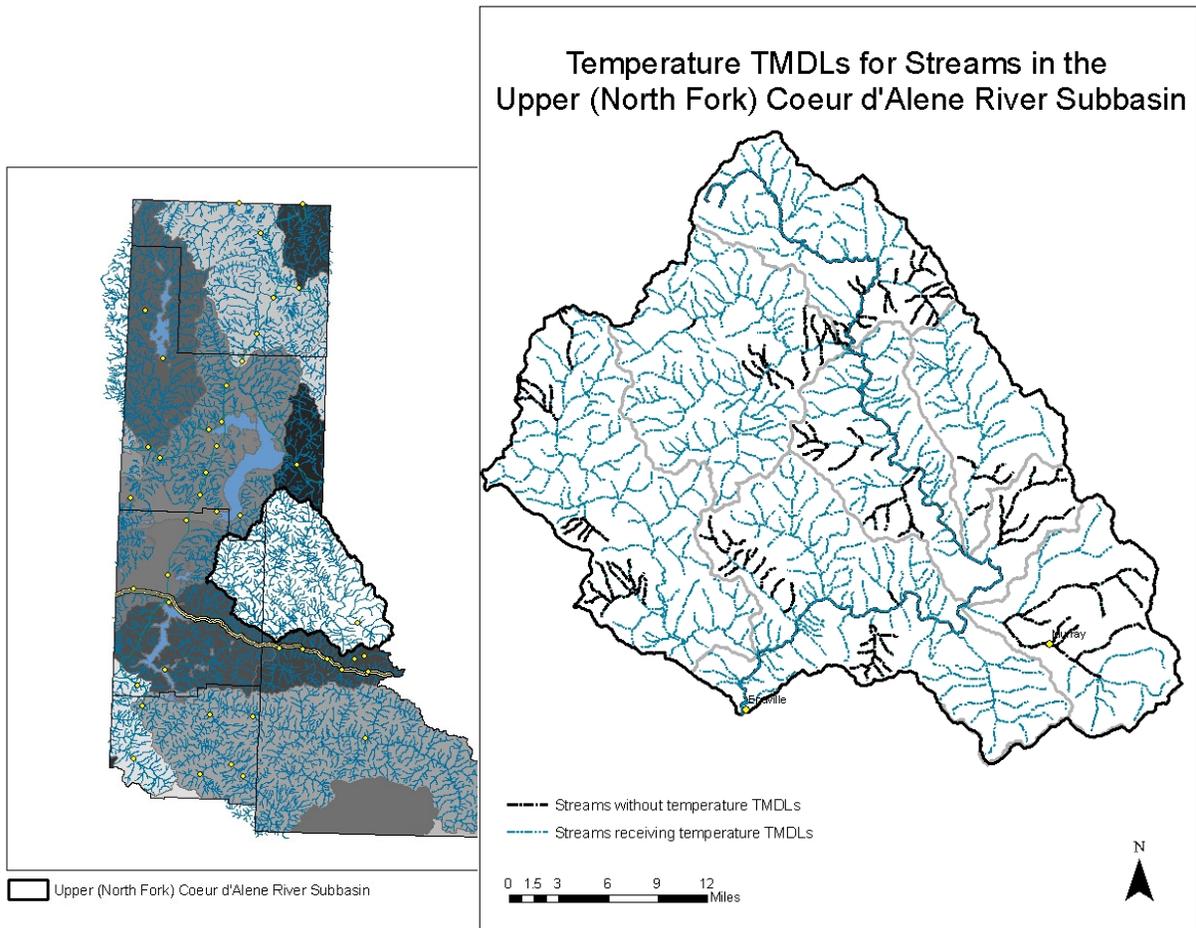


Executive Summary

Water Quality at a Glance:

| | |
|----------------------------------|--|
| Subbasin | Upper Coeur d'Alene River Subbasin |
| Hydrologic Unit Code..... | 17010301 |
| Watershed Area..... | 895 mi ² |
| Land Uses..... | Forestry, Agriculture, Recreation, Mining, Rural Residential |
| Pollutant Addressed..... | Temperature |
| Beneficial Uses Affected..... | Cold Water Aquatic Life and Salmonid Spawning |
| Assessment Units with TMDLs..... | 54 |



The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to Section 303 of the CWA, are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the nation's waters whenever possible. Section 303(d) of the CWA requires states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list, also called the "303(d) list," of impaired waters. Currently, this list must be published every two years and is published in Idaho as the Integrated Report. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutant(s) causing impairment, set at a level to achieve water quality standards. This TMDL analysis has been developed to comply with Idaho's TMDL schedule. The TMDL analysis quantifies pollutant sources, establishes load allocations, and assigns responsibility for load reductions needed to return waters to a condition of meeting water quality standards and full support of beneficial uses.

This document addresses water temperature conditions in the streams and rivers of the Upper (North Fork) Coeur d'Alene River Subbasin, and establishes temperature TMDLs for 54 assessment units with water temperatures in excess of Idaho's water quality standards (Figure D; Table A). Thirty one (31) of these assessment units were listed as impaired by temperature in the 2008 Integrated Report. An additional 23 assessment units were recommended for listing as impaired by temperature in the 2010 Integrated Report. This document addresses the temperature conditions and TMDLs for these streams. For more information about these watersheds, other pollutants, and the subbasin as a whole, see the Subbasin Assessment and TMDLs of the North Fork Coeur d'Alene River (IDEQ 2001).



Figure A. Floating at the confluence of the North Fork Coeur d'Alene and Little North Fork Coeur d'Alene rivers on a summer day.

