

Appendix E

Aquatic Species Viability

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AQUATIC SPECIES VIABILITY EVALUATION FORM**Definition of Terms and Underlying Assumptions**

Common Name/Scientific Name: Common and scientific names used in this report are from the book “Fishes of West Virginia” by Stauffer et al 1995. This is for consistency with species that may have had more than one common name (e.g. candy darter and finescale saddled darter are the same species), or have changed taxonomic groups.

G Rank, N Rank and S Rank: A ranking system that identifies the status of a species in its global (G) range, its status within each nation (N) in its range, and subnationally (S) for its status in each state or province within its range. Species are ranked on a scale from 1-5 that stand for:

- 1 = Critically imperiled.
- 2 = Imperiled.
- 3 = Vulnerable to extinction or extirpation.
- 4 = Apparently secure.
- 5 = Abundant, common, secure.

For additional information see: <http://www.natureserve.org/explorer/ranking.htm>

RFSS: Regional Forester Sensitive Species (RFSS) represent those species that occur within the proclamation boundary and are either candidates for listing under the Endangered Species Act, have a G or N ranking of 1, 2 or 3, or are considered sensitive by the National Forest based on a risk evaluation. For additional information refer to: http://www.fs.fed.us/r9/wildlife/tes/tes_lists.htm.

Distribution Within the Proclamation Boundary: Distribution of S 1, 2 and 3 species is described by 5th level watersheds. Initial distribution was based on Stauffer et al 1995 and supplemented with fish sampling data from the WVDNR and the Heritage database. WVDNR data that included site locations in UTM's were plotted in GIS. It should be noted that not all samples could be plotted due to a lack of coordinate data, different formats in reporting coordinates or errors in the data. Site descriptors such as county, USGS quad, and stream name were used to approximate the location of the data that could not be plotted.

Habitat Requirements: Detailed life histories and habitat requirements are lacking for many fish species. General requirements were obtained from Stauffer et al 1995, NatureServ (<http://www.natureserve.org/explorer/servlet/NatureServe?init=Species>), EFISH (<http://www.cnr.vt.edu/efish/index.html>), FishBase (<http://www.fishbase.org/home.htm>), and other literature on file or on the internet.

Threats: There are number of physical, biological and chemical factors that influence populations. The threats addressed here are specific to forest management activities and our potential to affect population viability. The primary concerns associated with land management activities are 1) increased sedimentation due to ground disturbing activities, 2) increased stream temperatures due to reduced riparian vegetation and stream shading,

3) decreased habitat conditions and channel stability due to reduced recruitment of large woody debris and 4) fragmentation of habitat and isolation of populations due to passage barriers associated with road crossings. In addition to these land management factors, much of the planning area is underlain by geologies that are sensitive to acid deposition and streams in watersheds with poorly buffered geologic types are susceptible to acidic conditions.

The threat analysis will evaluate the sensitivity of species to the different disturbances (sediment, temperature, habitat complexity, passage and acidic conditions). Given the lack of detailed life history information, the following assumptions are used to evaluate species sensitivity:

Sedimentation: Benthic organisms, or life stages, are susceptible to sedimentation and the filling of interstitial spaces that affect habitat and food supplies.

Water temperature: Cold water species are more sensitive to changes in stream temperature than the cool and warm water species that are more tolerant.

Habitat complexity: Species that prefer pool habitat are more sensitive to a loss of channel structure and habitat complexity than riffle and run dwelling species. Large woody debris plays a greater role in forming habitat in smaller headwater streams than in larger main stem systems, so species occupying headwater streams are more sensitive to losses of LWD.

Passage barriers: Road crossings on small streams are more likely to create passage barriers and reduce the habitat available to headwater species than crossings on larger main stem streams.

Acid deposition: At times, the literature referred specifically to a specie's sensitivity to acidic conditions. These species have been identified as being acid sensitive, when in actuality all species are susceptible to low pH levels. We also assumed that species in headwater streams are generally more susceptible to acidic conditions than species inhabiting main stem rivers with broad drainage areas.

Comments: How threats relate to watershed conditions and land management activities on NFS lands. Generally speaking, headwater species are in closer proximity to our management actions and are more susceptible to our actions. The relative role of NFS lands decreases as the drainage area increases moving downstream. The potential of the Forest to influence population viability, either positively or negatively, is greater in the headwaters than the larger main stem rivers

Viability Determination: Based upon the sensitivity of the species to habitat changes associated with the direct, indirect or cumulative effects of our land management activities within the watersheds they inhabit.

Outcome A. Species is present within the watershed and potential effects are low due to management prescriptions, watershed characteristics or species tolerance. The likelihood of maintaining viability is high.

Outcome B. Species is present within the watershed and management activities can potentially affect one or more of the species vulnerabilities. NFS lands represent more than 50% of the

watershed area within the proclamation boundary. The likelihood of maintaining viability is moderate.

Outcome C. Species is present within the watershed and forest management activities can potentially affect one or more of the species vulnerabilities. NFS lands represent less than 50% of the watershed area within the proclamation boundary. The likelihood of maintaining viability is low to moderate.

Outcome D. Species occurrence is rare within the watershed and stochastic events (accidents, weather events, etc.) may place persistence of the species within the watershed at risk. Potential effects related to forest management activities are low due to management prescriptions, watershed characteristics or species tolerance. The likelihood of maintaining viability is low to moderate.

Outcome E. Species occurrence is rare within the watershed and stochastic events (accidents, weather events, etc.) may place persistence of the species within the watershed at risk. Management activities can potentially affect one or more of the species vulnerabilities. NFS lands represent more than 50% of the watershed area within the proclamation boundary. The likelihood of maintaining viability is low to moderate.

Outcome F. Species occurrence is rare within the watershed and stochastic events (accidents, weather events, etc.) may place persistence of the species within the watershed at risk. Management activities can potentially affect one or more of the species vulnerabilities. NFS lands represent less than 50% of the watershed area within the proclamation boundary. The likelihood of maintaining viability is low.

