

APPENDIX I: Habitat Integrity and Future Security Factors in Range-wide Assessment

Tables 1 and 2 list the primary and secondary factors summarized for each EBT population patch or HUC12 subwatershed in the range-wide assessment. Data sources, comments on data processing, and reasoning for primary/secondary designation are included. Figure 1 provides a correlation matrix for all habitat condition factors at the EBT population patch scale.

Table 1: Habitat Integrity factors

Theme	Type	Factor	Data source	Comment
Land use/land cover	Primary	% riparian zone forested (within 100m stream buffer)	EPA StreamCat	Includes deciduous, evergreen, mixed forest and woody wetlands; open water excluded from total area calculation.
	Secondary	% forested	EPA StreamCat	Includes deciduous, evergreen, mixed forest and woody wetlands; open water excluded from total area calculation. Excluded as primary factor due to correlation w/ % riparian forested.
	Primary	% agricultural land use	EPA StreamCat	Includes cultivated crops and pasture lands.
Frag-mentation	Primary	Road-stream crossings per km ²	EBTJV	
	Primary	Road density (mi/mi ²)	EPA StreamCat	
Flow regime	Secondary	Dam count	USACE National Inventory of Dams 2008	Excluded as primary factor because patch delineation accounted for dams and spatial accuracy of dam location may misplace dam incorrectly into adjacent patches.
	Secondary	Ratio of dam storage to stream mi.	USACE National Inventory of Dams 2008	Excluded as primary factor because patch delineation accounted for dams and spatial accuracy of dam location may misplace dam incorrectly into adjacent patches.
	Secondary	% impervious surface	EPA StreamCat	Excluded as primary factor due to correlation with road density.
Water Quality	Secondary	% stream miles 303(d)-listed as impaired	2012 303(d)-listed impaired waters, EPA	Excluded as primary factor due to inconsistencies in 303d designation frequency and methodology among states.
	Primary	Mean acid deposition (kg/ha; NO ₃ + SO ₄ summed)	EBTJV 2015	

Theme	Type	Factor	Data source	Comment
Water Quality, cont.	Secondary	Existing oil & gas wells	FracTracker, 2015	Excluded as primary factor due to limited spatial extent of oil/gas development only within Central Appalachian region. Geothermal wells and uncompleted wells excluded from summary.
	Secondary	Active mines	USGS Mineral Resources Data System 2005	Excluded as a primary factor due to data set quality – active and abandoned/legacy coal mines absent.

Table 2: Future Security factors

Theme	Type	Factor	Data source	Comment
Resource development	Secondary	Projected coal development (@ > 90% modeled likelihood)	TNC/App LCC energy development forecast (Dunscomb et al. 2014)	Excluded as primary factor due to limited spatial extent of oil/gas development only within Central Appalachian region.
	Secondary	Projected shale gas development (@ > 65% modeled likelihood)	TNC/App LCC energy development forecast (Dunscomb et al. 2014)	Excluded as primary factor due to limited spatial extent of oil/gas development only within Central Appalachian region.
Urban development	Secondary	Projected urban/exurban development in 2030	Theobald urban projections, 2008	Excluded as primary factor due to local nature of urban/exurban development subject to zoning and other regulatory structures.
Climate change	Primary	Ave. max.30-day ave. stream temp. (°C)	DeWeber and Wagner, 2015	
	Secondary	% stream network underlain by karst	Karst in the United States: A Digital Map Compilation and Database, USGS, 2014	Excluded as primary factor due to limited spatial overlap of karst regions with larger EBT distribution.
Land stewardship	Secondary	% protected	USGS Protected Areas Database 1.4 2016	Includes all public and private designations. Excluded as primary factor due to wide range of permissible activities on public lands (e.g., mining, logging, commercial development).

Figure 1: Habitat Integrity factor correlation matrix. Numbers within matrix are r^2 values and indicate the strength of correlation – positive numbers indicate a positive relationship between variables, negative numbers indicate a negative relationship, and values closer to 1 or -1 indicate stronger relationships