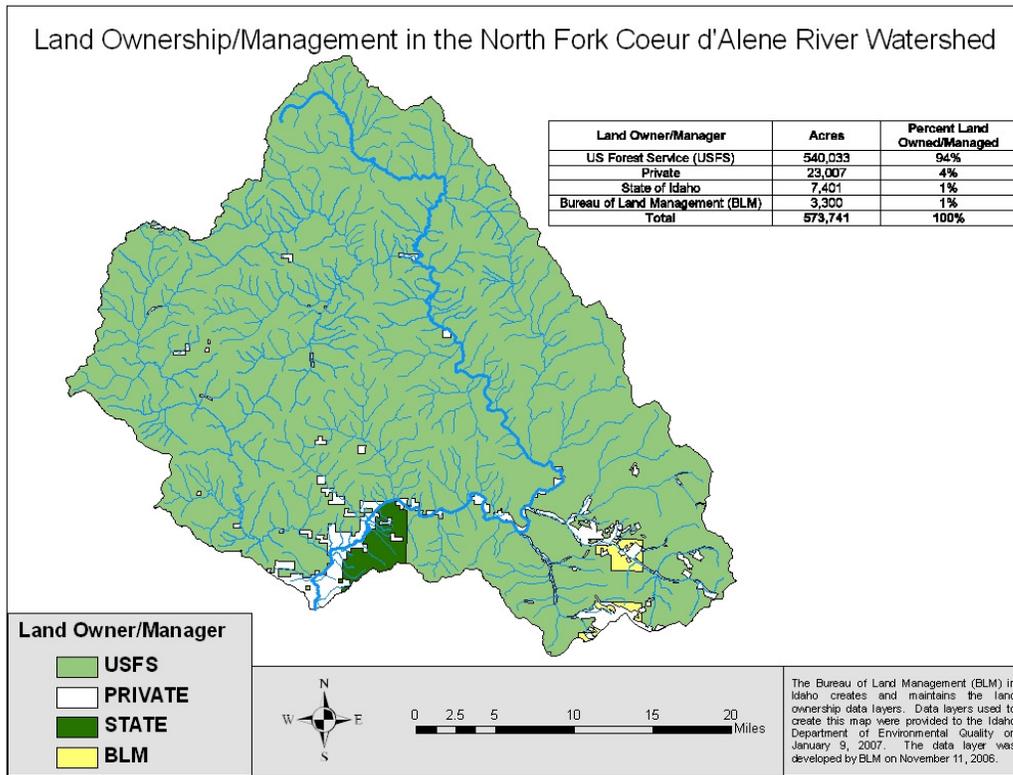


Figure B. Patterns of land ownership in the Upper (North Fork) Coeur d'Alene River Subbasin.

Subbasin at a Glance

The Upper (North Fork) Coeur d'Alene River Subbasin (HUC 17010301) is located in northern Idaho at the headwaters of the Spokane River Basin. The 895-square mile subbasin spans three counties: Kootenai, Bonner, and Shoshone. Land use within the subbasin is diverse and includes agriculture, silviculture, recreation (Figure A), residential, and mining. The U.S. Forest Service (USFS) is the major landowner in the subbasin and manages 540,033 acres or 94 percent of the subbasin's land area (Figure B). Private landowners, the State of Idaho, and the U.S. Bureau of Land Management (BLM) are also land owners/managers for the remaining 6 percent of land area. The subbasin contains seven major watersheds and 1,121 stream miles divided into 79 assessment units (AUs), DEQ's numeric tracking system for surface waterbodies.

Beneficial uses of stream surface waters include cold water aquatic life throughout the subbasin. The cold water aquatic life community includes both native and non-native cold water species. The native complement of species includes westslope cutthroat trout (Figure C), mountain whitefish, and bull trout (now thought to be extirpated in the subbasin). Nonnative cold water species include rainbow trout, eastern brook trout, and Chinook salmon. Together, these species support a popular sport fishery. Other components of the cold water aquatic community include amphibians like Pacific giant salamanders, and diverse invertebrates. Temperature criteria for protections of cold water aquatic life, salmonid spawning, and bull trout have been applied during water body assessments.

Key Findings

- Streams in the subbasin have high water temperatures in the summer that are harmful to fish and other aquatic life.
- The highest water temperatures observed are generally in the mainstem North Fork Coeur d'Alene River.
- Stream temperature data from DEQ and USFS were available for 54 of the 79 stream assessment units in the subbasin.
- Each of the 54 stream assessment units analyzed exceeded water quality criteria and were proposed for listing as impaired in the 2010 Integrated Report:
 - Six stream assessment units exceeded Idaho's water quality criteria for protection of cold water aquatic life.
 - All 54 stream assessment units evaluated exceeded Idaho's water quality criteria for protection of salmonid spawning.
 - Three stream assessment units exceeded the federal water quality criteria for protection of bull trout.
- Lack of riparian shade is thought to be the cause of excess water temperatures and improvements in shade should reduce water temperatures and allow full support of cold water aquatic life.
- Temperature TMDLs were developed for 54 stream assessment units using the potential natural vegetation (PNV) method that establishes shade and solar load targets for the watersheds analyzed.



Figure C. Westslope cutthroat trout in the North Fork Coeur d'Alene River

The 1998 303(d) list of impaired waters included Prichard Creek from Barton Gulch to the North Fork Coeur d'Alene was the only stream listed with temperature causing impairment. This encompassed three current assessment units: ID17010301PN004_03, ID17010301PN004_04, and ID17010301PN005_03. Steamboat Creek was then added to Idaho's 1998 303(d) list by the Environmental Protection Agency (EPA) as exceeding Idaho's temperature criteria. As more data became available, a large number of streams were added to the Idaho 303(d) list of impaired waters in 2002 and 2008.

The 2008 Integrated Report included 34 assessment units listed as temperature-impaired. In 2009, a full temperature assessment was completed to analyze all water temperature data available in the subbasin. There were available data for 1997 and 1999 from 31 DEQ temperature recorders in 21 assessment units indicating exceedances of Idaho's criteria for salmonid spawning. At the request of Watershed Advisory Group members, these data were supplemented by more extensive and current U.S. Forest Service (USFS) temperature datasets. The USFS data included 252 temperature recorders from 44 assessment units from 1998 to 2008. Combined, only 25 of 79 assessment units from the subbasin did not have any temperature data for evaluation. All of the 54 assessment units with temperature data exceeded at least one portion of the Idaho water quality criteria for temperature.

The temperature assessment completed in 2009 found that 3 of the assessment units listed as temperature-impaired in 2008 did not have temperature data. For the 2010 Integrated Report, they were recommended for removal of temperature as a pollutant causing impairment. The temperature assessment completed in 2009 also found exceedances of Idaho water quality criteria for temperature for another 23 assessment units. These additional waters were proposed for listing in 2010 as impaired due to temperature. In total, 54 assessment units were proposed for listing in 2010 with temperature impairments to cold water aquatic life and received temperature TMDLs in this document (Figures D and E; Tables A, B, C and D). This TMDL is built upon the results of the 2009 subbasin assessment for temperature and the 2010 Integrated Report.

The temperature TMDLs were developed using the potential natural vegetation (PNV) method described by Shumar and De Varona (2009). This method assumes that excess temperature loads to streams are due to solar radiation as a nonpoint source of pollution, that solar radiation loads have been increased as a result of riparian shade loss, and that maximum shading under potential natural vegetation results in natural background stream temperatures. Estimates are calculated for shade and solar loading under existing and potential conditions in order to establish the temperature TMDL load allocations. Existing shade was estimated from visual evaluation of aerial photographs field-verified with Solar Pathfinder data. Potential shade was estimated using USFS vegetation information, bankfull width estimates, and shade curves for various vegetation types, aspects and channel widths. This method evaluates existing effective shade to the streams, potential effective shade, and the amount of shade needed to reach potential effective shade and thus, natural background water temperatures. The shade and solar loading observed at potential natural vegetation provide natural background stream temperature and are the TMDLs target rather than numeric temperature criteria based on natural background provisions of the Idaho water quality standards (WQS 200.09).