Table E-1. Monongahela National Forest Fifth-Level Watershed Sizes and NFS Lands

Watershed	Hydrologic Unit Code #	Total Acres	Acres within Proclamation Boundary	NFS Land Acres	Percent NFS Lands
South Branch Potomac	2070001010	184,128	27,300	9,459	5%
North Fork	2070001020	202,752	136,600	71,143	36%
South Branch Potomac 1	2070001030	33,536	29,900	17,529	53%
Lunice Creek	2070001040	56,960	800	783	1%
Mill Creek	2070001050	66,752	7,800	1,500	2%
Upper Tygart Valley River	5020001010	96,704	60,800	16,480	17%
Upper Tygart Direct Drainages	5020001020	78,592	29,800	10,853	14%
Leading Creek	5020001030	38,592	1,300	918	2%
Shavers Fork	5020004010	137,152	137,200	95,815	71%
Red Creek	5020004020	39,168	38,000	26,726	68%
Gandy Creek	5020004030	61,056	61,100	18,153	30%
Laurel Fork	5020004040	38,592	38,600	22,484	58%
Glady Fork	5020004050	40,640	40,600	26,902	67%
Blackwater River	5020004060	89,344	45,400	14,013	16%
Dry Fork	5020004070	51,072	51,100	34,976	72%
Horseshoe Run	5020004080	35,264	35,300	13,896	39%
Cheat River Direct Drainages	5020004090	106,752	51,400	20,078	19%
Upper Greenbrier River	5050003010	85,120	85,100	69,016	81%
Deer Creek/Sitlington Creek	5050003020	74,432	74,400	30,453	41%
Greenbrier River 1	5050003040	100,224	87,600	27,556	28%
Knapp Creek/Marlin Run	5050003060	86,144	78,400	44,039	52%
Spring Creek	5050003080	118,976	23,100	7,020	6%
Greenbrier River	5050003090	109,312	72,400	35,425	32%
Anthony Creek	5050003100	94,976	94,900	71,989	76%
Howards Creek	5050003110	58,368	8,300	7,261	13%
Upper Gauley	5050005010	44,608	44,100	5,932	13%
Williams River	5050005020	82,624	82,600	72,941	89%
Gauley/Big Ditch Run	5050005040	41,664	20,900	11,553	29%
Cranberry River	5050005050	62,080	62,100	59,939	97%
Cherry River	5050005060	106,048	103,600	28,545	27%
Upper Elk River	5050007010	154,240	70,500	32,888	21%

Table E-2. Monongahela National Forest Fifth-Level Watershed Sensitivity Characteristics

Watershed	% of NFS Lands that are Highly Erosive	% of NFS Land with Mauch Chunk Soils	% of NFS Land with Acid Sensitive Geology	NFS Streams (miles)	NFS Road Crossings (No.)	Species of Concern (No.)
South Branch Potomac	89%	0%	54%	30	23	2
North Fork	84%	21%	23%	208	66	5
South Branch Potomac 1	90%	0%	47%	61	42	6
Lunice Creek	83%	59%	42%	3	3	3
Mill Creek	78%	0%	87%	3	0	3
Upper Tygart Valley River	90%	13%	18%	43	17	1
Upper Tygart Direct Drainages	91%	10%	16%	31	20	3
Leading Creek	87%	0%	0%	2	0	1
Shavers Fork	72%	3%	56%	287	129	7
Red Creek	45%	3%	33%	50	8	3
Gandy Creek	79%	5%	6%	59	19	4
Laurel Fork	70%	2%	7%	97	24	1
Glady Fork	73%	2%	5%	108	55	3
Blackwater River	19%	0%	67%	31	9	2
Dry Fork	44%	0%	59%	101	66	2
Horseshoe Run	81%	0%	1%	48	15	2
Cheat River Direct Drainages	77%	0%	2%	67	65	8
Upper Greenbrier River	83%	5%	5%	211	144	12
Deer Creek/Sitlington Creek	92%	2%	10%	103	57	8
Greenbrier River 1	87%	18%	11%	85	18	10
Knapp Creek/Marlin Run	94%	0%	31%	163	58	8
Spring Creek	84%	52%	30%	10	3	4
Greenbrier River	78%	0%	70%	108	38	4
Anthony Creek	85%	0%	50%	262	126	9
Howards Creek	95%	0%	16%	24	10	5
Upper Gauley	84%	0%	97%	19	12	3
Williams River	77%	20%	70%	203	103	12
Gauley/Big Ditch Run	78%	0%	98%	45	25	2
Cranberry River	75%	7%	83%	136	101	5
Cherry River	84%	0%	79%	84	50	9
Upper Elk River	90%	49%	44%	74	27	3

The following tables (Tables E-3 through E-7) display the data used to determine aquatic species viability for each fifth-level watershed in which the species were reported to occur.

Table E-3. Species Vulnerability Factors

Species	State S Rank	Species Vulnerability Factor				
		Sediment	Temp.	Habitat Complexity	Passage	Acid Dep.
FISH						
American eel (<i>Anguilla rostrata</i>)	S2					
Appalachia darter (<i>Percina gymnocephala</i>)*	S3	X		X		
Banded sculpin (<i>Cottus caroliniae</i>)	S2	X				
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	S3S4	X				
Bluebreast darter (<i>Etheostoma camurm</i>)	S3	X				X
Bluehead chub (<i>Nocomis leptcephalus</i>)	S3					
Candy darter (<i>Etheostoma osburni</i>)*	S2	X				
Cheat minnow (<i>Rhinichthys bowersi</i>)*	S1S2			X		X
Common shiner (<i>Luxilus cornutus</i>)	S3					
Creek chubsucker (<i>Erimyzon oblongus</i>)	S3	X			X	
Kanawha minnow (<i>Phenacobius teretulus</i>)*	S1	X				X
Longhead darter (<i>Percina macrocephala</i>)	S2	X		X	X	
Mountain redbelly dace (<i>Phoxinus oreas</i>)	S3			X	X	
New River shiner (<i>Notropis scabriceps</i>)*	S2		X			X
Pearl dace (<i>Margariscus margarita</i>)*	S3S4		X	X	X	
Popeye shiner (<i>Notropis ariommus</i>)	S2	X				
Potomac scuplin (<i>Cottus girardi</i>)	S3	X				
Redside dace (<i>Clinostomus elongatus</i>)*	S1S2	X	X		X	X
Tesselated darter (<i>Etheostoma olmstedii</i>)	S2	X				
Tonguetied minnow (<i>Exoglossum laurae</i>)	S3	X				X
Torrent sucker (<i>Thoburnia rhothoeca</i>)	S3	X			X	
Black redbhorse (<i>Moxostoma dusquensnei</i>)	S4	X	X	X	X	
Brindled madtom (<i>Noturus miurus</i>)	S4	X		X	X	
Logperch (<i>Percina caprodes</i>)	S5	X		X		
Longear sunfish (<i>Lepomis megalotis</i>)	S5	X		X		
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	S5	X		X		
Rosefin shiner (<i>Lythrurus ardens</i>)		X				X
Spottail shiner (<i>Notropis hudsonius</i>)	S4			X		
Spotted bass (<i>Micropterus punctulatus</i>)	S5			X		
Yellow bullhead (<i>Ameiurus natalis</i>)	S5					
AMPHIBIAN						
Eastern Hellbender (<i>Cryptobranchus alleganiensis</i>)*	S2	X	X			X
CRUSTACEAN						
A Crayfish (<i>Cambarus monongalensis</i>)	S3					
New River Crayfish (<i>Cambarus chasmodactylus</i>)	S3	X				
MOLLUSK						
Elktoe (<i>Alasmidonta marginata</i>)*	S2	X		X		X
Green Floater (<i>Lasmigona subviridis</i>)*	S2	X		X		

