	A	B	C	D	E	F	G	H	L	P	T	U	V
1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
2	Alosa pseudoharengus	Alewife	Freshwater Fish	Fish	IV	a	Tidal headwaters, Tidal Creeks and Rivers, Large Rivers, Tidal Big Rivers, Tidal Wetlands, Estuaries, Marine Nearshore, Marine Offshore and Oceanic	7.2.6, 11.3, 7.2	Withdrawal of Surface Water / Changes in Temperature Regimes / Dams and Water Management/Use	Withdrawal of fresh surface water for human consumption, crop production or other purposes. E.g., withdrawal by municipalities, spring water bottling companies and farmers; reservoirs for firefighting, creation of man-made lakes. / Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Facilities or activities that alter the natural water regime (flow or water levels).	Work with Department of Environmental Quality and Virginia Marine Resources Commission to enact BMPs for water withdrawals to reduce entrainment and impingement. Encourage natural flows to help ameliorate saltwater intrusion and warming impactsEncourage natural flows to help ameliorate saltwater intrusion and warming impacts. Limit impacts of freshwater withdrawals through proper placement and operation (time of year restrictions) and require best practices for intake design (7.2.6), Work with partners to protect natural flow regimes to combat increased effects of water temperature changes. Stop or slow contributing factors to climate change (11.3), Put tight restrictions on and limit the construction of new dams. Remove obsolete dams to restore and increase spawning and rearing habitat. Require safe, timely and effective passage of alewife on functional dams that will not be removed (7.2).		
3	Margariscus margarita	Allegheny pearl dace	Freshwater Fish	Freshwater Fish	IV	b	Creeks and Rivers	8.1.3, 9.3, 11.3	Aquatic Animals / Agricultural and Forestry Effluents / Changes in Temperature Regimes	/ Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change.	Coordinate with VDWR biologists to prevent stocking non-native salmonds such as brown trout (Salmo trutta) into waters containing pearl dace (8.1.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Decrease fossil fuel emmisions. Increase stream shading by planting riparian buffers to cool stream temperatures (11.3).		
4	Lethenteron appendix	American brook lamprey	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Develop, biologically meaningful standards for the waste water effluent (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
5	Anguilla rostrata	American eel	Freshwater Fish	Fish	II	a	Headwater Streams, Creeks and Rivers, Large Rivers, Tidal Headwaters, Tidal Creeks and Rivers, Tidal Large Rivers, Lakes, Ponds, Tidal Wetlands, Estuaries, Marine Nearshore, Marine Offshore and Oceanic	5.4.2, 3.3.1, 7.2	Commercial Fishing / Hydroelectric Dams / Dams and Water Management/Use	Harvesting of aquatic species for commercial purposes that is governed by management measures for which the environmental impact is primarily on the species (as opposed to habitat damage from sea bottom trawling, Threat 7.3.6). Includes bycatch but excludes ghost fishing gear entangling wildlife (Threat 9.4.4). E.g., commercial fisheries, use of nets and fishing gear for eels, factory ships, marine mammals caught in industrial fishing nets. / / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Marine Resources to develop regulations to prevent the bycatch of anadromous fishes by commercial fisheries, and develop, promote, and enforce sustainable fishing practices (5.4.2), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		Additional conservation actions my include, coordinate with the Virginia Department of Marine Resources to enforce regulations to prevent the poaching of glass eels (5.4.3), Continued coordination with FERC, USFWS, and NMFS to address eel passage in new projects and facilities undergoing re-licensing (3.3.1)
6	Alosa sapidissima	American shad	Freshwater Fish	Fish	II	b	Creeks and Rivers, Large Rivers, Tidal Creeks and Rivers, Tidal Large Rivers, Tidal Wetlands, Estuaries, Marine Nearshore, Marine Offshore and Oceanic	7.2.6, 5.4.2, 7.2	Withdrawal of Surface Water / Commercial Fishing / Dams and Water Management/Use	Withdrawal of fresh surface water for human consumption, crop production or other purposes. E.g., withdrawal by municipalities, spring water bottling companies and farmers; reservoirs for firefighting, creation of man-made lakes. / Harvesting of aquatic species for commercial purposes that is governed by management measures for which the environmental impact is primarily on the species (as opposed to habitat damage from sea bottom trawling, Threat 7.3.6). Includes bycatch but excludes ghost fishing gear entangling wildlife (Threat 9.4.4). E.g., commercial fisheries, use of nets and fishing gear for eels, factory ships, marine mammals caught in industrial fishing nets. / Facilities or activities that alter the natural water regime (flow or water levels).	Limit impacts of freshwater withdrawals through proper placement and operation (time of year restrictions) and require best practices for intake design. (7.2.6), Continue moratorium on fishing to allow for rebuilding of stocks. (5.4.2), Put tight restrictions on and limit the construction of new dams. Remove obsolete dams to restore and increase spawning and rearing habitat. Require safe, timely and effective passage of American shad on functional dams that will not be removed. (7.2)		