Estimated shade conditions and solar loads were highly variable among the streams evaluated (Figure F). Most stream segments were within 20% of target shade conditions. Two assessment units had existing solar loads lower than the estimated target and load allocation: Graham Creek below Deceitful Gulch (ID17010301PN002_03) and Lost Creek below East Fork Lost Creek (ID17010301PN009_03). These should be evaluated as possibly attaining potential natural vegetation, shade targets and natural background temperatures. The highest solar load reductions needed were in the lower portions of larger streams including the middle and lower North Fork Coeur d'Alene River, the lower Little North Fork Coeur d'Alene River, lower Trail Creek and lower Tepee Creek. Areas with shade less than 50% of potential effective shade include the lower North Fork Coeur d'Alene River, stretches of upper Beaver Creek, portions of Falls Creek, lower Trail Creek, and portions of middle Tepee Creek. These should be considered as priorities for TMDL implementation.

Implementation of these temperature TMDLs should incorporate the needed solar load reductions and target shade conditions using strategies that maximize shade from riparian vegetation. Managers can utilize this analysis to identify locations with high excess solar loads and the largest differences between existing and target shade. Within the overall load allocation for each stream assessment unit, these TMDLs establish reach-specific allocations for solar loading at potential natural vegetation condition. Some reaches are already thought to be reaching their target shade and solar loading rates. Other reaches have estimated shade deficits ranging from 2 to 88 percent. These locations can be prioritized for implementation activities including tree planting. Lack of shade and excess solar loads can result from a variety of circumstances including natural events such as wildfire and anthropogenic activities with varying degrees of permanency (e.g., paved roads versus partial vegetation removal along recreational properties). Some of these conditions can be changed while others cannot. Implementation strategies must take these realities into account.

Recommendations for monitoring include:

- Verify assumptions and estimates used in the TMDL analysis. For example, estimates of existing shade made from aerial photographs should be field-validated using the Solar Pathfinder. Bankfull width estimates from regional curves can also be field-validated to develop even better estimates of existing solar loads.
- Measure water quality trends including water temperature and overall support of beneficial uses. Water temperatures should be measured to evaluate trends and effects to aquatic life. Riparian vegetation, channel dimensions, and shade should be measured to detect trends and evaluate progress toward TMDL goals.

Recommendations for TMDL implementation include:

- Maintain existing shade and increase riparian shade by planting trees.
- Protect springs, headwaters, and other sources of cold water, and protect cold water refugia in side-channel habitats. Ensure access to cooler waters by removing barriers.
- Retain and restore large wood and boulders in stream channels.
- Minimize other sources of pollution and stressors to cold water aquatic life.

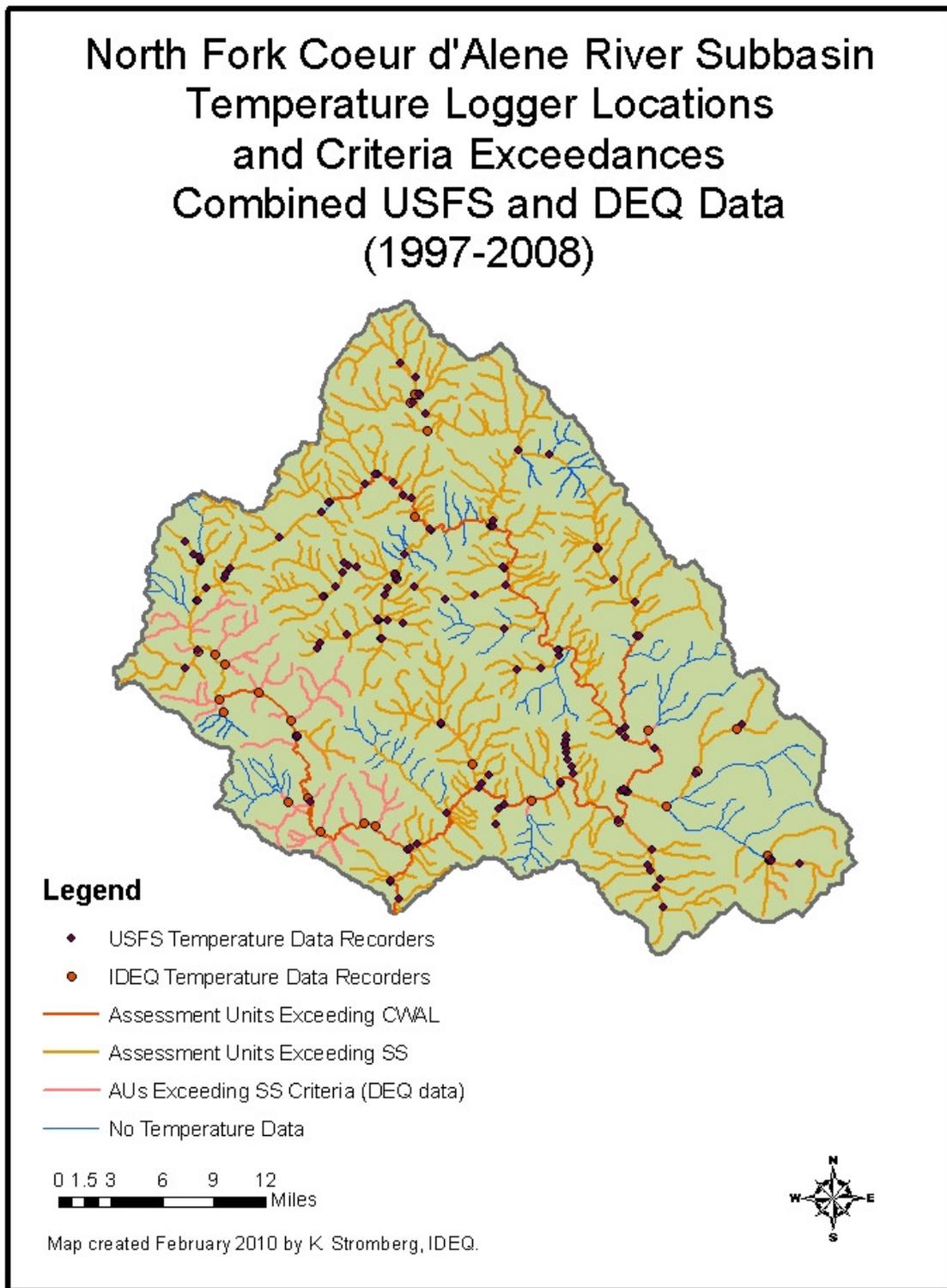


Figure D. Streams included in the temperature assessment for the Upper (North Fork) Coeur d'Alene River Subbasin