*Regional Forester's Sensitive Species

Table E-4. Species Occurrence by Watershed

Species	Watershed	Percent NFS Land within Proclamation Boundary	Number of Collections	Last Year Reported
FISH				
American eel (<i>Anguilla rostrata</i>)	N. Fork South Branch Potomac	53%	3	1986
	South Branch Potomac 1	60%	1	1979
Appalachia darter (<i>Percina gymnocephala</i>)	Upper Greenbrier River	81%	6	2001
	Greenbrier River 1	32%	1	1971
	Anthony Creek	76%	N/A	N/A
	Howards Creek	88%	N/A	N/A
	Upper Gauley	13%	N/A	N/A
	Williams River	89%	2	1977
	Cherry River	27%	2	1980
Banded sculpin (<i>Cottus carolinae</i>)	Upper Greenbrier River	81%	N/A	N/A
	Deer Creek/Sitlington Creek	41%	N/A	N/A
	Greenbrier River 1	32%	N/A	N/A
	Knapp Creek/Marlin Run	57%	4	2000
	Greenbrier River	49%	N/A	N/A
	Anthony Creek	76%	2	2001
	Howards Creek	88%	N/A	N/A
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	Upper Greenbrier River	81%	11	2001
	Deer Creek/Sitlington Creek	41%	10	2001
	Greenbrier River 1	32%	4	2000
	Knapp Creek/Marlin Run	57%	13	2000
	Greenbrier River	49%	8	1991
	Anthony Creek	76%	3	1999
	Howards Creek	88%	N/A	N/A
	Upper Gauley	13%	6	1994
	Williams River	89%	16	2001
	Gauley/Big Ditch Run	57%	4	1981
	Cranberry River	97%	1	2001
	Cherry River	27%	10	2001
Bluebreast darter (<i>Etheostoma camurm</i>)	Upper Elk River	47%	N/A	N/A
	Shavers Fork	71%	N/A	N/A
	Blackwater River	31%	N/A	N/A
	Dry Fork	72%	N/A	N/A
Bluehead chub (<i>Nocomis leptcephalus</i>)	Cheat River Direct Drainages	39%	1	1973
	Deer Creek/Sitlington Creek	41%	3	2001
	Knapp Creek/Marlin Run	57%	7	2000
Candy darter (<i>Etheostoma osburni</i>)	Anthony Creek	76%	4	2001
	Upper Greenbrier River	81%	14	2001
	Deer Creek/Sitlington Creek	41%	6	2001
	Greenbrier River 1	32%	1	1960
	Knapp Creek/Marlin Run	57%	6	2000
	Greenbrier River	49%	N/A	N/A
	Anthony Creek	76%	4	1999
	Upper Gauley	13%	1	1994

Species	Watershed	Percent NFS Land within Proclamation Boundary	Number of Collections	Last Year Reported
	Williams River	89%	9	2001
	Gauley/Big Ditch Run	57%	N/A	N/A
	Cherry River	27%	9	2001
Cheat minnow (<i>Rhinichthys bowersi</i>)	Shavers Fork	71%	2	1999
	Gandy Creek	30%	1	1976
	Laurel Fork	58%	1	1986
	Glady Fork	67%	1	1986
	Horseshoe Run	39%	1	1977
	Cheat River Direct Drainages	39%	N/A	N/A
Common shiner (<i>Luxilus cornutus</i>)	South Branch Potomac	35%	N/A	N/A
	N. Fork South Branch Potomac	53%	10	1995
	South Branch Potomac 1	60%	2	1979
	Lunice Creek	100%	N/A	N/A
	Mill Creek	19%	N/A	N/A
	Glady Fork	67%	3	1975
Creek chubsucker (<i>Erimyzon oblongus</i>)	Lunice Creek	100%	N/A	N/A
	Cherry River	27%	1	1998
	Upper Elk River	47%	1	2001
Kanawha minnow (<i>Phenacobius teretulus</i>)	Upper Greenbrier River	81%	9	2001
	Greenbrier River 1	32%	1	1971
	Williams River	89%	1	1944
	Cherry River	27%	N/A	N/A
Longhead darter (<i>Percina macrocephala</i>)	Williams River	89%	1	1967
Mountain redbelly dace (<i>Phoxinus oreas</i>)	Shavers Fork	71%	5	1999
	Upper Greenbrier River	81%	26	2001
	Deer Creek/Sitlington Creek	41%	5	2001
	Greenbrier River 1	32%	N/A	N/A
	Knapp Creek/Marlin Run	57%	3	1999
	Spring Creek	31%	1	1996
	Williams River	89%	1	1999
	Cranberry River	97%	1	1995
New River shiner (<i>Notropis scabriceps</i>)	Upper Greenbrier River	81%	5	1999
	Deer Creek/Sitlington Creek	41%	4	2001
	Greenbrier River 1	32%	1	1971
	Knapp Creek/Marlin Run	57%	6	2000
	Spring Creek	31%	N/A	N/A
	Greenbrier River	49%	N/A	N/A
	Anthony Creek	76%	N/A	N/A
	Howards Creek	88%	N/A	N/A
	Williams River	89%	2	1944
	Cherry River	27%	1	1944
Pearl dace (<i>Margariscus margarita</i>)	N. Fork South Branch Potomac	53%	N/A	N/A
	Upper Tygart Direct Drainages	37%	N/A	N/A
	Red Creek	70%	2	1986
	Gandy Creek	30%	5	1984
	Glady Fork	67%	N/A	N/A

