

# **Appendix M**

**Water Resources Technical Report**

**Errata and Addenda**



## Revisions

- **Section 2.1.3.1, Regulatory Requirements, page 16**  
*Revise the section numbering as follows:*  
Section 2.1.4 ~~2.1.3.1~~ Regulatory Requirements
- **Section 2.1.4 Regulatory Requirements, third paragraph, page 16**  
*Revise the fifth and sixth sentences as follows:*  
“However, the USACE has the responsibility for **administering**, implementing, permitting, and **enforcing** provisions **Section 404** of the CWA. ~~Specifically, Section...~~”
- **Section 2.1.4 Regulatory Requirements, fourth paragraph, page 17**  
*Insert the following text after “...a Section 401 Certification is issued or waived.”*  
“The Section 401 Water Quality Certification process is the mechanism by which the state assures that a project will not violate the applicable water quality standards and that appropriate measures are in place to avoid violations.”
- **Section 2.1.4 Regulatory Requirements, fifth paragraph, page 17**  
*Insert the following text at the end of the paragraph:*  
“If a partial-build or build alternative were implemented, all necessary permits would be requested from the appropriate regulatory agencies upon the completion of final design. The NPS would comply with the conditions and requirements associated with the issuance of these permits.”
- **Section 2.2.1 Methodology for Assessing the Impacts of the Proposed Alternatives, second paragraph, page 18**  
*At the end of the paragraph, insert the following text:*  
“The assessment of impacts to wetlands was completed assuming no implementation of mitigation measures; this is the worst-case scenario. However, NPS is committed to “no net loss” of wetlands. Applicable avoidance, minimization, and mitigation measures, such as described in Section 4.4.1.3, would be utilized if a partial-build or build alternative is implemented.”
- **Section 2.3.2 Minimization Techniques, second paragraph, page 29**  
*Replace second paragraph and revise fourth and fifth bulleted items as follows:*  
The following is a summary list of BMPs for NPS actions that will have adverse impacts on wetlands (NPS 1998; NCDOT 2003). **This summary list also incorporates general protective guidelines from regulatory agencies. Additional BMPs may be required by local, state, or other federal regulations or permit requirements.**
  - **Equipment storage and s**Stockpiling material: **Construction equipment and e**Excavated material must be placed **and stored** on an upland site.
  - ~~Temporary stockpiles in wetlands must be removed in their entirety as soon as practicable and wetlands returned to their pre-existing conditions.~~
- **Section 2.3.3 Mitigation Techniques, third paragraph, page 31**  
*Revise the second sentence as follows:*  
“...or (3) in another watershed within the ~~Park same NPS unit~~ (NPS 1998b).”

- **Section 2.3.3 Mitigation Techniques, fourth paragraph, page 31**  
*Insert the following text at the end of the paragraph:*  
“NPS would comply with all mitigation requirements.”
  
- **3.1.2.1 Fontana and Cheoah Lakes, page 34**  
*After the fifth sentence, insert the following text:*  
“There is a water supply intake located on Fontana Lake near the dam that supplies drinking water to the Fontana Village. It averages a daily intake of approximately 500,000 gallons (1,852,000 liters).”
  
- **3.1.3 Regulatory Requirements, page 36**  
*Add the following text to the end of the fourth paragraph:*  
“In addition, bridges or stream relocations or other obstructions on Tennessee River tributary streams would also require Section 26 approval.”
  
- **3.1.3 Regulatory Requirements, page 36**  
*After the fourth paragraph, insert the following text:*  
“A Sedimentation and Erosion Control Plan would be required for land-disturbing activities and would meet the requirements of state and local ordinances, as applicable. General requirements of this plan include buffer zones on streams and lakes sufficient to confine visible siltation and ground cover requirements on disturbed areas. The plan is required to address stormwater runoff and meet minimum design and performance standards. Special provisions may be required for the NPDES permit for stormwater runoff that drains to Outstanding Resource Waters (ORWs) (15A NCAC 02H .1007). Land-disturbing activities in the Water Supply Watershed will comply with state and local ordinances, as applicable.”
  