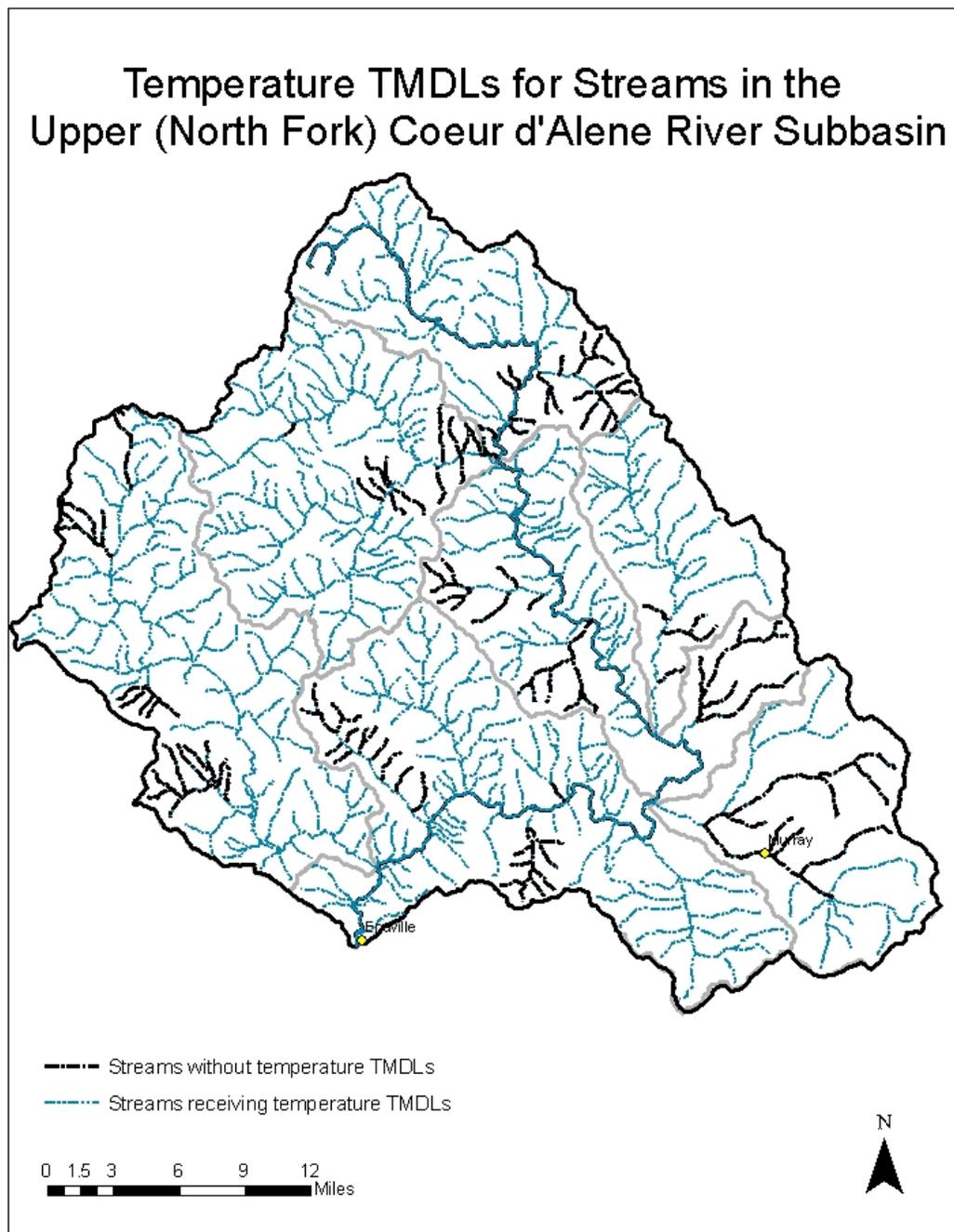


Figure E. Streams included in the temperature TMDL analysis for the Upper (North Fork) Coeur d'Alene River Subbasin.

