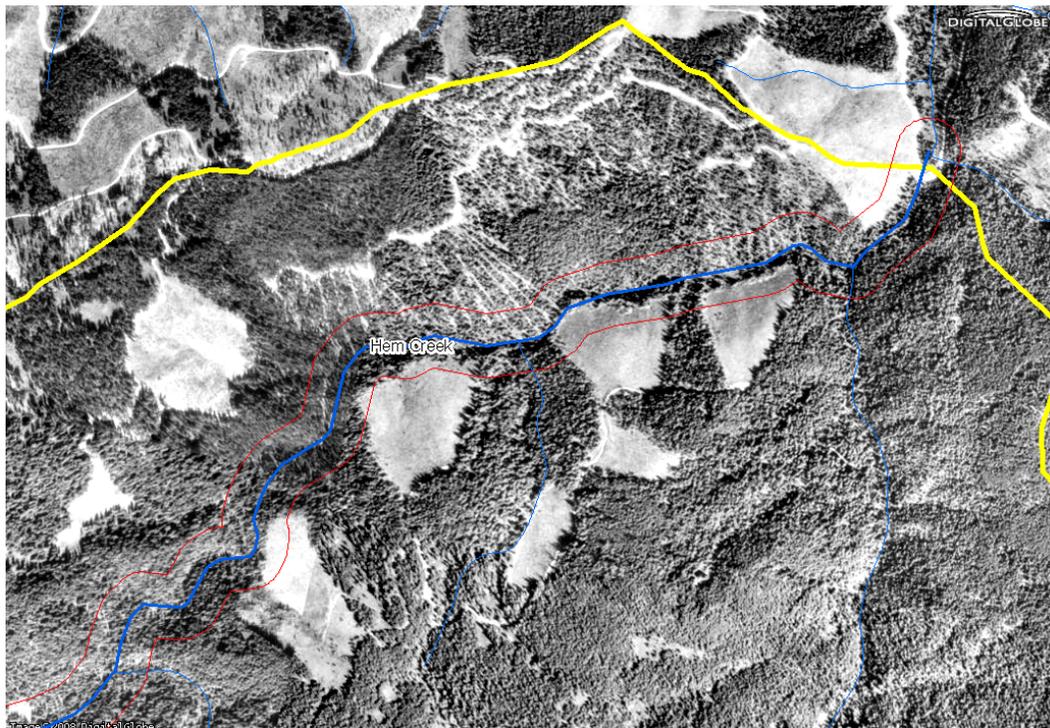
1 – No harvest occurred directly along the class 1 stream channels. Only within the 300 foot buffer

Enclosure 3: EPA Review of Idaho's Delisting Rationale for Hem Creek

Figure 3. 2004 Photograph of the Lower Hem Creek Watershed.
[Red line represents a 300 foot buffer from the Hem Creek mainstem.]



Figure 4. 1998 Photograph of the Lower Hem Creek Watershed.
[Red line represents a 300 foot buffer from the Hem Creek mainstem.]



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Figure 5. Harvest areas the Lower Hem Creek Watershed – 2004 Image.
[Purple polygons are thinning harvest areas and yellow polygons are clearcut harvest areas.]