- **Section 3.2.1 Methodology for Assessing the Impacts of the Proposed Alternatives, second paragraph, page 37**  
*At the end of the paragraph, insert the following text:*  
“The assessment of impacts to lakes, rivers, and streams was completed assuming no implementation of mitigation measures; this is the worst-case scenario. However, NPS is committed to the protection of water resources and would utilize applicable avoidance, minimization, and mitigation measures, such as described in Section 4.3, if a partial-build or build alternative were implemented. ”
  
- **Section 3.2.3 Summary of Impacts, first paragraph, page 39**  
*Revise the first sentence as follows:*  
“**Direct** stream impacts for each proposed alternative...”
  
- **Section 3.2.3 Summary of Impacts, Table 5, page 40**  
*Revise the title as follows:*  
“**Direct** Stream Impacts with the Proposed Build Alternatives”
  
- **Section 4.1.2.1 Stream Water Quality, fourth paragraph, page 48**  
*Revise the text as follows:*  
On June 21, 2005, ~~a bill was ratified by~~ the North Carolina Legislature ratified a bill to initiate rule-making to adopt rules to reclassify all the streams that drain to the north shore of Fontana Lake between and including Eagle and Forney creeks as outstanding resource waters (ORWs), based upon

the excellent water quality of these streams and that these waters are a special and unique resource (~~15A NCAC 02B.0225~~).

Public hearings on the draft rules were held by NCDWQ on June 5, 2006. Effective January 1, 2007, NCDWQ, under order of the North Carolina Legislature and with concurrence from the Environmental Management Commission, amended 15A NCAC 02B.0225 to establish the Fontana Lake North Shore ORW Area. The Fontana Lake North Shore ORW Area consists of the entire watersheds of all creeks that drain to the north shore of Fontana Lake between Eagle Creek and Forney Creek, inclusive. All of these streams are located within the project study corridors (Figure 3-5).

According to NCAC 02B .0225, ORWs exhibit values or uses that are of exceptional state or national recreational or ecological significance. In general, water quality conditions should be protected to maintain the outstanding resource values of these waters. No new dischargers or expansions of existing dischargers should be permitted and new development activities must follow the provisions as specified in 15A NCAC 02H .1000. Refer to 15A NCAC 02B.0225 for the specific requirements.

~~Pending the outcome of the rule making, the minimum management strategies for ORWs, as established in 15A NCAC 02B.0225, have been applied to these waters. The proposed rule making is expected to be completed by November 1, 2006. All of these streams are located within the project study corridors (Figure 1). ORWs have special protection including a minimum of no new discharges and a 30-foot (9-m) buffer or stormwater controls for most new development. When the Environmental Management Commissions adopts rules to reclassify these streams, additional requirements or management strategies may be added.~~

- **Section 4.2.1 Methodology for Assessing the Impacts of the Proposed Alternatives, first paragraph, page 57**

*At the end of the paragraph, insert the following text:*

“The assessment of impacts to water quality was completed assuming no implementation of mitigation measures, including encapsulation as described in Appendix L; this is the worst-case scenario. However, NPS is committed to maintaining water quality and they would utilize applicable avoidance minimization and mitigation measures, such as described in Section 4.3, if a partial-build or build alternative were implemented. ”

- **Section 4.2.1 Methodology for Assessing the Impacts of the Proposed Alternatives, second paragraph, page 57**

*Revise fifth sentence as follows:*

“A summary list of **applicable** North Carolina state water quality standards is available in Table 11 (NCDENR 2004).”

- **Section 4.2.1 Methodology for Assessing the Impacts of the Proposed Alternatives, second paragraph, page 58**

*After the fifth sentence, insert the following text:*

“These numerical and biological standards were used in the assessment of intensity thresholds for water quality.”