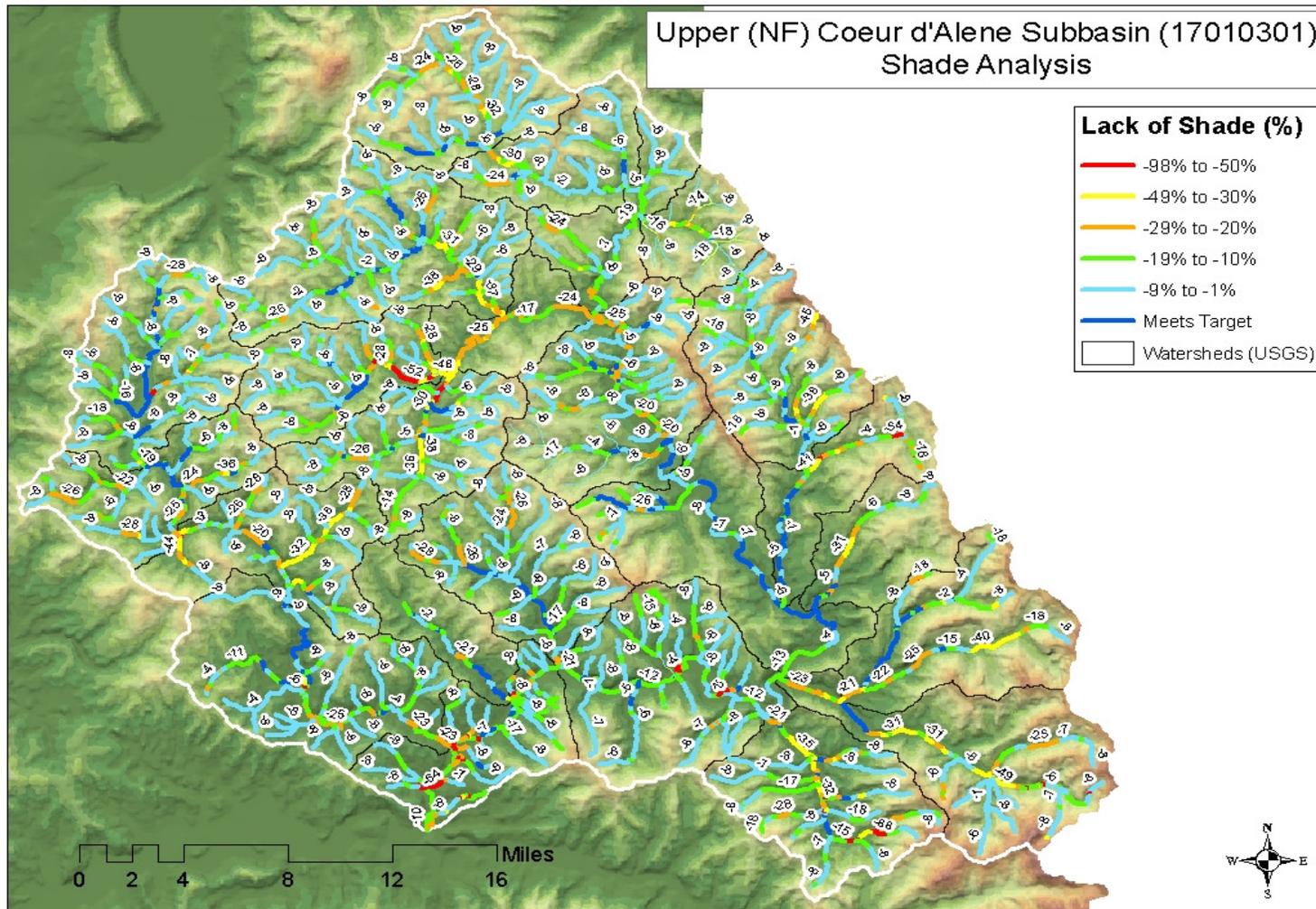


Figure F. Summary of shade conditions in the Upper (North Fork) Coeur d'Alene River Subbasin highlighting areas with estimated existing shade less than TMDL targets at potential natural vegetation.

Table A. Streams for which temperature TMDLs were developed.

| Assessment Unit Number | Assessment Unit Name |
|------------------------|---|
| ID17010301PN001_02 | North Fork Coeur d'Alene River tributaries below Prichard Creek |
| ID17010301PN001_05 | North Fork Coeur d'Alene River below Prichard Creek |
| ID17010301PN001_05a | North Fork Coeur d'Alene River between Yellowdog and Prichard creeks |
| ID17010301PN002_03 | Graham Creek below Deceitful Gulch |
| ID17010301PN003_02 | Beaver Creek headwaters and tributaries |
| ID17010301PN003_03 | Beaver Creek below White Creek |
| ID17010301PN004_04 | Prichard Creek below Eagle Creek |
| ID17010301PN005_02 | Prichard Creek headwaters and tributaries above Butte Gulch |
| ID17010301PN008_02 | West Fork Eagle Creek and tributaries |
| ID17010301PN009_03 | Lost Creek below East Fork Lost Creek |
| ID17010301PN010_03 | Shoshone Creek below Falls Creek |
| ID17010301PN011_02 | Falls Creek and tributaries |
| ID17010301PN012_02 | Shoshone Creek headwaters and tributaries above Falls Creek |
| ID17010301PN012_03 | Shoshone Creek between Little Lost Fork and Falls Creek |
| ID17010301PN013_02 | North Fork Coeur d'Alene River tributaries between Tepee and Yellowdog creeks |
| ID17010301PN013_04 | North Fork Coeur d'Alene River between Jordan and Tepee creeks |
| ID17010301PN013_05 | North Fork Coeur d'Alene River between Tepee and Yellowdog creeks |
| ID17010301PN014_03 | Jordan Creek and Lower Lost Fork |
| ID17010301PN015_02 | North Fork Coeur d'Alene River, upper, headwaters and tributaries |
| ID17010301PN015_03 | North Fork Coeur d'Alene River, upper, and lower Buckskin Creek |
| ID17010301PN015_04 | North Fork Coeur d'Alene River between Buckskin and Jordan creeks |
| ID17010301PN016_02 | West Elk Creek and Cataract Creek |
| ID17010301PN017_04 | Tepee Creek between Trail Creek and Independence Creek |
| ID17010301PN017_05 | Tepee Creek below Independence Creek |
| ID17010301PN018_02 | Independence Creek headwaters and tributaries |
| ID17010301PN018_03a | Declaration Creek, lower |
| ID17010301PN018_03b | Snow Creek, lower |
| ID17010301PN018_04 | Independence Creek below Declaration Creek |

| Assessment Unit Number | Assessment Unit Name |
|-------------------------------|---|
| ID17010301PN019_02 | Trail Creek headwaters and tributaries |
| ID17010301PN019_03 | Trail Creek below Stewart Creek |
| ID17010301PN020_02 | Tepee Creek headwaters and tributaries |
| ID17010301PN020_03 | Tepee Creek between Short Creek and Trail Creek |
| ID17010301PN021_02 | Brett Creek and tributaries |
| ID17010301PN022_02 | Miners Creek and tributaries |
| ID17010301PN023_03 | Flat Creek, lower |
| ID17010301PN024_02 | Yellowdog Creek and tributaries |
| ID17010301PN026_02 | Brown Creek and tributaries |
| ID17010301PN028_02 | Steamboat Creek headwaters and tributaries |
| ID17010301PN028_03 | Steamboat Creek and West Fork Steamboat Cr. below Comfy Cr. |
| ID17010301PN029_03 | Cougar Gulch below East Fork Cougar Gulch |
| ID17010301PN030_02a | Little North Fork Coeur d'Alene River tributaries above Iron Creek |
| ID17010301PN030_02c | Little North Fork Coeur d'Alene River tributaries between Hudlow and Deception creeks |
| ID17010301PN030_02d | Little North Fork Coeur d'Alene River tributaries below Skookum |
| ID17010301PN030_03 | Little North Fork Coeur d'Alene River between Solitaire and Skookum creeks |
| ID17010301PN030_04 | Little North Fork Coeur d'Alene River below Skookum Creek |
| ID17010301PN031_02 | Bumblebee Creek and tributaries |
| ID17010301PN032_02 | Laverne Creek and tributaries |
| ID17010301PN033_02 | Leiberg Creek and tributaries |
| ID17010301PN034_02 | Bootjack Creek and tributaries |
| ID17010301PN035_02 | Iron Creek and tributaries |
| ID17010301PN036_02 | Burnt Cabin Creek and tributaries |
| ID17010301PN037_02 | Deception Creek and tributaries |
| ID17010301PN038_03 | Skookum Creek, lower |
| ID17010301PN039_03 | Copper Creek, lower |

Table B. Summary of temperature assessment outcomes.