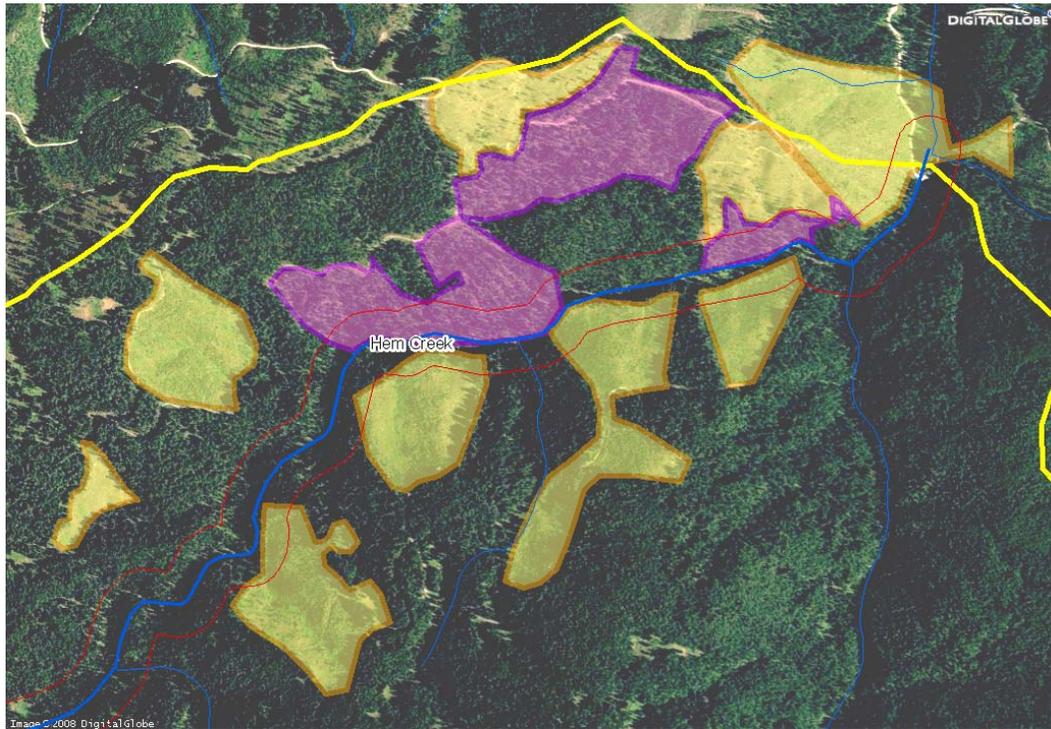


Figure 6. Harvest areas the Lower Hem Creek Watershed – 1998 Image
[Purple polygons are thinning harvest areas and yellow polygons are clearcut harvest areas.]

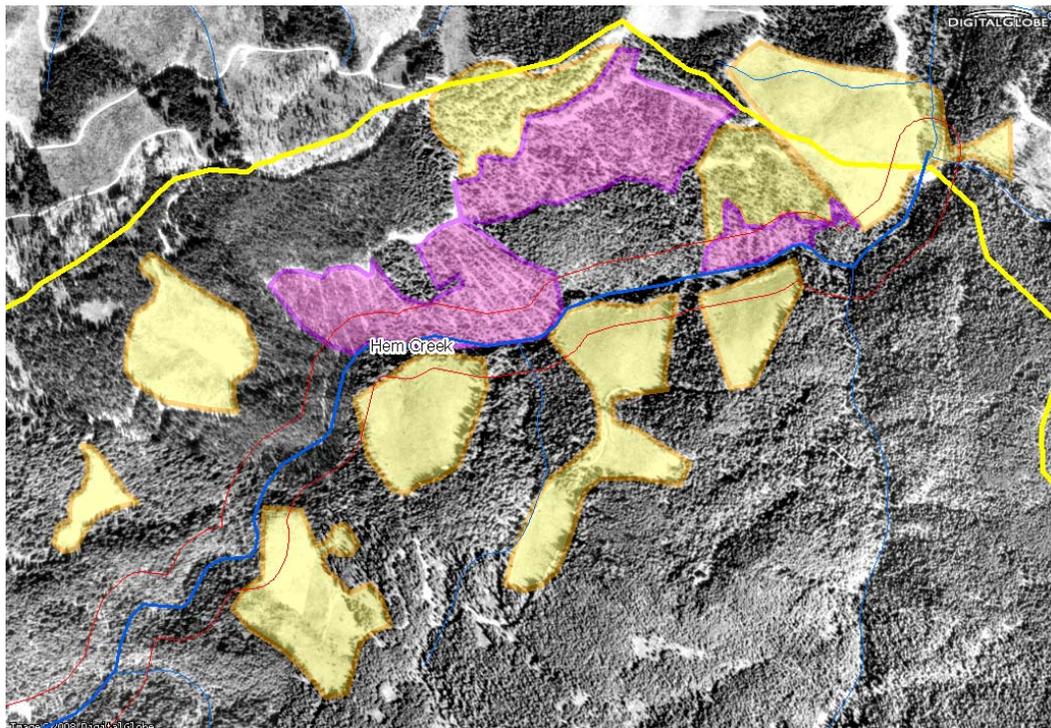
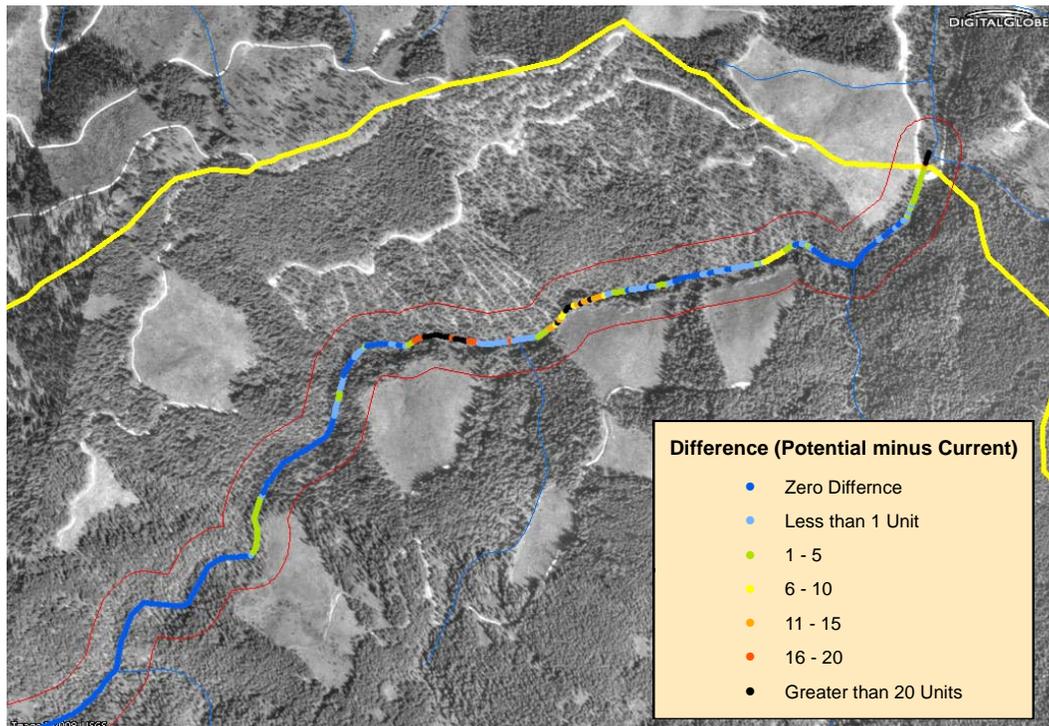