- **Section 4.2.3 Summary of Impacts, first paragraph, page 62**  
*At the end of the paragraph, insert the following text:*  
“Encapsulation of acid-producing rock would be employed, at all appropriate locations, if a partial-build or build alternative were implemented.”
- **Section 4.2.3 Summary of Impacts, second paragraph (pH), page 64**  
*Insert the following text at the end of the paragraph:*  
“Section 5.3.5 summarizes impacts to aquatic life.”
- **Section 4.2.3 Summary of Impacts, fourth paragraph (heavy metals), page 64**  
*Revise the third sentence as follows:*  
“Low pH (as discussed in Section 4.1.2.1 4.2.1.2) would mobilize...”
- **Section 4.2.3 Summary of Impacts, first paragraph (heavy metals, cont.), page 65**  
*Insert the following text at the end of the paragraph:*  
“Section 5.2.3 summarizes impacts to aquatic life.”
- **Section 4.2.3 Summary of Impacts, sixteenth paragraph (Macroinvertebrate Biotic Index), page 68**  
*Insert the following text at the end of the paragraph:*  
“Additional information on impacts to aquatic wildlife is summarized in Section 5.2.3.”
- **Section 4.2.3.3 Laurel Branch Picnic Area, page 69**  
*After the “Laurel Branch Picnic Area” heading, insert the following text:*  
“Nine streams classified as trout streams would be crossed by the Laurel Branch Picnic Area. There would be no impacts to Water Supply waters or ORWs.”
- **Section 4.2.3.4 Partial-Build Alternative to Bushnell, page 70**  
*After the “Partial-Build Alternative to Bushnell” heading, insert the following text:*  
“The baseline Partial-Build Alternative to Bushnell (Primitive Park Road) would impact 21 trout streams and 29 streams classified as ORWs. The baseline Partial-Build Alternative to Bushnell (Principal Park Road) would impact 18 trout streams and 30 streams classified as ORWs. There would be no impacts to Water Supply waters for the Primitive and Principal Park Roads. For the Southern Option at Forney Creek Embayment, the Primitive Park Road would impact eight fewer streams classified as ORWs and the Principal Park Road would impact 12 fewer streams classified as ORWs.”
- **Section 4.2.3.5 Northern Shore Corridor, page 72**  
*After the “Northern Shore Corridor” heading, insert the following text:*  
“The baseline Northern Shore Corridor (Primitive Park Road) would impact 104 streams classified as ORWs and 96 trout streams. One-hundred and thirteen (113) streams classified as ORWs would be impacted for the Northern Shore Corridor (Principal Park Road). Both road types would impact 39 Water Supply waters, including 28 streams that are in the Critical Area. For the Southern Option at Forney Creek Embayment, the Primitive Park Road would impact eight fewer streams classified as ORWs and the Principal Park Road would impact 12 fewer streams classified as ORWs. For the Southern Option at Hazel and Eagle Creek Embayments, the Primitive Park Road would impact 10 fewer streams classified as ORWs and the Principal Park Road would impact 17 fewer streams

classified as ORWs. However, this option could increase the area impacted within the Water Supply Critical Area. There would be no change in the number of ORWs impacted for the Southern Option Crossing Fontana Dam.”

▪ **Section 4.2.3.5 Northern Shore Corridor, second paragraph, page 72**

*Revise the fourth sentence as follows:*

“The Southern Option Crossing Fontana Dam would avoid potential impacts to Cheoah Lake and cross fewer streams than the baseline Northern Shore Corridor. However, this option would increase impacts to Fontana Lake by crossing two additional ~~Water Supply~~ streams classified as Water Supply waters, as compared with the baseline corridor.”

▪ **Section 4.2.3.5 Northern Shore Corridor, eighth paragraph, page 74**

*Revise the fourth sentence as follows:*

“The Southern Option Crossing Fontana Dam would eliminate potential impacts to Cheoah Lake and cross fewer streams than the baseline Northern Shore Corridor. However, this option would slightly increase the potential for impacts to Fontana Lake by crossing two additional streams classified as Water Supply waters.”

▪ **Section 4.2.3.5 Northern Shore Corridor, eighth paragraph, page 74**

*Delete the last sentence of the paragraph:*

~~“Cumulative impacts from sedimentation due to the planned removal of a dam upstream at Dillsboro, North Carolina, are discussed in Section 5.”~~

▪ **Section 4.3.2 Minimization Techniques, first paragraph, page 75**

*Insert the following sentence at the end of the paragraph:*

“NPS would comply with the final rules for the classification of the Fontana Lake ORW Area as summarized in Section 4.1.2.1.”