| Assessment Unit Number | Assessment Unit Name | TMDL(s) Completed | Recommended Changes to 303(d) List | Justification |
|-------------------------------|--|--------------------------|--|---|
| ID17010301PN001_02 | North Fork Coeur d'Alene River tributaries below Prichard Creek | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN001_02a | North Fork Coeur d'Alene River tributaries between Yellowdog and Prichard creeks | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN001_05 | North Fork Coeur d'Alene River below Prichard Creek | Yes | Move to Category 4a in 2012. | USFS data exceeded SS and CWAL criteria. Excess solar load from lack of shade. |
| ID17010301PN001_05a | North Fork Coeur d'Alene River between Yellowdog and Prichard creeks | Yes | Move to Category 4a in 2012. | USFS data exceeded SS and CWAL criteria. Excess solar load from lack of shade. |
| ID17010301PN002_02 | Graham Creek headwaters and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN002_03 | Graham Creek below Deceitful Gulch | Yes | Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN003_02 | Beaver Creek headwaters and tributaries | Yes | Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN003_03 | Beaver Creek below White Creek | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN004_02 | Prichard Creek tributaries between Butte Gulch and Eagle Cr. | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN004_03 | Prichard Creek between Butte Gulch and Eagle Cr. | No | Delist in 2010. Temperature not assessed. | No temperature data available. |
| ID17010301PN004_04 | Prichard Creek below Eagle Creek | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN005_02 | Prichard Creek headwaters and tributaries above Butte Gulch | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |

| Assessment Unit Number | Assessment Unit Name | TMDL(s) Completed | Recommended Changes to 303(d) List | Justification |
|-------------------------------|---|--------------------------|--|---|
| ID17010301PN005_03 | Prichard Creek between Barton Gulch and Butte Gulch | No | Delist in 2010. Temperature not assessed. | No temperature data available. |
| ID17010301PN006_02 | Butte Gulch | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN007_02 | East Fork Eagle Creek and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN007_03 | Eagle Creek | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN008_02 | West Fork Eagle Creek and tributaries | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN009_02 | Lost Creek headwaters and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN009_03 | Lost Creek below East Fork Lost Creek | Yes | Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN010_02 | Shoshone Creek tributaries below Falls Creek | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN010_03 | Shoshone Creek below Falls Creek | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS and CWAL criteria. Excess solar load from lack of shade. |
| ID17010301PN011_02 | Falls Creek and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS and EPA BT criteria. Excess solar load from lack of shade. |
| ID17010301PN012_02 | Shoshone Creek headwaters and tributaries above Falls Creek | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |

| Assessment Unit Number | Assessment Unit Name | TMDL(s) Completed | Recommended Changes to 303(d) List | Justification |
|-------------------------------|---|--------------------------|--|---|
| ID17010301PN012_03 | Shoshone Creek between Little Lost Fork and Falls Creek | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS and EPA BT criteria. Excess solar load from lack of shade. |
| ID17010301PN013_02 | North Fork Coeur d'Alene River tributaries between Tepee and Yellowdog creeks | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS and EPA BT criteria. Excess solar load from lack of shade. |
| ID17010301PN013_02a | North Fork Coeur d'Alene River tributaries between Jordan and Tepee creeks | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN013_04 | North Fork Coeur d'Alene River between Jordan and Tepee creeks | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS and EPA BT criteria. Excess solar load from lack of shade. |
| ID17010301PN013_05 | North Fork Coeur d'Alene River between Tepee and Yellowdog creeks | Yes | Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN014_02 | Jordan Creek headwaters and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN014_02a | Cub Creek | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN014_02b | Calamity Creek | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN014_03 | Jordan Creek and Lower Lost Fork | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN015_02 | North Fork Coeur d'Alene River, upper, headwaters and tributaries | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN015_03 | North Fork Coeur d'Alene River, upper, and lower Buckskin Creek | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |

| Assessment Unit Number | Assessment Unit Name | TMDL(s) Completed | Recommended Changes to 303(d) List | Justification |
|-------------------------------|---|--------------------------|--|--|
| ID17010301PN015_04 | North Fork Coeur d'Alene River between Buckskin and Jordan creeks | Yes | Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN016_02 | West Elk Creek and Cataract Creek | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN017_02 | Tepee Creek tributaries below Trail Creek | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN017_04 | Tepee Creek between Trail Creek and Independence Creek | Yes | Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN017_05 | Tepee Creek below Independence Creek | Yes | Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN018_02 | Independence Creek headwaters and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN018_03 | Independence Creek between Ellis and Declaration creeks | No | Delist in 2010. Temperature not assessed. | No temperature data available. |
| ID17010301PN018_03a | Declaration Creek, lower | Yes | Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN018_03b | Snow Creek, lower | Yes | Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN018_04 | Independence Creek below Declaration Creek | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS and CWAL criteria. Excess solar load from lack of shade. |
| ID17010301PN019_02 | Trail Creek headwaters and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |

| Assessment Unit Number | Assessment Unit Name | TMDL(s) Completed | Recommended Changes to 303(d) List | Justification |
|-------------------------------|---|--------------------------|--|--|
| ID17010301PN019_03 | Trail Creek below Stewart Creek | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN020_02 | Tepee Creek headwaters and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN020_03 | Tepee Creek between Short Creek and Trail Creek | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN021_02 | Brett Creek and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN022_02 | Miners Creek and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN023_02 | Flat Creek headwaters and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN023_03 | Flat Creek, lower | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN024_02 | Yellowdog Creek and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN025_02 | Downey Creek headwaters and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN025_03 | Downey Creek, lower | No | Temperature not assessed. | No temperature data available. |

| Assessment Unit Number | Assessment Unit Name | TMDL(s) Completed | Recommended Changes to 303(d) List | Justification |
|-------------------------------|---|--------------------------|--|---|
| ID17010301PN026_02 | Brown Creek and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS and EPA BT criteria. Excess solar load from lack of shade. |
| ID17010301PN027_03 | Grizzly Creek, below Dewey Creek | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN028_02 | Steamboat Creek headwaters and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN028_03 | Steamboat Creek and West Fork Steamboat Cr. below Comfy Cr. | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN029_02 | Cougar Gulch headwaters and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN029_03 | Cougar Gulch below East Fork Cougar Gulch | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN030_02 | Little North Fork Coeur d'Alene River tributaries to Solitaire Creek | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN030_02a | Little North Fork Coeur d'Alene River tributaries above Iron Creek | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN030_02b | Hudlow Creek and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN030_02c | Little North Fork Coeur d'Alene River tributaries between Hudlow and Deception creeks | Yes | Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN030_02d | Little North Fork Coeur d'Alene River tributaries below Skookum | Yes | Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |

| Assessment Unit Number | Assessment Unit Name | TMDL(s) Completed | Recommended Changes to 303(d) List | Justification |
|-------------------------------|--|--------------------------|--|--|
| ID17010301PN030_03 | Little North Fork Coeur d'Alene River between Solitaire and Skookum creeks | Yes | Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN030_04 | Little North Fork Coeur d'Alene River below Skookum Creek | Yes | Move to Category 4a in 2012. | USFS data exceeded SS and CWAL criteria. Excess solar load from lack of shade. |
| ID17010301PN031_02 | Bumblebee Creek and tributaries | Yes | Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN032_02 | Laverne Creek and tributaries | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN033_02 | Leiberg Creek and tributaries | Yes | Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN034_02 | Bootjack Creek and tributaries | Yes | Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN035_02 | Iron Creek and tributaries | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN036_02 | Burnt Cabin Creek and tributaries | Yes | Move to Category 4a in 2012. | DEQ and USFS data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN037_02 | Deception Creek and tributaries | Yes | Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN038_02 | Skookum Creek headwaters and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN038_03 | Skookum Creek, lower | Yes | List Category 5 in 2010. Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |
| ID17010301PN039_02 | Copper Creek headwaters and tributaries | No | Temperature not assessed. | No temperature data available. |
| ID17010301PN039_03 | Copper Creek, lower | Yes | Move to Category 4a in 2012. | DEQ data exceeded SS criteria. Excess solar load from lack of shade. |

