

## **Appendix A.6**

# **Environmental Impacts Associated with Facilities Considered Most Comparable**



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## PROJECT TECHNICAL MEMORANDUM

**TO:** NYCDEP – OEPA

**FROM:** EA Engineering, P.C. and its Affiliate EA Science and Technology

**SUBJECT:** Crossroads DEIS Review – Deliverable No. A.4 Subtask 3b  
Environmental Impacts Associated with Facilities Considered Most Comparable

**DATE:** 16 January 2004 (Finalized April 2004)

### INTRODUCTION

This Technical Memorandum provides an evaluation of potential water quality impacts of the comparable facilities identified by RKG Associates, Inc. in Appendix A.4; these include Copper Mountain, Colorado, and Mountain Creek, New Jersey. EA was unable to identify relevant existing water quality data for the Snowshoe Mountain Resort, West Virginia, or the Northstar Village at Lake Tahoe, California. West Virginia and California watershed monitoring sites at these two resorts were located at too great a distance from the respective developments to be indicative of potential project impacts.

### MOUNTAIN CREEK VILLAGE

The Mountain Creek Village is located in Vernon, New Jersey adjacent to the Mountain Creek Ski Area. These accommodations and ski village border Black Creek and the Black Creek Sanctuary. A key component of construction of this development included demolition of a number of old deteriorated buildings, wetland restoration in the Black Creek floodplain, and upland habitat restoration. Lawler, Matusky, and Skelly Engineers prepared the environmental impact statement for this project; no pre- or post-construction water quality monitoring was conducted in conjunction with this study. The extensive wetland and upland habitat restoration work was accepted by regulators and stakeholders as an enhancement to water quality and aquatic and wildlife habitat (Lawler, Matusky, and Skelly Engineers 2003).

The New Jersey Department of Environmental Protection had a water quality monitoring station (USGS 01368950) on Black Creek downstream of Mountain Creek as part of their watershed management program. This monitoring program generally included the collection of 4-6 samples on random dates between spring and fall each year beginning in 1976. Samples were variably analyzed for nutrients, pesticides/polychlorinated biphenyls, metals and other inorganics, suspended and bed load sediments, bacteria, and physical parameters ([http://nwis.waterdata.usgs.gov/nj/nwis/qwdata?search\\_site\\_no=01368950&search\\_site\\_no\\_match\\_type=exact&county\\_cd=34037&sort\\_key=site\\_no&group\\_key=NONE&sitefile\\_output\\_format=html\\_table&column\\_name=site\\_no&column\\_name=station\\_nm&column\\_name=map\\_nm&column\\_name=alt\\_va&colu](http://nwis.waterdata.usgs.gov/nj/nwis/qwdata?search_site_no=01368950&search_site_no_match_type=exact&county_cd=34037&sort_key=site_no&group_key=NONE&sitefile_output_format=html_table&column_name=site_no&column_name=station_nm&column_name=map_nm&column_name=alt_va&colu)



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\\_site\\_no\).](#) While this database provides a useful pre-construction characterization of water quality in Black Creek near the resort, sampling at this station was terminated in 1997, prior to the beginning of the majority of new development at the Mountain Creek Resort.

### COPPER MOUNTAIN RESORT

The Copper Mountain Resort in Colorado is located along the south side of West Tenmile Creek. Within the study area, Interstate 70 parallels West Tenmile Creek to the north for approximately 2 mi; immediately upstream of the study area, West Tenmile Creek flows within the median between the east and west-bound lanes of the interstate for approximately 2 mi.

EA reviewed two water quality monitoring reports for Copper Mountain Resort covering the period 1999-2001 (Lewis and Saunders 2000, 2002). This monitoring program encompassed a network of five sampling stations including upstream, within, and downstream of the resort. The primary objective of the program was to assess the impact of the resort and Interstate 70 on phosphorus loadings to West Tenmile Creek. Although 15-17 sampling events per year, including water quality and discharge, were anticipated in the sampling design, only 9-15 water quality samples were collected per year and discharge was measured for only 4-13 sampling dates per year. The sampling program was based on sampling on pre-selected sampling dates and, therefore, may have missed a number of significant runoff events. The 2001 sampling year appears to have been a relatively dry year compared to 1999 and 2000, based on the following staff gauge flows provided in these reports:

Location	Staff Gauge (cfs)		
	1999	2000	2001
Upstream (WT1)	8-155	8-162	5-76
Within Development (WT2)	7-163	2-242	3-81
Downstream (WT3)	8-190	1-14	2-102

The watershed areas upstream of each of these sampling points are as follows:

Location	Area (acres)
Upstream (WT1)	15,445
Within Development (WT2)	17,300
Downstream (WT3)	18,530

There is considerable variability among sampling locations within sampling dates as well as between sampling dates and years. There does not appear to be a consistent relationship between observed flow, total suspended solids, and total phosphorus. The reported mean and range for total phosphorus concentrations are summarized below:



Location	Total Phosphorus (µg/L)		
	1999	2000	2001
Upstream (WT1)	5.7 (3.1-16.3)	6.3 (2.0-15.1)	4.8 (2.2-9.7)
Within Development (WT2)	6.6 (2.5-17.2)	8.2 (2.7-18.0)	7.0 (2.0-31.1)
Downstream (WT3)	7.2 (3.9-17.0)	14.7 (3.7-22.5)	7.0 (3.3-18.8)

Background phosphorus concentrations were estimated based on watershed modeling. The authors subtracted the background concentrations from observations at the upstream station (WT1) to estimate the loading of phosphorus per mile from Interstate 70. The estimates for total annual export of phosphorus are summarized below:

Export Control Location	Phosphorus Export (kg/year)		
	WT1	WT2	WT3
<b>1999</b>			
Background	186	212	227
Interstate 70	32	36	44
Copper Mountain	0	26	9
Total	218	274	280
<b>2000</b>			
Background	186	212	227
Interstate 70	65	74	91
Copper Mountain	0	31	91
Total	252	317	409
<b>2001</b>			
Background	93	85	98
Interstate 70	6	7	9
Copper Mountain	0	32	33
Total	99	124	140

During the wetter years (1999-2000), the estimated export attributed to Interstate 70 was equal or greater than that estimated from Copper Mountain. During drier conditions in 2001, the phosphorus loading from Copper Mountain was similar to that observed in 1999 and 2000, although background phosphorus export and export associated with Interstate 70 were significantly lower than in the wet years, 1999 and 2000. Phosphorus export associated with the Copper Mountain property was an increase of approximately 30-35 percent above background during the dry year, 2001. In 1999 and 2000, the increases over background were 4-10 percent and 15-40 percent, respectively. Assuming that best management practices were implemented at Copper Mountain, this represents a significant increase in the uncontrolled phosphorus load to the system from this development.

On an area basis, the export from Copper Mountain ranged from 0.49 to 4.9 g/ac/year.

It is difficult to put this export rate into perspective with the proposed Belleayre Resort without a complete understanding of the type and extent of stormwater management procedures and engineering controls at Copper Mountain. In addition, information relative to watershed soils, vegetative cover, extent of disturbed surfaces and added impervious surfaces, and



geomorphology are important factors influencing the quantity and quality of runoff that are not readily available for Copper Mountain.

#### **REFERENCES CITED**

Lawler, Matusky, and Skelly Engineers. 2003. Personal communication with John Matousek. 22 December.

Lewis, W.M., Jr. and J.F. Saunders. 2000. Water Quality Monitoring for Copper Mountain Resort, Results for 1999 and 2000. 15 December.

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