▪ **Section 4.3.2 Minimization Techniques, page 76**

*After the third paragraph, insert the following text:*

“In order to determine the ongoing effectiveness of BMPs and other minimization measures, NPS would conduct water quality and aquatic ecology monitoring before construction, during construction, and after construction. Monitoring before construction would be conducted to establish baseline conditions for comparisons and would occur in the year prior to construction. Suggested parameters to be sampled include: pH, conductivity, water temperature, dissolved oxygen, acidity, alkalinity, hardness, total solids, total suspended solids, turbidity, aluminum, calcium, copper, iron, magnesium, manganese, nitrate, phosphate, sulfate, and zinc. In addition, surveys for benthic macroinvertebrates and electroshocking for fish would be conducted once prior to construction. Monitoring during construction would be conducted to determine immediate changes in water quality. Any changes to water quality should be immediately addressed and could trigger additional water quality monitoring. Monitoring after construction would most likely follow the same sampling regime as the monitoring before construction.”

▪ **Section 5.2.3 Summary of Impacts, after first paragraph, page 93**

*Insert the heading “Acidification:.” After the “Acidification” heading, insert the following text:*

“Weathering of exposed pyritic rock to air and water promotes acid generation and metal mobility in surface runoff (Hammarstrom et al. 2003). Weathered AP rock enters aquatic ecosystems as sediment during storm events. Metals are soluble when pH is low (such as during storm events) and settle out of solution when pH is higher. Therefore, there can be sequestering of heavy metals in stream sediments which may continue to impact aquatic ecosystems after ambient water quality has improved. The heavy metals may dissolve in the water column during storm events causing short-term, toxic events (Dagenhart 1980).

Aquatic wildlife is vulnerable to acid runoff from exposed bedrock that is high in iron-sulfide minerals and to acid precipitation. Aquatic insects and other aquatic organisms are negatively impacted by low pH in at least three ways: (1) low pH affects the physiology of organisms; (2) metal released at low pH may be toxic to the organism; and (3) indirect effects occur through the reduction of primary productivity (Hall et al. 1980). Low pH levels can cause a salt imbalance in fish that interferes with the ability of gills to absorb oxygen (Neville 1979). In addition, fish may be killed by hypoxic conditions in acidic waters by precipitation and coagulation of the mucus on gill membranes (Jones 1955). Low pH levels can also prevent some fish from maintaining calcium levels sufficient to produce viable eggs. The capacity of the gills of aquatic salamanders to uptake oxygen may be reduced by aluminum toxicity resulting from a low pH environment (Burrows 1977). Aluminum, copper, manganese, and zinc, in combination with low pH, are likely to cause impacts to aquatic habitats that receive unmitigated runoff from AP rock (Huckabee et al. 1975; Herrman et al. 1976; Bacon and Maas 1979; Mathews and Morgan 1982).

The range of aquatic organisms has different tolerance limits to low pH and high heavy metal concentrations. Aquatic organisms may be more sensitive to acidification and heavy metals at different life stages. Therefore, the timing of an event may affect the intensity of impacts. Only one species needs to be eliminated to affect the whole food chain. Gevert (2002) found that fungi, whose primary role is to break down leaf litter in streams, were reduced in waters impacted with acidic runoff. Schofield (1965) found that brook trout mortality is related to low pH and high heavy metal concentrations, and Butler et al. (1973) found that brook trout populations were severely degraded at pH levels between 5.6 and 4.5. But, Butler et al. also found that benthic macroinvertebrates (which are one source food for certain fish and salamander species) were not affected by pH levels of 4.5. For heavy metals, short-term toxicity tests have indicated that benthic macroinvertebrates may be more tolerant than fish (Warnick and Bell 1969). However, tests with longer exposures to heavy metals have indicated that some macroinvertebrates may be equally or more sensitive than fish (Spehar et al. 1978).