Species	Watershed	Percent NFS Land within Proclamation Boundary	Number of Collections	Last Year Reported
	Dry Fork	72%	N/A	N/A
	Horseshoe Run	39%	N/A	N/A
	Cheat River Direct Drainages	39%	2	1987
Popeye shiner (<i>Notropis ariommus</i>)	Cheat River Direct Drainages	39%	N/A	N/A
Potomac scuplin (<i>Cottus girardi</i>)	South Branch Potomac	35%	N/A	N/A
	N. Fork South Branch Potomac	53%	1	1995
	Mill Creek	19%	N/A	N/A
Redside dace (<i>Clinostomus elongatus</i>)	Blackwater River	31%	N/A	N/A
Tessellated darter (<i>Etheostoma olmstedii</i>)	South Branch Potomac 1	60%	N/A	N/A
	Upper Tygart Direct Drainages	37%	N/A	N/A
	Upper Greenbrier River	81%	17	2001
	Deer Creek/ Sitlington Creek	41%	2	2001
	Knapp Creek/Marlin Run	57%	N/A	N/A
	Spring Creek	31%	N/A	N/A
	Anthony Creek	76%	1	1999
	Howards Creek	88%	N/A	N/A
	Williams River	89%	3	1976
	Cranberry River	97%	N/A	N/A
	Cherry River	27%	N/A	N/A
Torrent sucker (<i>Thoburnia rhothoeca</i>)	North Fork South Branch Potomac	53%	30	1995
LOCALLY RARE FISH				
Black redhorse (<i>Moxostoma duquesnei</i>)	Shavers Fork	71%	1	1958
	Upper Elk River	47%	N/A	N/A
Brindled madtom (<i>Noturus miurus</i>)	Shavers Fork	71%	1	1967
	Red Creek	70%	1	1968
	Cheat River Direct Drainages	39%	1	1973
	Williams River	89%	N/A	N/A
Logperch (<i>Percina caprodes</i>)	Cheat River Direct Drainages	39%	2	1980
Longear sunfish (<i>Lepomis megalotis</i>)	South Branch Potomac 1	60%	1	1979
	Leading Creek	77%	N/A	N/A
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	Upper Tygart Valley River	27%	N/A	N/A
	Cheat River Direct Drainages	39%	N/A	N/A
	Greenbrier River 1	32%	N/A	N/A
	Knapp Creek/Marlin Run	57%	1	1955
Rosefin shiner (<i>Lythrurus ardens</i>)	Anthony Creek	76%	N/A	N/A
Spottail shiner (<i>Notropis hudsonius</i>)	South Branch Potomac 1	60%	N/A	N/A
	Lunice Creek	100%	N/A	N/A
	Mill Creek	19%	N/A	N/A
Spotted bass (<i>Micropterus punctulatus</i>)	Upper Tygart Direct Drainages	37%	N/A	N/A
Yellow bullhead	South Branch Potomac 1	60%	N/A	N/A

Species	Watershed	Percent NFS Land within Proclamation Boundary	Number of Collections	Last Year Reported
(<i>Ameiurus natalis</i>)				
AMPHIBIANS				
Eastern Hellbender (<i>Cryptobranchus alleganiensis</i>)	Shavers Fork	71%	2	1997
	Gandy Creek	30%	1	N/A
	Cheat River Direct Drainages	39%	1	1937
	Upper Greenbrier River	81%	4	1998
	Williams River	89%	1	1996
	Cranberry River	97%	4	1995
	Cherry River	27%	1	2001
CRUSTACEANS				
A Crayfish (<i>Cambarus monongalensis</i>)	Shavers Fork	71%	2	1986
	Red Creek	70%	1	1988
	Gandy Creek	30%	2	1988
	Upper Greenbrier River	81%	3	1988
	Deer Creek/ Sitlington Creek	41%	1	1987
	Spring Creek	31%	1	1988
	Williams River	89%	2	1988
	Cranberry River	97%	2	1988
	Cherry River	27%	2	1987
New River Crayfish (<i>Cambarus chasmodactylus</i>)	Anthony Creek	76%	1	2001
MOLLUSKS				
Elktoe (<i>Alasmidonta marginata</i>)	Upper Greenbrier River	81%	1	1998
	Greenbrier River 1	32%	1	1996
Green Floater (<i>Lasmigona subviridis</i>)	Upper Greenbrier River	81%	1	2001
	Greenbrier River 1	32%	1	2001

Table E-5. Acres of Suited Timberland Management Prescriptions by Species and Watershed

Species	Watershed	Acres of Suited Land MPs by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
FISH						
American eel (<i>Anguilla rostrata</i>)	N. Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
	South Branch Potomac 1	5,564	0	0	0	0
Appalachia darter (<i>Percina gymnocephala</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
	Upper Gauley	3,253	3,832	9,553	3,832	3,832
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cherry River	11,996	15,244	15,244	12,329	15,244
Banded sculpin (<i>Cottus carolinae</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Greenbrier River	17,308	19,846	19,846	16,488	23,647
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Greenbrier River	17,308	19,846	19,846	16,488	23,647
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
	Upper Gauley	3,253	3,832	9,553	3,832	3,832
	Williams River	18,120	17,239	17,239	17,239	17,559
	Gauley/Big Ditch Run	7,966	10,498	10,498	10,498	10,498
	Cranberry River	16,681	17,842	17,842	9,916	17,842
	Cherry River	11,996	15,244	15,244	12,329	15,244
	Upper Elk River	31,837	37,114	37,114	36,890	40,271
Bluebreast darter (<i>Etheostoma camurm</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Blackwater River	1,593	1,045	1,045	715	1,100
	Dry Fork	3,664	0	0	0	0
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Bluehead chub (<i>Nocomis leptcephalus</i>)	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
Candy darter (<i>Etheostoma osburni</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Greenbrier River	17,308	19,846	19,846	16,488	23,647