Table C. Summary of existing solar loads, temperature TMDL load allocations, and load reductions needed. This table summarizes loading over entire stream assessment units. Within each assessment unit, there are reach-specific shade targets and solar load allocations provided in Appendix F.

| Assessment Unit Number | Assessment Unit Name | Existing Load (kWh/day) | Load Allocation (kWh/day) | Load Reduction Needed (kWh/Day) |
|--|---|--------------------------------|----------------------------------|---|
| ID17010301PN001_02- <i>check for AU split</i> | North Fork Coeur d'Alene River tributaries below Prichard Creek | 192,643 | 37,263 | 155,380 |
| ID17010301PN001_05 <i>check for AU split</i> | North Fork Coeur d'Alene River below Prichard Creek | 15,696,379 | 13,851,949 | 1,844,430 |
| ID17010301PN001_05a | North Fork Coeur d'Alene River between Yellowdog and Prichard creeks | | | |
| ID17010301PN002_03 | Graham Creek below Deceitful Gulch | 14,163 | 17,094 | Existing shade > potential shade ¹ |
| ID17010301PN003_02 | Beaver Creek headwaters and tributaries | 436,783 | 147,154 | 289,629 |
| ID17010301PN003_03 | Beaver Creek below White Creek | 419,095 | 213,717 | 205,378 |
| ID17010301PN004_04 | Prichard Creek below Eagle Creek | 342,320 | 239,642 | 102,678 |
| ID17010301PN005_02 | Prichard Creek headwaters and tributaries above Butte Gulch | 173,492 | 30,495 | 142,997 |
| ID17010301PN008_02 | West Fork Eagle Creek and tributaries | 169,438 | 143,683 | 25,755 |
| ID17010301PN009_03 | Lost Creek below East Fork Lost Creek | 37,263 | 44,955 | Existing shade > potential shade ¹ |
| ID17010301PN010_03 | Shoshone Creek below Falls Creek | 571,857 | 561,789 | 10,068 |
| ID17010301PN011_02 | Falls Creek and tributaries | 88,390 | 18,729 | 69,661 |
| ID17010301PN012_02 | Shoshone Creek headwaters and tributaries above Falls Creek | 135,977 | 41,402 | 94,575 |
| ID17010301PN012_03 | Shoshone Creek between Little Lost Fork and Falls Creek | 356,879 | 336,361 | 20,518 |
| ID17010301PN013_02 | North Fork Coeur d'Alene River tributaries between Tepee and Yellowdog creeks | 64,377 | 21,145 | 43,232 |

| Assessment Unit Number | Assessment Unit Name | Existing Load (kWh/day) | Load Allocation (kWh/day) | Load Reduction Needed (kWh/Day) |
|-------------------------------|---|--------------------------------|----------------------------------|--|
| ID17010301PN013_04 | North Fork Coeur d'Alene River between Jordan and Tepee creeks | 913,699 | 753,106 | 160,593 |
| ID17010301PN013_05 | North Fork Coeur d'Alene River between Tepee and Yellowdog creeks | 2,672,334 | 2,130,373 | 541,961 |
| ID17010301PN014_03 | Jordan Creek and Lower Lost Fork | 93,545 | 64,147 | 29,398 |
| ID17010301PN015_02 | North Fork Coeur d'Alene River, upper, headwaters and tributaries | 213,488 | 100,419 | 113,069 |
| ID17010301PN015_03 | North Fork Coeur d'Alene River, upper, and lower Buckskin Creek | 111,408 | 80,684 | 30,724 |
| ID17010301PN015_04 | North Fork Coeur d'Alene River between Buckskin and Jordan creeks | 385,913 | 317,951 | 67,962 |
| ID17010301PN016_02 | West Elk Creek and Cataract Creek | 30,838 | 6,390 | 24,448 |
| ID17010301PN017_04 | Tepee Creek between Trail Creek and Independence Creek | 539,660 | 336,372 | 203,288 |
| ID17010301PN017_05 | Tepee Creek below Independence Creek | 889,043 | 305,883 | 583,160 |
| ID17010301PN018_02 | Independence Creek headwaters and tributaries | 227,436 | 87,944 | 139,492 |
| ID17010301PN018_03a | Declaration Creek, lower | 23,320 | 18,942 | 4,378 |
| ID17010301PN018_03b | Snow Creek, lower | 35,728 | 27,887 | 7,841 |
| ID17010301PN018_04 | Independence Creek below Declaration Creek | 1,007,633 | 619,733 | 387,900 |
| ID17010301PN019_02 | Trail Creek headwaters and tributaries | 123,189 | 49,699 | 73,490 |
| ID17010301PN019_03 | Trail Creek below Stewart Creek | 664,576 | 221,495 | 443,081 |
| ID17010301PN020_02 | Tepee Creek headwaters and tributaries | 170,149 | 76,257 | 93,892 |
| ID17010301PN020_03 | Tepee Creek between Short Creek and Trail Creek | 301,477 | 138,916 | 162,561 |