In GSMNP, two streams have been impacted from exposure to pyritic rock from road fill (Beech Flats Prong) and a landslide (Walker Camp Prong). These streams exemplify detrimental impacts from unmitigated runoff. Beech Flats Prong was impacted in 1963 when rubble from AP rock was used as road fill at US 441 (Bacon and Mass 1979). Downstream of the AP rock, the stream had a reduction in pH, an increase in heavy metals, and the elimination of fish, salamander larvae, and most benthic macroinvertebrates (Huckabee et al. 1975; Kucken et al. 1992). The stream was still impacted 25 years after the initial disturbance. Mean pH levels upstream of the AP rock were almost neutral in 1975 (pH = 6.69) and 1988-1990 (pH = 6.31); however, the mean pH values immediately below the AP rock were acidic in 1975 and 1988-1990 (pH = 4.84) (Huckabee et al. 1975; Kucken et al. 1992). Similar results were observed in Walker Camp Prong, where a natural landslide exposed pyritic rock.

Several studies at Beech Flats Prong have shown the acidic leachate has eliminated the fish, salamander larvae, and benthic macroinvertebrates downstream of exposed AP rock (Huckabee et al. 1975; Mathews and Morgan 1982). Brook trout were eliminated for at least 5 miles (8 km) downstream and salamanders were eliminated for at least 1 mile (1.6 km) downstream (Huckabee et al. 1975). Trumf et al. (1976) found reduced levels of benthic macroinvertebrates in Beech Flats Prong. This study found that the mean annual density was 1,323 upstream of the exposed AP rock (Site 1), 241 immediately downstream of the exposed AP rock (Site 2), and 854 approximately 3.7 miles (6.0 km) downstream of the exposed AP rock (Site 3). The total number of benthic macroinvertebrate taxa followed a similar pattern, with 28 different species found at Sites 1 and 3 and only 12 species found at Site 2. This study found a decrease in the pollution intolerant species such as stoneflies (Plecoptera) and mayflies (Ephemeroptera) and found an increase in the pollution tolerant species such as true flies (Diptera) and midges (Chironomidae). While Trumf et al. (1976) found recovery of benthic macroinvertebrates 3.7 miles (6.0 km) downstream of the road, Herrman et al. (1976) documented no substantial recovery 1.2 miles (2.0 km) below the exposed AP rock.

The decrease of aquatic organisms may cause a subsequent increase in terrestrial species. Along Beech Flats Prong, Kucken et al. (1994) found an increase in the number of terrestrial breeding salamanders (*Plethodon jordani* and *Desmognathus wrighti*) concurrently with the elimination of stream-breeding salamanders (*Desmognathus quadramaculatus* and *Eurycea wilderae*).

In general, the project study area has acidic soils with low buffering capacity. There are likely to be adverse impacts to aquatic organisms from construction activities for the partial-build or build alternatives without implementation of the BMPs described in Section 4.4.4.3.”

- **Section 5.2.3 Summary of Impacts, tenth paragraph (Other Water Quality Factors), page 96**  
*Revise the first sentence:*  
“Impacts to aquatic wildlife within streams could occur due to runoff of pollutants such as ~~heavy metals~~, bacteria, and chemicals.”
- **Section 5.2.3 Summary of Impacts, tenth paragraph (Other Water Quality Factors), page 96**  
*Delete all text after the third sentence (this information was moved to “Acidification,” starting on page 93):*  
“~~For heavy metals...affect the intensity of impacts.~~”
- **Section 5.2.3 Summary of Impacts, after fourteenth paragraph (Hydrology), page 97**  
*Insert the heading “Recreational Fishing:.” After the “Recreational Fishing” heading, insert the following text:*  
“Impacts to recreational fishing and potential changes in accessibility are discussed in Section 4.2.5.2.5, Visitor Use and Experience. As noted in that section, implementation of the partial-build or build alternatives would increase access to trout streams for the active and passive visitor. Fishing regulations in GSMNP provide protection and promote survivability of game fish species. Regulations limit the daily take and quantity an angler may possess and require a 7-inch (18-cm) minimum on trout and smallmouth bass. Fishing is permitted with the use of a hand-held rod and only artificial flies or lures with a single hook may be used. Bait fishing is prohibited to prevent

introduction of non-native species or disease. Many of the fish caught are below the legal size limit and must be released; single hook lures cause less mortality than multiple hook lures. Long-term monitoring in the Park indicates that fishermen have little effect on the population dynamic of fish in GSMNP. Major spring floods and summer droughts are the driving forces behind fish population dynamics in the Park (NPS 2006).”