Species	Watershed	Acres of Suited Land MPs by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Upper Gauley	3,253	3,832	9,553	3,832	3,832
	Williams River	18,120	17,239	17,239	17,239	17,559
	Gauley/Big Ditch Run	7,966	10,498	10,498	10,498	10,498
	Cherry River	11,996	15,244	15,244	12,329	15,244
Cheat minnow (<i>Rhinichthys bowersi</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Gandy Creek	2,315	1,575	1,575	1,333	1,575
	Laurel Fork	2,912	3,889	3,747	3,747	3,889
	Glady Fork	13,356	11,646	11,646	11,646	11,646
	Horseshoe Run	7,236	9,521	9,521	9,521	9,521
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Common shiner (<i>Luxilus cornutus</i>)	South Branch Potomac	3,855	821	821	821	821
	N. Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
	South Branch Potomac 1	5,564	0	0	0	0
	Lunice Creek	501	660	660	660	660
	Mill Creek	933	0	0	0	0
	Glady Fork	13,356	11,646	11,646	11,646	11,646
Creek chubsucker (<i>Erimyzon oblongus</i>)	Lunice Creek	501	660	660	660	660
	Cherry River	11,996	15,244	15,244	12,329	15,244
	Upper Elk River	16,950	9,924	9,553	9,885	10,950
Kanawha minnow (<i>Phenacobius teretulus</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cherry River	11,996	15,244	15,244	12,329	15,244
Longhead darter (<i>Percina macrocephala</i>)	Williams River	18,120	17,239	17,239	17,239	17,559
Mountain redbelly dace (<i>Phoxinus oreas</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sittington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Spring Creek	2,392	0	0	0	0
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cranberry River	16,681	17,842	17,842	9,916	17,842
New River shiner (<i>Notropis scabriceps</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/Sittington Creek	17,404	23,331	23,331	22,662	23,331
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Spring Creek	2,392	0	0	0	0
	Greenbrier River	17,308	19,846	19,846	16,488	23,647
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cherry River	11,996	15,244	15,244	12,329	15,244
Pearl dace (<i>Margariscus margarita</i>)	N. Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
	Upper Tygart Direct Drainages	6,331	3,589	3,589	3,589	3,589
	Red Creek	623	57	30	0	5

Species	Watershed	Acres of Suited Land MPs by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
	Gandy Creek	2,315	1,575	1,575	1,333	1,575
	Glady Fork	13,356	11,646	11,646	11,646	11,646
	Dry Fork	3,664	0	0	0	0
	Horseshoe Run	7,236	9,521	9,521	9,521	9,521
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Popeye shiner (<i>Notropis ariommus</i>)	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Potomac scuplin (<i>Cottus girardi</i>)	South Branch Potomac	3,855	821	821	821	821
	N. Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
	Mill Creek	933	0	0	0	0
Redside dace (<i>Clinostomus elongatus</i>)	Blackwater River	1,593	1,045	1,045	715	1,100
Tesselated darter (<i>Etheostoma olmstedii</i>)	South Branch Potomac 1	5,564	0	0	0	0
Tonguetied minnow (<i>Exoglossum laurae</i>)	Upper Tygart Direct Drainages	6,331	3,589	3,589	3,589	3,589
	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/ Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
	Spring Creek	2,392	0	0	0	0
	Anthony Creek	30,477	42,460	42,460	14,968	49,092
	Howards Creek	92	120	120	120	352
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cranberry River	16,681	17,842	17,842	9,916	17,842
Cherry River	11,996	15,244	15,244	12,329	15,244	
Torrent sucker (<i>Thoburnia rhothoeca</i>)	North Fork South Branch Potomac	25,531	22,335	21,966	20,621	22,335
LOCALLY RARE FISH						
Black redhorse (<i>Moxostoma duquesnei</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Upper Elk River	16,950	9,924	9,553	9,885	10,950
Brindled madtom (<i>Noturus miurus</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Red Creek	623	57	30	0	5
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
	Williams River	18,120	17,239	17,239	17,239	17,559
Logperch (<i>Percina caprodes</i>)	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
Longear sunfish (<i>Lepomis megalotis</i>)	South Branch Potomac 1	5,564	0	0	0	0
	Leading Creek	648	852	852	852	852
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	Upper Tygart Valley River	9,326	3,741	3,741	3,741	3,741
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
	Knapp Creek/Marlin Run	28,129	33,840	33,840	11,879	35,018
Rosefin shiner (<i>Lythrurus ardens</i>)	Anthony Creek	30,477	42,460	42,460	14,968	49,092
Spottail shiner (<i>Notropis hudsonius</i>)	South Branch Potomac 1	5,564	0	0	0	0
	Lunice Creek	501	660	660	660	660
	Mill Creek	933	0	0	0	0
Spotted bass	Upper Tygart Direct Drainages	6,331	3,589	3,589	3,589	3,589

Species	Watershed	Acres of Suited Land MPs by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
<i>(Micropterus punctulatus)</i>						
Yellow bullhead (<i>Ameiurus natalis</i>)	South Branch Potomac 1	5,564	0	0	0	0
AMPHIBIANS						
Eastern Hellbender (<i>Cryptobranchus alleganiensis</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Gandy Creek	2,315	1,575	1,575	1,333	1,575
	Cheat River Direct Drainages	12,640	16,616	16,616	16,616	16,616
	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cranberry River	16,681	17,842	17,842	9,916	17,842
	Cherry River	11,996	15,244	15,244	12,329	15,244
CRUSTACEANS						
A Crayfish (<i>Cambarus monongalensis</i>)	Shavers Fork	21,577	4,183	4,183	4,105	4,278
	Red Creek	623	57	30	0	5
	Gandy Creek	2,315	1,575	1,575	1,333	1,575
	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Deer Creek/ Sitlington Creek	17,404	23,331	23,331	22,662	23,331
	Spring Creek	2,392	0	0	0	0
	Williams River	18,120	17,239	17,239	17,239	17,559
	Cranberry River	16,681	17,842	17,842	9,916	17,842
Cherry River	11,996	15,244	15,244	12,329	15,244	
New River Crayfish (<i>Cambarus chasmodactylus</i>)	Anthony Creek	30,477	42,460	42,460	14,968	49,092
MOLLUSKS						
Elktoe (<i>Alasmidonta marginata</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196
Green Floater (<i>Lasmigona subviridis</i>)	Upper Greenbrier River	31,837	37,114	37,114	36,890	40,271
	Greenbrier River 1	9,260	16,196	16,196	6,415	16,196