	A	B	C	D	E	F	G	H	L	P	T	U	V
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7	Percina gymnocephala	Appalachia darter	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers, Large Rivers	9.1, 9.3, 11.3	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Changes in Temperature Regimes	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change.	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Decrease fossil fuel emmisions. Increase stream shading by planting riparian buffers to cool stream temperatures (11.3).		
8	Allohistium cinereum	Ashy darter	Freshwater Fish	Freshwater Fish	I	b	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standards for coal and gas extraction. (9.2), Increase partnerships to implement best management practices such as alternate water sources for cattle and protecting/establishing vegetated stream buffers for agriculture and forestry. (9.3.2), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2)		
9	Acipenser oxyrinchus	Atlantic sturgeon	Freshwater Fish	Fish	I	b	Tidal Large Rivers, Estuaries, Marine Nearshore	5.4.2, 7.2, 8.1.3	Commercial Fishing / Dams and Water Management/Use / Aquatic Animals	Harvesting of aquatic species for commercial purposes that is governed by management measures for which the environmental impact is primarily on the species (as opposed to habitat damage from sea bottom trawling, Threat 7.3.6). Includes bycatch but excludes ghost fishing gear entangling wildlife (Threat 9.4.4). E.g., commercial fisheries, use of nets and fishing gear for eels, factory ships, marine mammals caught in industrial fishing nets. / Facilities or activities that alter the natural water regime (flow or water levels). /	Coordinate with the Virginia Department of Marine Resources to develop regulations to prevent the overfishing by recreational and commercial fisheries. (5.4.2), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2), reduce standing stocks of Blue Catfish in Chesapeake Bay rivers (8.1.3).		Additional conservation actions may include limit impacts of freshwater withdrawals through proper placement and operation (time of year restrictions) and require best practices for intake design (7.2.6), Continue moratorium on harvest across all sectors to allow for rebuilding of stocks (5.4), Continue efforts to work with ACOE on dredging outside of established TOYRs; coordinate with regulatory partners to implement shipping best practices (i.e. low speed in estuaries) to reduce ship strikes (4.3).
10	Moxostoma ariommum	Bigeye jumprock	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Develop, biologically meaningful standards for the waste water effluent (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
11	Cottus baileyi	Black sculpin	Freshwater Fish	Freshwater Fish	IV	c	Headwater Streams, Creeks and Rivers	11.3, 9.3, 7.2	Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams and Water Management/Use	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Decrease fossil fuel emissions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

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12	Enneacanthus chaetodon	Blackbanded sunfish	Freshwater Fish	Freshwater Fish	I	a	Creeks and Rivers, Ponds, Non Tidal Wetlands	7.2.2, 9.3, 5.4.4	Beaver Dam Management / Agricultural and Forestry Effluents / Management/Control of Aquatic Species	Structures (dams) built by beavers create habitats for a number of species; however, these dams may be dismantled by humans. Dismantling of dams result in habitat loss by drying-out the beaver-created basin and flooding lands downstream. It could also potentially cause loss of accumulated sediments due to increased flow in streams farther downstream. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Deliberately killing individuals of an aquatic species for human gain that is governed by management measures. E.g., control of lampreys using lampricides, control of mosquitos in their aquatic larval stage (BTi), water weed cutting.	Coordinate the County Extension Agents and VDWR Biologists to educate landowners on the importance of beavers in maintaing fish and wildlife habitat. Provide alternative to dam and beaver removal such as flow control devices to prevent extreme flooding and damage to property. (7.2.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Coordinate with County Extension Agents and VDWR Fisheries Biologists to educate landowners on the importance of maintaining submerged vegetation in their ponds and lakes. Prevent introduction of Grass Carp (Ctenopharyngodon idella) and suggest targeted vegetation removal when possible (5.4.4)		
13	Chrosomus (Phoxinus) cumberlandensis	Blackside dace	Freshwater Fish	Freshwater Fish	II	a	Headwater Streams	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
14	Percina maculata	Blackside darter	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