▪ **Section 5.2.3.5 Northern Shore Corridor, eighth paragraph, page 101**

*Revise the third sentence as follows:*

“Indirect impacts such as hydrologic alterations would also be ~~increased~~ ~~decreased~~ by an estimated 4 and 7 & percent, respectively, for the Primitive and Principal Park Roads.”

▪ **Section 5.2.3.5 Northern Shore Corridor, ninth paragraph, page 101**

*Revise the third sentence as follows:*

“Indirect impacts would be ~~increased~~ ~~reduced~~ by an estimated 8 and 7 percent, respectively, for the Primitive and Principal Park Roads.”

▪ **Section 5.3.2 Minimization Techniques, page 103**

*After the first paragraph, insert the following text:*

“In order to determine the ongoing effectiveness of BMPs and other minimization measures, NPS would conduct water quality and aquatic ecology monitoring before construction, during construction, and after construction. Monitoring before construction would be conducted to establish baseline conditions for comparisons and would occur in the year prior to construction. Surveys for benthic macroinvertebrates and electroshocking for fish would be conducted once prior to construction. Monitoring during construction would be conducted to determine immediate changes in water quality. Any changes to water quality would be immediately addressed or would trigger additional water quality monitoring. Monitoring after construction would most likely follow the same sampling regime as the monitoring before construction.”

▪ **Section 8 References, p. 116**

*Revise the text as follows:*

Robinson, R.B., J.L. Smoot, J. Shubzda, M. Wood, G. Harwell, and T. Barnett. 2003. Great Smoky Mountains National Park Hazel Creek Water Quality Data (**unpublished data**). The University of Tennessee, Knoxville.

▪ **Section 8 References**

*Insert the following references in the appropriate locations:*

Bacon, J.R. and R.P. Maas. Acid and heavy metal contamination of Great Smoky Mountains National Park trout streams by Anakeesta formations. *Journal of Environmental Quality*, 8:538-542.

Burrows, W.D. 1977. Aquatic aluminum: chemistry, toxicology, and environmental prevalence. *In* Critical reviews in environmental controls. The Chemical Rubber Company, Cleveland, OH.

Butler, R.L., E.L. Cooper, J.K. Crawford, C.C. Hales, W.G. Kimmel, and C.C. Wagner. 1973. Fish and food organisms in acid mine waters of Pennsylvania. Ecology Research Service Publication No. EPA-R3-73-032, Office of Research and Monitoring, United States Environmental Protection Agency. Washington, DC.