Table E-6. Sensitivity Factors by Species and Watershed

Species	Watershed	Sensitivity Factor			
		% High Erosion Potential	% Mauch Chunk Geology	% High Acid Sensitivity	Road Density (miles/sq.mi.)
FISH					
American eel (<i>Anguilla rostrata</i>)	N.F. South Branch Potomac	84%	21%	23%	1.1
	South Branch Potomac 1	90%	0%	47%	1.3
Appalachia darter (<i>Percina gymnocephala</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Greenbrier River 1	87%	18%	11%	1.0
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3
	Upper Gauley	84%	0%	97%	2.5
	Williams River	77%	20%	70%	1.3
	Cherry River	84%	0%	79%	1.6
Banded sculpin (<i>Cottus carolinae</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Greenbrier River	78%	0%	70%	1.7
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3
	Williams River	77%	20%	70%	1.3
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Greenbrier River	78%	0%	70%	1.7
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3
	Upper Gauley	84%	0%	97%	2.5
	Williams River	77%	20%	70%	1.3
	Gauley/Big Ditch Run	78%	0%	98%	1.4
	Cranberry River	75%	7%	83%	1.3
	Cherry River	84%	0%	79%	1.6
Upper Elk River	83%	5%	5%	2.1	
Bluebreast darter (<i>Etheostoma camurm</i>)	Shavers Fork	72%	3%	56%	2.0
	Blackwater River	19%	0%	67%	0.8
	Dry Fork	44%	0%	59%	1.1
	Cheat River Direct Drainages	77%	0%	2%	2.3
Bluehead chub (<i>Nocomis leptocephalus</i>)	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Anthony Creek	85%	0%	50%	1.2
Candy darter (<i>Etheostoma osburni</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6

Species	Watershed	Sensitivity Factor			
		% High Erosion Potential	% Mauch Chunk Geology	% High Acid Sensitivity	Road Density (miles/sq.mi.)
	Greenbrier River	78%	0%	70%	1.7
	Anthony Creek	85%	0%	50%	1.2
	Upper Gauley	84%	0%	97%	2.5
	Williams River	77%	20%	70%	1.3
	Gauley/Big Ditch Run	78%	0%	98%	1.4
	Cherry River	84%	0%	79%	1.6
Cheat minnow (<i>Rhinichthys bowersi</i>)	Shavers Fork	72%	3%	56%	2.0
	Gandy Creek	79%	5%	6%	1.4
	Laurel Fork	70%	2%	7%	1.1
	Glady Fork	73%	2%	5%	2.1
	Horseshoe Run	81%	0%	1%	2.0
	Cheat River Direct Drainages	77%	0%	2%	2.3
Common shiner (<i>Luxilus cornutus</i>)	South Branch Potomac	89%	0%	54%	1.0
	N. Fork South Branch Potomac	84%	21%	23%	1.1
	South Branch Potomac 1	90%	0%	47%	1.3
	Lunice Creek	83%	59%	42%	1.5
	Mill Creek	78%	0%	87%	1.1
	Glady Fork	73%	2%	5%	2.1
Creek chubsucker (<i>Erimyzon oblongus</i>)	Lunice Creek	83%	59%	42%	1.5
	Cherry River	84%	0%	79%	1.6
	Upper Elk River	90%	49%	44%	1.3
Kanawha minnow (<i>Phenacobius teretulus</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Greenbrier River 1	87%	18%	11%	1.0
	Williams River	77%	20%	70%	1.3
	Cherry River	84%	0%	79%	1.6
Longhead darter (<i>Percina macrocephala</i>)	Williams River	77%	20%	70%	1.3
Mountain redbelly dace (<i>Phoxinus oreas</i>)	Shavers Fork	72%	3%	56%	2.0
	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Spring Creek	84%	52%	30%	1.5
	Williams River	77%	20%	70%	1.3
	Cranberry River	75%	7%	83%	1.3
New River shiner (<i>Notropis scabriceps</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/Sitlington Creek	92%	2%	10%	1.6
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Spring Creek	84%	52%	30%	1.5
	Greenbrier River	78%	0%	70%	1.7
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3

Species	Watershed	Sensitivity Factor			
		% High Erosion Potential	% Mauch Chunk Geology	% High Acid Sensitivity	Road Density (miles/sq.mi.)
	Williams River	77%	20%	70%	1.3
	Cherry River	84%	0%	79%	1.6
Pearl dace (<i>Margariscus margarita</i>)	N. Fork South Branch Potomac	84%	21%	23%	1.1
	Upper Tygart Direct Drainages	91%	10%	16%	1.7
	Red Creek	45%	3%	33%	0.5
	Gandy Creek	79%	5%	6%	1.4
	Glady Fork	73%	2%	5%	2.1
	Dry Fork	44%	0%	59%	1.1
	Horseshoe Run	81%	0%	1%	2.0
	Cheat River Direct Drainages	77%	0%	2%	2.3
Popeye shiner (<i>Notropis ariommus</i>)	Cheat River Direct Drainages	77%	0%	2%	2.3
Potomac scuplin (<i>Cottus girardi</i>)	South Branch Potomac	89%	0%	54%	1.0
	N. Fork South Branch Potomac	84%	21%	23%	1.1
	Mill Creek	78%	0%	87%	1.1
Redside dace (<i>Clinostomus elongatus</i>)	Blackwater River	19%	0%	67%	0.8
Tesselated darter (<i>Etheostoma olmstedti</i>)	South Branch Potomac 1	90%	0%	47%	1.3
Tonguetied minnow (<i>Exoglossum laurae</i>)	Upper Tygart Direct Drainages	91%	10%	16%	1.7
	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/ Sitlington Creek	92%	2%	10%	1.6
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
	Spring Creek	84%	52%	30%	1.5
	Anthony Creek	85%	0%	50%	1.2
	Howards Creek	95%	0%	16%	0.3
	Williams River	77%	20%	70%	1.3
	Cranberry River	75%	7%	83%	1.3
Cherry River	84%	0%	79%	1.6	
Torrent sucker (<i>Thoburnia rhothoeca</i>)	North Fork South Branch Potomac	84%	21%	23%	1.1
LOCALLY RARE FISH					
Black redborse (<i>Moxostoma duquesnei</i>)	Shavers Fork	72%	3%	56%	2.0
	Upper Elk River	90%	49%	44%	1.3
Brindled madtom (<i>Noturus miurus</i>)	Shavers Fork	72%	3%	56%	2.0
	Red Creek	45%	3%	33%	0.5
	Cheat River Direct Drainages	77%	0%	2%	2.3
	Williams River	77%	20%	70%	1.3
Logperch (<i>Percina caprodes</i>)	Cheat River Direct Drainages	77%	0%	2%	2.3