| Assessment Unit Number | Assessment Unit Name | Existing Load (kWh/day) | Load Allocation (kWh/day) | Load Reduction Needed (kWh/Day) |
|-------------------------------|---|--------------------------------|----------------------------------|---|
| ID17010301PN021_02 | Brett Creek and tributaries | 25,680 | 10,506 | 15,174 |
| ID17010301PN022_02 | Miners Creek and tributaries | 17,781 | 3,621 | 14,160 |
| ID17010301PN023_03 | Flat Creek, lower | 83,506 | 66,100 | 17,406 |
| ID17010301PN024_02 | Yellowdog Creek and tributaries | 45,639 | 16,139 | 29,500 |
| ID17010301PN026_02 | Brown Creek and tributaries | 19,767 | 3,605 | 16,162 |
| ID17010301PN028_02 | Steamboat Creek headwaters and tributaries | 159,182 | 51,585 | 107,597 |
| ID17010301PN028_03 | Steamboat Creek and West Fork Steamboat Cr. below Comfy Cr. | 307,522 | 310,253 | Existing shade > potential shade ¹ |
| ID17010301PN029_03 | Cougar Gulch below East Fork Cougar Gulch | 135,581 | 118,357 | 17,224 |
| ID17010301PN030_02a | Little North Fork Coeur d'Alene River tributaries above Iron Creek | 38,302 | 9,220 | 29,082 |
| ID17010301PN030_02c | Little North Fork Coeur d'Alene River tributaries between Hudlow and Deception creeks | 84,260 | 34,125 | 50,135 |
| ID17010301PN030_02d | Little North Fork Coeur d'Alene River tributaries below Skookum | 38,626 | 8,527 | 30,099 |
| ID17010301PN030_03 | Little North Fork Coeur d'Alene River between Solitaire and Skookum creeks | 751,113 | 661,829 | 89,284 |
| ID17010301PN030_04 | Little North Fork Coeur d'Alene River below Skookum Creek | 4,021,028 | 2,955,648 | 1,065,380 |
| ID17010301PN031_02 | Bumblebee Creek and tributaries | 40,816 | 11,886 | 28,930 |
| ID17010301PN032_02 | Laverne Creek and tributaries | 50,012 | 14,287 | 35,725 |
| ID17010301PN033_02 | Leiberg Creek and tributaries | 178,189 | 42,119 | 136,070 |

| Assessment Unit Number | Assessment Unit Name | Existing Load (kWh/day) | Load Allocation (kWh/day) | Load Reduction Needed (kWh/Day) |
|-------------------------------|-----------------------------------|--------------------------------|----------------------------------|--|
| ID17010301PN034_02 | Bootjack Creek and tributaries | 17,297 | 2,819 | 14,478 |
| ID17010301PN035_02 | Iron Creek and tributaries | 73,744 | 37,936 | 35,808 |
| ID17010301PN036_02 | Burnt Cabin Creek and tributaries | 113,075 | 54,206 | 58,869 |
| ID17010301PN037_02 | Deception Creek and tributaries | 29,640 | 13,111 | 16,529 |
| ID17010301PN038_03 | Skookum Creek, lower | 28,479 | 2,046 | 26,433 |
| ID17010301PN039_03 | Copper Creek, lower | 89,584 | 60,676 | 28,908 |

¹The loads included in this table are added over the entire stream assessment unit. While the assessment unit's overall existing solar load may be less than the estimated load allocation over the entire unit, there are reach-specific targets identified in Appendix F that should also be met to ensure water temperature protection.

Table D. Summary of existing solar loads, load allocations, and load reductions needed on tributaries not listed for excess temperature.

| Assessment Unit Number | Assessment Unit Name | Existing Load (kWh/day) | Load Allocation (kWh/day) | Load Reduction Needed (kWh/Day) |
|--|--|--------------------------------|----------------------------------|--|
| ID17010301PN001_02a <i>check for AU split</i> | North Fork Coeur d'Alene River tributaries between Yellowdog and Prichard creeks | 192,643 | 37,263 | 155,380 |
| ID17010301PN002_02 | Graham Creek, headwaters and tributaries | 9,235 | 3,247 | 5,988 |
| ID17010301PN004_02 | Prichard Creek tributaries between Butte Gulch and Eagle Cr. | nd ¹ | nd | nd |
| ID17010301PN004_03 | Prichard Creek, between Butte Gulch and Eagle Creek | 507,975 | 364,472 | 143,503 |
| ID17010301PN005_03 | Prichard Creek, between Barton Creek and Butte Gulch | 156,492 | 79,533 | 76,959 |
| ID17010301PN006_02 | Butte Gulch | nd | nd | nd |
| ID17010301PN007_02 | East Fork Eagle Creek and tributaries | 471,526 | 212,411 | 259,115 |
| ID17010301PN007_03 | Eagle Creek | 158,928 | 63,862 | 95,066 |
| ID17010301PN009_02 | Lost Creek, headwaters and tributaries | 67,155 | 32,693 | 34,462 |
| ID17010301PN010_02 | Shoshone Creek tributaries below Falls Creek | nd | nd | nd |
| ID17010301PN013_02a | North Fork Coeur d'Alene River tributaries between Jordan Cr. and Tepee Cr. | nd | nd | nd |
| ID17010301PN014_02 | Jordan Creek, headwaters and tributaries | 30,855 | 10,188 | 20,667 |
| ID17010301PN014_02a | Cub Creek | nd | nd | nd |
| ID17010301PN014_02b | Calamity Creek | nd | nd | nd |
| ID17010301PN017_02 | Tepee Creek tributaries, below Trail Cr. | nd | nd | nd |
| ID17010301PN018_03 | Independence Creek, between Ellis Cr. and Declaration Cr. | 61,380 | 42,966 | 18,414 |

| Assessment Unit Number | Assessment Unit Name | Existing Load (kWh/day) | Load Allocation (kWh/day) | Load Reduction Needed (kWh/Day) |
|-------------------------------|--|--------------------------------|----------------------------------|---|
| ID17010301PN023_02 | Flat Creek, headwaters and tributaries | 28,083 | 4,430 | 23,653 |
| ID17010301PN025_02 | Downey Creek, headwaters and tributaries | nd | nd | nd |
| ID17010301PN025_03 | Downey Creek, lower | nd | nd | nd |
| ID17010301PN027_03 | Grizzly Creek, below Dewey Cr. | 7,288 | 2,987 | 4,301 |
| ID17010301PN029_02 | Cougar Gulch, headwaters and tributaries | nd | nd | nd |
| ID17010301PN030_02 | Little North Fork Coeur d'Alene River tributaries, headwaters to Solitaire Cr. | 24,332 | 26,487 | Existing load < Potential load ² |
| ID17010301PN030_02b | Hudlow Creek, headwaters and tributaries | 42,268 | 20,015 | 22,253 |
| ID17010301PN038_02 | Skookum Creek, headwaters and tributaries | 14,427 | 3,484 | 10,943 |
| ID17010301PN039_02 | Copper Creek, headwaters and tributaries | 21,494 | 9,442 | 12,052 |

¹No data are reported in this table for stream assessment units that are not identified as temperature impaired and did not have the PNV analysis performed during development of these TMDLs. There is a presumption that these streams are shaded under PNV conditions unless data shows otherwise.

²The loads included in this table are added over the entire stream assessment unit. While the assessment unit's overall existing solar load may be less than the estimated load allocation over the entire unit, there are reach-specific targets identified in Appendix F that should also be met to ensure water temperature protection.