Table 2. Model Description

- Models/Sampling Tools – Obtained “shade” model from Washington Department of Ecology webpage - www.ecy.wa.gov/programs/eap/models.html. Obtained GIS sampling tool from Oregon Department of Environmental Quality webpage - www.deq.state.or.us/wq/TMDLs/tools.htm.
- Input Data – High resolution stream layer (NHD), 10 m Digital Elevation Model, Harvest Area dataset (see Figures 5 and 6).
- Sampling and Analysis Methods – Assumptions (1) forest vegetation was 80 feet tall and 60% canopy cover, (2) thinning forest vegetation condition was 80 feet tall and 40% canopy cover, (3) clearcut areas were 5 feet tall and 80% canopy cover, and (4) stream channel was 30 feet wide. Ran the model for current conditions, and then ran the model for a “potential” vegetation conditions (i.e., change all vegetation to the “forest” condition which is presented above). **Figure 7** illustrates the product of potential model run results minus the current model run results. These results should not be viewed as absolute values, but rather as a relative risk of potential change in shade conditions along the mainstem Hem Creek. In other words, although there is uncertainty, these results indicate that several areas may have reduced shade levels.

Figure 7. Estimated Shade Reduction along Lower Hem Creek.
[Red line represents a 300 foot buffer from the Hem Creek mainstem.]



ATTACHMENT C

**SUBBASIN
17060307 - Upper North
Fork Clearwater**

Assessment Unit Status Report 2002

**ASSESSMENT UNIT ID: ID17060307CL007_02b
Segment Name: Hem Creek
Segment Type: River
Segment Size: 9.96 Miles**

Beneficial Uses	Status
Aquatic Life Use -- Cold	Fully
Aquatic Life Use --SS	Not supporting
Secondary Contact (Recr)	Fully
Agriculture	Not assessed
Industrial Water Supply	Not assessed
Wildlife Habitats	Not assessed
Aesthetics	Not assessed

Assessment Date: 06/16/2002

Pollutants

Thermal modifications

Monitoring Methods

BIOLOGICAL MONITORING
HABITAT ASSESSMENT
PATHOGEN MONITORING
Idaho WBAGII (January 2002) using BURP data

Document Name

UpNF SBA es
UNF TMDL Executive Summary
UNF CL TMDL

Document File

UperNFCWTMDLExecSum.doc
UNF CL TMDL ExecSum.doc
UNF temptmdl.doc

Monitoring Sites 1993 - 2003

SITE ID	Stream	Elevation (ft)	Latitude	Longitude
1997SLEWA028	Hem Creek	4042	46 31 26.48	-115 36 12.67
1998SLEWB026	Hem Creek	4075	46 31 24.09	-115 36 25.70

Monitoring Results for Reporting Years 1997 - 2000

SITEID	Stream	SMI	SMIScore	SFI	SFI Score
1997SLEWA028	Hem	79.92	3	82.66	3

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1998SLEWB026	Creek Hem Creek	79.33	3	99.5	3
SITEID 1997SLEWA028	Stream Hem Creek	SHI 77	SHIScore 3	SMIBioRegion No.Mtns.	
1998SLEWB026	Hem Creek	74	3	No.Mtns.	
SITEID 1997SLEWA028	Stream Hem Creek	SHIBioRegion No.Mtns	SFIBioRegion Forested	AVGScore 3	
1998SLEWB026	Hem Creek	No.Mtns	Forested	3	

ASSESSMENT UNIT	CONDITION RATING	STATUS
ID17060307CL007_02b	3	PASS

Assessment Comments

Assessment is based on 97,98 burp data. AU within a roadless area, and is a federally protected bull trout watershed. USFS temp data indicate this AU does not meet the federal bull trout water temperature standard. E. coli results= 8/100 ml

Segment Comments

Hem Creek is on the 303(d) list.