Species	Watershed	Sensitivity Factor			
		% High Erosion Potential	% Mauch Chunk Geology	% High Acid Sensitivity	Road Density (miles/sq.mi.)
Longear sunfish (<i>Lepomis megalotis</i>)	South Branch Potomac 1	90%	0%	47%	1.3
	Leading Creek	87%	0%	0%	1.9
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	Upper Tygart Valley River	90%	13%	18%	0.8
	Cheat River Direct Drainages	77%	0%	2%	2.3
	Greenbrier River 1	87%	18%	11%	1.0
	Knapp Creek/Marlin Run	94%	0%	31%	1.6
Rosefin shiner (<i>Lythrurus ardens</i>)	Anthony Creek	85%	0%	50%	1.2
Spottail shiner (<i>Notropis hudsonius</i>)	South Branch Potomac 1	90%	0%	47%	1.3
	Lunice Creek	83%	59%	42%	1.5
	Mill Creek	78%	0%	87%	1.1
Spotted bass (<i>Micropterus punctulatus</i>)	Upper Tygart Direct Drainages	91%	10%	16%	1.7
Yellow bullhead (<i>Ameiurus natalis</i>)	South Branch Potomac 1	90%	0%	47%	1.3
AMPHIBIANS					
Eastern Hellbender (<i>Cryptobranchus alleganiensis</i>)	Shavers Fork	72%	3%	56%	2.0
	Gandy Creek	79%	5%	6%	1.4
	Cheat River Direct Drainages	77%	0%	2%	2.3
	Upper Greenbrier River	83%	5%	5%	2.1
	Williams River	77%	20%	70%	1.3
	Cranberry River	75%	7%	83%	1.3
	Cherry River	84%	0%	79%	1.6
CRUSTACEANS					
A Crayfish (<i>Cambarus monongalensis</i>)	Shavers Fork	72%	3%	56%	2.0
	Red Creek	45%	3%	33%	0.5
	Gandy Creek	79%	5%	6%	1.4
	Upper Greenbrier River	83%	5%	5%	2.1
	Deer Creek/ Sitlington Creek	92%	2%	10%	1.6
	Spring Creek	84%	52%	30%	1.5
	Williams River	77%	20%	70%	1.3
	Cranberry River	75%	7%	83%	1.3
Cherry River	84%	0%	79%	1.6	
New River Crayfish (<i>Cambarus chasmodactylus</i>)	Anthony Creek	85%	0%	50%	1.2
MOLLUSKS					
Elktoe (<i>Alasmidonta marginata</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Greenbrier River 1	87%	18%	11%	1.0
Green Floater (<i>Lasmigona subviridis</i>)	Upper Greenbrier River	83%	5%	5%	2.1
	Greenbrier River 1	87%	18%	11%	1.0

Table E-7. Viability Outcomes by Species and Watershed and Alternative

Species	Watershed	Viability Outcome by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
FISH						
American eel (<i>Anguilla rostrata</i>)	N. Fork South Branch Potomac	D	D	D	D	D
	South Branch Potomac 1	D	D	D	D	D
Appalachia darter (<i>Percina gymnocephala</i>)	Upper Greenbrier River	B	B	B	B	B
	Greenbrier River 1	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
	Upper Gauley	F	F	F	F	F
	Williams River	E	E	E	E	E
	Cherry River	F	F	F	F	F
Banded sculpin (<i>Cottus carolinae</i>)	Upper Greenbrier River	E	E	E	E	E
	Deer Creek/Sitlington Creek	F	F	F	F	F
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	E	E	E	E	E
	Greenbrier River	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
Bigmouth chub (<i>Nocomis platyrhynchus</i>)	Upper Greenbrier River	B	B	B	B	B
	Deer Creek/Sitlington Creek	C	C	C	C	C
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	B	B	B	B	B
	Greenbrier River	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
	Upper Gauley	E	E	E	E	E
	Williams River	B	B	B	B	B
	Gauley/Big Ditch Run	E	E	E	E	E
	Cranberry River	E	E	E	E	E
	Cherry River	C	C	C	C	C
	Upper Elk River	B	B	B	B	B
Bluebreast darter (<i>Etheostoma camurm</i>)	Shavers Fork	E	E	E	E	E
	Blackwater River	F	F	F	F	F
	Dry Fork	E	D	D	D	D
	Cheat River Direct Drainages	F	F	F	F	F
Bluehead chub (<i>Nocomis leptocephalus</i>)	Deer Creek/Sitlington Creek	D	D	D	D	D
	Knapp Creek/Marlin Run	A	A	A	A	A
	Anthony Creek	D	D	D	D	D
Candy darter (<i>Etheostoma osburni</i>)	Upper Greenbrier River	B	B	B	B	B
	Deer Creek/Sitlington Creek	C	C	C	C	C
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	B	B	B	B	B
	Greenbrier River	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Upper Gauley	F	F	F	F	F
Williams River	B	B	B	B	B	