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15	Erimystax insignis	Blotched chub	Freshwater Fish	Freshwater Fish	III	c	Headwater Streams, Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
16	Percina burtoni	Blotchside logperch	Freshwater Fish	Freshwater Fish	II	a	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2)		
17	Alosa aestivalis	Blueback herring	Freshwater Fish	Fish	IV	a	Creeks and Rivers, Tidal Creeks and Rivers, Tidal Large Rivers, Tidal Wetlands, Estuaries, Marine Nearshore, Marine Offshore and Oceanic	7.2.6, 7.2, 5.4.2	Withdrawal of Surface Water / Dams and Water Management/Use / Commercial Fishing	Withdrawal of fresh surface water for human consumption, crop production or other purposes. E.g., withdrawal by municipalities, spring water bottling companies and farmers; reservoirs for firefighting, creation of man-made lakes. / Facilities or activities that alter the natural water regime (flow or water levels). / Harvesting of aquatic species for commercial purposes that is governed by management measures for which the environmental impact is primarily on the species (as opposed to habitat damage from sea bottom trawling, Threat 7.3.6). Includes bycatch but excludes ghost fishing gear entangling wildlife (Threat 9.4.4). E.g., commercial fisheries, use of nets and fishing gear for eels, factory ships, marine mammals caught in industrial fishing nets.	Limit impacts of freshwater withdrawals through proper placement and operation (time of year restrictions) and require best practices for intake design. (7.2.6), Put tight restrictions on and limit the construction of new dams. Remove obsolete dams to restore and increase spawning and rearing habitat. Require safe, timely and effective passage on functional dams that will not be removed. Ensure BMP adherance for surface water withdrawals and maintain groundwater levels that ensure base flows. (7.2), Coordinate with VMRC, NMFS, and ASMFC to develop harvest strategies to reduce commercial bycatch of Mid-Atlantic stock (i.e. observers, caps) (5.4.2)		
18	Etheostoma jessiae	Blueside darter	Freshwater Fish	Freshwater Fish	III	c	Headwater Streams, Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Develop, biologically meaningful standards for the waste water effluent (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

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19	Cottus sp. 1	Bluestone sculpin	Freshwater Fish	Freshwater Fish	III	a	Headwater Streams, Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
20	Moxostoma sp.	Brassy jumprock	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
21	Notropis bifrenatus	Bridle shiner	Freshwater Fish	Freshwater Fish	I	a	Creeks and Rivers, Large Rivers, Large Tidal Rivers, Ponds	7.2, 9.3, 5.4.4	Dams and Water Management/Use / Agricultural and Forestry Effluents / Management/Control of Aquatic Species	Facilities or activities that alter the natural water regime (flow or water levels). / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Deliberately killing individuals of an aquatic species for human gain that is governed by management measures. E.g., control of lampreys using lampricides, control of mosquitos in their aquatic larval stage (BTi), water weed cutting.	Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Coordinate with County Extension Agents and VDWR Fisheries Biologists to educate landowners on the importance of maintaining submerged vegetation in their ponds and lakes. Prevent introduction of Grass Carp (Ctenopharyngodon idella) and suggest targeted vegetation removal when possible (5.4.4).		
22	Labidesthes sicculus	Brook silverside	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

	A	B	C	D	E	F	G	H	L	P	T	U	V
1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
23	Salvelinus fontinalis	Brook trout	Freshwater Fish	Freshwater Fish	IV	a	Headwater Streams, Creeks and Rivers	11.3, 9.3, 8.1.3	Changes in Temperature Regimes / Agricultural and Forestry Effluents / Aquatic Animals	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) /	Decrease fossil fuel emissions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Coordinate with VDWR biologists to prevent stocking non-native salmonds such as brown trout (Salmo trutta) into waters containing brook trout (8.1.3).		
24	Pimephales vigilax	Bullhead minnow	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
25	Etheostoma osburni	Candy darter	Freshwater Fish	Freshwater Fish	I	a	Creeks and Rivers	8.1.3, 9.3, 11.2	Aquatic Animals / Agricultural and Forestry Effluents / Changes in Geochemical Regime	/ Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Large-scale changes in an ecosystem's physio-chemical makeups	Develop and enforce regulations that prevent the introduction of Variegate Darter (Etheostoma variatum) into waters near to or containing Candy Darter. Educate the public on the potential harm of releasing unused bait and moving aquatic organisms (8.1.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Decrease fossil fuel emmisions. Increase stream shading by planting riparian buffers to cool stream temperatures (11.3)		
26	Etheostoma collis	Carolina darter	Freshwater Fish	Freshwater Fish	II	c	Headwater Streams	11.3, 9.3, 7.2	Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams and Water Management/Use	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Decrease fossil fuel emmisions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
27	Etheostoma brevispinum	Carolina fantail darter	Freshwater Fish	Freshwater Fish	IV	c	Headwater Streams, Creeks and Rivers	11.3, 9.3, 7.2	Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams and Water Management/Use	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Decrease fossil fuel emissions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