- Dagenhart, T.V. 1980. The acid mine drainage of Contrary Creek, Louisa County, Virginia – factors causing variations in stream water chemistry. MS Thesis, University of Virginia.
- Greverd, D.A. 2002. Effect of Anakeesta leachate on the decomposition of allochthonous leaf litter by aquatic hyphomycetes. Thesis, Western Carolina University.
- Hammarstrom, J.M., R.R. Seal, A.L. Meier, and J.C. Jackson. 2003. Weathering of sulfidic shale and copper mine waste: secondary minerals and metal cycling in Great Smoky Mountains National Park, Tennessee, and North Carolina, USA. *Environmental Geology*, 45:35-57.
- Herrman, R., E.L. Morgan, and R.L. Green. 1978. Aluminum precipitation, Beech Flats and Walker's Prong Creeks, Great Smoky Mountains National Park. *Proceedings of the First Conference on Scientific Research in the National Parks*. 3:715-718.
- Huckabee, J.W., C.P. Goodyear, and R.D. Jones. 1975. Acid rock in the Great Smokies: unanticipated impact on aquatic biota of road construction in regions of sulfide mineralization. *Transactions of the American Fisheries Society*, 4:677-684.
- Kucken, D.J., R.P. Maas, and S.C. Patch. 1992. Great Smokies streams acidified by Anakeesta formation exposures. *Park Science: A Resource Management Bulletin*. United States Department of the Interior, National Park Service, 12(1):1-4.
- Kucken, D.J., J.S. Davis, J.W. Petranka, and C.K. Smith. 1994. Anakeesta stream acidification and metal contamination effects on a salamander community. *Journal of Environmental Quality*, 23:1311-1317.
- Mathews, R.C., and E.L. Morgan. 1982. Toxicity of Anakeesta Leachates to Shovel-Nosed Salamander, Great Smoky Mountains National Park. *Journal of Environmental Quality*, 11(1):102-106.
- National Park Service (NPS). 2006. *Nature & Science: Fish*.  
<http://www.nps.gov/grsm/pphtml/subanimals4.html> Accessed July.
- Neville, C.M. 1979. Influence on mild hypercapnia on the effects of environmental acidification of rainbow trout (*Salmo gairdneri*). *Journal of Experimental Biology*, 83:345-349.
- Schofield, C.A. 1965. Water Quality in Relation to Survival of Brook Trout, *Salvelinus fontinalis* (Mitchill). *Transactions of the American Fisheries Society*, 94:227-235.
- Trumf, W.F., E.L. Morgan, and R. Herrman. 1976. Man induced acid drainage impact on benthic macroinvertebrate communities in the Great Smoky Mountains National Park. *In Proceedings of the 1<sup>st</sup> Conference on Scientific Research in the National Parks*, New Orleans, LA.

▪ **Attachment M-5**

*Revise rows in the table as follows:*

Report IDs 33-210, 218-304, 307-332, and 334-362: Add “ORW” to DWQ Usage.

Report IDs 211-217 and 305-306: Replace DWQ Usage “WS-IV; Tr, CA” with “C; Tr, ORW”.

Report IDs 295 and 305: Add “-(0.5)” to the DWQ ID to read “2-146-(0.5)”.

Report ID 333: Replace DWQ usage “WS-IV, Tr, CA” with “WS-IV; Tr, ORW”.

▪ **Attachment M-5**

*Revise footnote 2 as follows:*

Add “ORW = Outstanding Resource Water.”

▪ **Attachment M-6**

*Revise title as follows:*

**Direct Impacts to Streams Impacted by Principal and Primitive Park Road Designs**

▪ **Attachment M-6**

*Revise rows in the table as follows:*

Report IDs 33-210, 218-304, 307-332, and 334-362: Add “ORW” to DWQ Usage.

Report IDs 212-216 and 305-306: Replace DWQ Usage “WS-IV; Tr, CA” with “C; Tr, ORW”.

Report IDs 295 and 305: Add “-(0.5)” to the DWQ ID to read “2-146-(0.5)”.

▪ **Attachment M-6**

*Revise the following text for footnote 2:*

“LB = Laurel Branch Picnic Area; NSC = Northern Shore ~~Corridor Road~~; B = Partial-Build Alternative to Bushnell ~~Option~~; SOF = Southern Option at Forney Creek; SOHE = Southern Option at Hazel and Eagle Creeks; FD = **Southern Option Crossing** Fontana Dam ~~Option~~.”

▪ **Attachment M-6**

*Replace current footnote 4 with the following text:*

“P = perennial stream; I = intermittent stream.”

▪ **Attachment M-6**

*Replace current footnote 5 with the following text:*

“NCDWQ Usage Classifications: B = Class B (primarily recreational use); C = Class C (secondary recreation and wildlife use); Tr = Trout Waters; WS-IV = Water Supply (public water supply); CA = critical area within 0.5 miles (0.8 km) from water supply intake; ORW = Outstanding Resource Water.”

▪ **Attachment M-6**

*Insert superscript “6” to column name “Area Impacted (ac)”*

*Insert footnote:*

“<sup>6</sup> Area of stream impacted directly by the proposed footprint.”