Species	Watershed	Viability Outcome by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
	Gauley/Big Ditch Run	E	E	E	E	E
	Cherry River	C	C	C	C	C
Cheat minnow (<i>Rhinichthys bowersi</i>)	Shavers Fork	E	E	E	E	E
	Gandy Creek	F	F	F	F	F
	Laurel Fork	E	E	E	E	E
	Glady Fork	E	E	E	E	E
	Horseshoe Run	F	F	F	F	F
	Cheat River Direct Drainages	F	F	F	F	F
Common shiner (<i>Luxilus cornutus</i>)	South Branch Potomac	D	D	D	D	D
	N. Fork South Branch Potomac	D	D	D	D	D
	South Branch Potomac 1	D	D	D	D	D
	Lunice Creek	D	D	D	D	D
	Mill Creek	D	D	D	D	D
	Glady Fork	D	D	D	D	D
Creek chubsucker (<i>Erimyzon oblongus</i>)	Lunice Creek	E	E	E	E	E
	Cherry River	F	F	F	F	F
	Upper Elk River	F	F	F	F	F
Kanawha minnow (<i>Phenacobius teretulus</i>)	Upper Greenbrier River	B	B	B	B	B
	Greenbrier River 1	F	F	F	F	F
	Williams River	E	E	E	E	E
	Cherry River	F	F	F	F	F
Longhead darter (<i>Percina macrocephala</i>)	Williams River	E	E	E	E	E
Mountain redbelly dace (<i>Phoxinus oreas</i>)	Shavers Fork	E	E	E	E	E
	Upper Greenbrier River	B	B	B	B	B
	Deer Creek/Sitlington Creek	F	F	F	F	F
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	E	E	E	E	E
	Spring Creek	F	D	D	D	D
	Williams River	E	E	E	E	E
	Cranberry River	E	E	E	E	E
New River shiner (<i>Notropis scabriceps</i>)	Upper Greenbrier River	E	E	E	E	E
	Deer Creek/Sitlington Creek	F	F	F	F	F
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	B	B	B	B	B
	Spring Creek	F	D	D	D	D
	Greenbrier River	F	F	F	F	F
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
	Williams River	E	E	E	E	E
	Cherry River	E	E	E	E	E
Pearl dace (<i>Margariscus margarita</i>)	N. Fork South Branch Potomac	E	E	E	E	E
	Upper Tygart Direct Drainages	F	F	F	F	F
	Red Creek	E	E	E	D	E
	Gandy Creek	F	F	F	F	F
	Glady Fork	E	E	E	E	E
	Dry Fork	E	D	D	D	D
	Horseshoe Run	F	F	F	F	F

Species	Watershed	Viability Outcome by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
	Cheat River Direct Drainages	F	F	F	F	F
Popeye shiner (<i>Notropis ariommus</i>)	Cheat River Direct Drainages	F	F	F	F	F
Potomac scuplin (<i>Cottus girardi</i>)	South Branch Potomac	F	F	F	F	F
	N. Fork South Branch Potomac	E	E	E	E	E
	Mill Creek	F	D	D	D	D
Redside dace (<i>Clinostomus elongatus</i>)	Blackwater River	F	F	F	F	F
Tessellated darter (<i>Etheostoma olmstedii</i>)	South Branch Potomac 1	E	D	D	D	D
Tonguetied minnow (<i>Exoglossum laurae</i>)	Upper Tygart Direct Drainages	F	F	F	F	F
	Upper Greenbrier River	B	B	B	B	B
	Deer Creek/ Sitlington Creek	F	F	F	F	F
	Knapp Creek/Marlin Run	E	E	E	E	E
	Spring Creek	F	D	D	D	D
	Anthony Creek	E	E	E	E	E
	Howards Creek	E	E	E	E	E
	Williams River	E	E	E	E	E
	Cranberry River	E	E	E	E	E
Cherry River	F	F	F	F	F	
Torrent sucker (<i>Thoburnia rhothoeca</i>)	North Fork South Branch Potomac	E	E	E	E	E
LOCALLY RARE FISH						
Black redhorse (<i>Moxostoma duquesnei</i>)	Shavers Fork	E	E	E	E	E
	Upper Elk River	F	F	F	F	F
Brindled madtom (<i>Noturus miurus</i>)	Shavers Fork	E	E	E	E	E
	Red Creek	E	E	E	D	E
	Cheat River Direct Drainages	F	F	F	F	F
	Williams River	E	E	E	E	E
Logperch (<i>Percina caprodes</i>)	Cheat River Direct Drainages	F	F	F	F	F
Longear sunfish (<i>Lepomis megalotis</i>)	South Branch Potomac 1	E	D	D	D	D
	Leading Creek	E	E	E	E	E
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	Upper Tygart Valley River	F	F	F	F	F
	Cheat River Direct Drainages	F	F	F	F	F
	Greenbrier River 1	F	F	F	F	F
	Knapp Creek/Marlin Run	E	E	E	E	E
Rosefin shiner (<i>Lythrurus ardens</i>)	Anthony Creek	E	E	E	E	E
Spottail shiner (<i>Notropis hudsonius</i>)	South Branch Potomac 1	E	D	D	D	D
	Lunice Creek	E	E	E	E	E
	Mill Creek	F	D	D	D	D
Spotted bass (<i>Micropterus punctulatus</i>)	Upper Tygart Direct Drainages	F	F	F	F	F
Yellow bullhead (<i>Ameiurus natalis</i>)	South Branch Potomac 1	D	D	D	D	D
AMPHIBIANS						
	Shavers Fork	E	E	E	E	E

Species	Watershed	Viability Outcome by Alternative				
		Alt. 1	Alt. 2	Alt 2M	Alt. 3	Alt. 4
Eastern Hellbender (<i>Cryptobranchus alleganiensis</i>)	Gandy Creek	F	F	F	F	F
	Cheat River Direct Drainages	F	F	F	F	F
	Upper Greenbrier River	E	E	E	E	E
	Williams River	E	E	E	E	E
	Cranberry River	E	E	E	E	E
	Cherry River	F	F	F	F	F
CRUSTACEANS						
A Crayfish (<i>Cambarus monongalensis</i>)	Shavers Fork	E	E	E	E	E
	Red Creek	E	E	E	D	E
	Gandy Creek	F	F	F	F	F
	Upper Greenbrier River	E	E	E	E	E
	Deer Creek/ Sitlington Creek	F	F	F	F	F
	Spring Creek	F	D	D	D	D
	Williams River	E	E	E	E	E
	Cranberry River	E	E	E	E	E
	Cherry River	F	F	F	F	F
New River Crayfish (<i>Cambarus chasmodactylus</i>)	Anthony Creek	E	E	E	E	E
MOLLUSKS						
Elktoe (<i>Alasmidonta marginata</i>)	Upper Greenbrier River	E	E	E	E	E
	Greenbrier River 1	F	F	F	F	F
Green Floater (<i>Lasmigona subviridis</i>)	Upper Greenbrier River	E	E	E	E	E
	Greenbrier River 1	F	F	F	F	F