	A	B	C	D	E	F	G	H	L	P	T	U	V
1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
28	Percina copelandi	Channel darter	Freshwater Fish	Freshwater Fish	II	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop, implement, and enforce meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofitted to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
29	Cottus sp. 7	Checkered sculpin	Freshwater Fish	Freshwater Fish	IV	c	Headwater Streams, Creeks and Rivers	11.3, 9.3, 7.2	Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams and Water Management/Use	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Decrease fossil fuel emmisions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofitted to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
30	Chrosomus sp. cf. saylori	Clinch dace	Freshwater Fish	Freshwater Fish	I	a	Headwater Streams	9.2, 9.3, 8.1.3	Industrial and Military Effluents / Agricultural and Forestry Effluents / Aquatic Animals	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) /	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Develop regulations to prevent the introduction non-native minnows (leuciscids) into waters containing Clinch Dace. Educate the public on the potential harm of releasing unused bait and moving aquatic organisms (8.1.3)		

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1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
31	Cottus sp. 4	Clinch sculpin	Freshwater Fish	Freshwater Fish	III	c	Headwater Streams	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
32	Percina sciera	Dusky darter	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
33	Etheostoma percnurum	Duskytail darter	Freshwater Fish	Freshwater Fish	I	a	Creeks and Rivers	9.3, 9.1.1, 8.2	Agricultural and Forestry Effluents / Domestic Wastewater / Problematic Native Plants and Animals	Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Liquid domestic waste that is produced by urban centers and discharged primarily by the sewage system. E.g., discharges from municipal waste treatment plants, leaks from sewers/septic tanks, untreated discharged, pit toilets, medical components in water (birth control hormones, antidepressants, antibiotics), toxoplasmosis, etc. / Plants and animals that were originally present in ecosystem(s), but whose populations have increased to a level where they are now "out of control" or overabundant as a direct or indirect result of certain human activities.	Increase partnerships to implement best management practices such as alternate water sources for cattle and protecting/establishing vegetated stream buffers for agriculture and forestry. (9.3), Coordinate with the Virginia Department of Health to determine which homes in the Copper Creek watershed are straight piping and provide incentives to connect to municipal sewer lines or septic tanks. (9.1.1), Develop and implement techniques to prevent the invasion of the Fantail Darter (Etheostoma flabellare) into remaining Duskytail Darter habitat. (8.2)		
34	Phenacobius crassilabrum	Fatlips minnow	Freshwater Fish	Freshwater Fish	II	c	Creeks and Rivers	11.3, 9.3, 7.2	Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams and Water Management/Use	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Work toward decreasing fossil fuel emmisions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2)		

	A	B	C	D	E	F	G	H	L	P	T	U	V
1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
35	Aplodinotus grunniens	Freshwater drum	Freshwater Fish	Freshwater Fish	II	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
36	Nothonotus denoncourti	Golden darter	Freshwater Fish	Freshwater Fish	II	b	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
37	Nothonotus chlorobranchium	Greenfin darter	Freshwater Fish	Freshwater Fish	I	a	Creeks and Rivers	9.3, 7.2, 11.3	Agricultural and Forestry Effluents / Dams and Water Management/Use / Changes in Temperature Regimes	Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels). / Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change.	Increase partnerships to implement best management practices such as alternate water sources for cattle and protecting/establishing vegetated stream buffers for agriculture and forestry. (9.3.2), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2), Decrease fossil fuel emmisions. Increase stream shading by planting riparian buffers to cool stream temperatures. (11.3)		

	A	B	C	D	E	F	G	H	L	P	T	U	V
1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
38	Alosa mediocris	Hickory shad	Freshwater Fish	Fish	IV	a	Creeks and Rivers, Large Rivers, Large Tidal Rivers, Tidal Wetlands, Estuaries, Marine Nearshore, Marine Offshore and Oceanic	7.2.6, 7.2, 5.4.2	Withdrawal of Surface Water / Dams and Water Management/Use / Commercial Fishing	Withdrawal of fresh surface water for human consumption, crop production or other purposes. E.g., withdrawal by municipalities, spring water bottling companies and farmers; reservoirs for firefighting, creation of man-made lakes. / Facilities or activities that alter the natural water regime (flow or water levels). / Harvesting of aquatic species for commercial purposes that is governed by management measures for which the environmental impact is primarily on the species (as opposed to habitat damage from sea bottom trawling, Threat 7.3.6). Includes bycatch but excludes ghost fishing gear entangling wildlife (Threat 9.4.4). E.g., commercial fisheries, use of nets and fishing gear for eels, factory ships, marine mammals caught in industrial fishing nets.	Limit impacts of freshwater withdrawals through proper placement and operation (time of year restrictions) and require best practices for intake design (7.2.6), Put tight restrictions on and limit the construction of new dams. Remove obsolete dams to restore and increase spawning and rearing habitat. Require safe, timely and effective passage on functional dams that will not be removed. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. Ensure BMP adherance for surface water withdrawals and maintain groundwater levels that ensure base flows (7.2), Develop, promote, and enforce sustainable fishing practices across all sectors. This includes bycatch, recreational, and commercial exploitation (5.4.2).		An additional conservation action would include coordinating with the Virginia Marine Resources Commission to establish a recreational limit on hickory shad (5.4.1).
39	Hybopsis hypsinotus	Highback chub	Freshwater Fish	Freshwater Fish	IV	c	Headwater Streams	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
40	Hudsonius altipinnis	Highfin shiner	Freshwater Fish	Freshwater Fish	IV	c	Headwater Streams, Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
41	Cottus sp. 5	Holston sculpin	Freshwater Fish	Freshwater Fish	III	c	Headwater Streams, Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2)		
42	Alburnops chalybaeus	Ironcolor shiner	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers, Non-tidal Wetlands	7.2.2, 9.3.2, 5.4.4	Beaver Dam Management / Soil Erosion, Sedimentation / Management/Control of Aquatic Species	Structures (dams) built by beavers create habitats for a number of species; however, these dams may be dismantled by humans. Dismantling of dams result in habitat loss by drying-out the beaver-created basin and flooding lands downstream. It could also potentially cause loss of accumulated sediments due to increased flow in streams farther downstream. / Erosion and sedimentation that are due to agricultural or silvicultural activities, regardless of the presence of local drainage systems (threat 7.2.4 and 7.2.5). / Deliberately killing individuals of an aquatic species for human gain that is governed by management measures. E.g., control of lampreys using lampricides, control of mosquitos in their aquatic larval stage (BTi), water weed cutting.	Coordinate the County Extension Agents and VDWR Biologists to educate landowners on the importance of beavers in maintaing fish and wildlife habitat. Provide alternative to dam and beaver removal such as flow control devices to prevent extreme flooding and damage to property (7.2.2), Coordinate with the Virginia Department of Forestry to provide sufficient riparian buffers around occupied Ironcolor Shiner ponds when conducting logging activities (9.3.2), Coordinate with County Extension Agents and VDWR Fisheries Biologists to educate landowners on the importance of maintaining submerged vegetation in their ponds and lakes. Prevent introduction of grass carp (Ctenopharyngodon idella) and suggest targeted vegetation removal when possible (5.4.4).		

	A	B	C	D	E	F	G	H	L	P	T	U	V
1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
43	Etheostoma kanawhae	Kanawha darter	Freshwater Fish	Freshwater Fish	III	c	Headwater Streams, Creeks and Rivers	11.3, 8.1.3, 9.3	Changes in Temperature Regimes / Aquatic Animals / Agricultural and Forestry Effluents	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2)	Decrease fossil fuel emmisions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Develop and enforce regulations that prevent the introduction of the variegate darter (Etheostoma variatum) into waters near to or containing Kanawha Darter. Educate the public of the potential harm of releasing unused bait and moving aquatic organisms (8.1.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3).		
44	Phenacobius teretulus	Kanawha minnow	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers	11.3, 9.3, 7.2	Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams and Water Management/Use	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Decrease fossil fuel emmisions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
45	Erimyzon sucetta	Lake chubsucker	Freshwater Fish	Freshwater Fish	III	c	Headwater Streams, Creeks and Rivers, Lakes, Ponds, Non-tidal Wetlands	7.2.2, 9.3, 5.4.4	Beaver Dam Management / Agricultural and Forestry Effluents / Management/Control of Aquatic Species	Structures (dams) built by beavers create habitats for a number of species; however, these dams may be dismantled by humans. Dismantling of dams result in habitat loss by drying-out the beaver-created basin and flooding lands downstream. It could also potentially cause loss of accumulated sediments due to increased flow in streams farther downstream. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Deliberately killing individuals of an aquatic species for human gain that is governed by management measures. E.g., control of lampreys using lampricides, control of mosquitos in their aquatic larval stage (BTi), water weed cutting.	Coordinate the County Extension Agents and VDWR Biologists to educate landowners on the importance of beavers in maintaing fish and wildlife habitat. Provide alternative to dam and beaver removal such as flow control devices to prevent extreme flooding and damage to property (7.2.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Coordinate with County Extension Agents and VDWR Fisheries Biologists to educate landowners on the importance of maintaining submerged vegetation in their ponds and lakes. Prevent introduction of grass carp (Ctenopharyngodon idella) and suggest targeted vegetation removal when possible (5.4.4).		
46	Fundulus lineolatus	Lined topminnow	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers, Lakes, Ponds, Non-tidal Wetlands	7.2.2, 9.3, 5.4.4	Beaver Dam Management / Agricultural and Forestry Effluents / Management/Control of Aquatic Species	Structures (dams) built by beavers create habitats for a number of species; however, these dams may be dismantled by humans. Dismantling of dams result in habitat loss by drying-out the beaver-created basin and flooding lands downstream. It could also potentially cause loss of accumulated sediments due to increased flow in streams farther downstream. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Deliberately killing individuals of an aquatic species for human gain that is governed by management measures. E.g., control of lampreys using lampricides, control of mosquitos in their aquatic larval stage (BTi), water weed cutting.	Coordinate the County Extension Agents and VDWR Biologists to educate landowners on the importance of beavers in maintaing fish and wildlife habitat. Provide alternative to dam and beaver removal such as flow control devices to prevent extreme flooding and damage to property (7.2.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Coordinate with County Extension Agents and VDWR Fisheries Biologists to educate landowners on the importance of maintaining submerged vegetation in their ponds and lakes. Prevent introduction of grass carp (Ctenopharyngodon idella) and suggest targeted vegetation removal when possible (5.4.4).		
47	Lepomis megalotis	Longear sunfish	Freshwater Fish	Freshwater Fish	IV	b	Creeks and Rivers	8.1.3, 9.3, 7.2	Aquatic Animals / Agricultural and Forestry Effluents / Dams and Water Management/Use	/ Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Prevent the introduction of redbreast sunfish (Lepomis auritus) into waters containing longear sunfish. Educate the public on the potential harm of stocking non-native gamefish (8.1.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

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1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
48	Etheostoma longimanum	Longfin darter	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
49	Paranotropis spectrunculus	Mirror shiner	Freshwater Fish	Freshwater Fish	II	c	Headwater Streams. Creeks and Rivers	9.1, 9.3, 11.3	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Changes in Temperature Regimes	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change.	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Decrease fossil fuel emmisions. Increase stream shading by planting riparian buffers to cool stream temperature (11.3).		
50	Ichthyomyzon greeleyi	Mountain brook lamprey	Freshwater Fish	Freshwater Fish	III	c	Headwater Streams	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
51	Noturus eleutherus	Mountain madtom	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction. (9.2), Increase partnerships to implement best management practices such as alternate water sources for cattle and protecting/establishing vegetated stream buffers for agriculture and forestry. (9.3.2), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2)		

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52	Lythrurus lirus	Mountain shiner	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
53	Acantharchus pomotis	Mud sunfish	Freshwater Fish	Freshwater Fish	IV	c	Headwater Streams, Creeks and Rivers, Ponds, Non-tidal Wetlands	7.2.2, 9.3, 5.4.4	Beaver Dam Management / Agricultural and Forestry Effluents / Management/Control of Aquatic Species	Structures (dams) built by beavers create habitats for a number of species; however, these dams may be dismantled by humans. Dismantling of dams result in habitat loss by drying-out the beaver-created basin and flooding lands downstream. It could also potentially cause loss of accumulated sediments due to increased flow in streams farther downstream. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Deliberately killing individuals of an aquatic species for human gain that is governed by management measures. E.g., control of lampreys using lampricides, control of mosquitos in their aquatic larval stage (BTi), water weed cutting.	Coordinate the County Extension Agents and VDWR Biologists to educate landowners on the importance of beavers in maintaing fish and wildlife habitat. Provide alternative to dam and beaver removal such as flow control devices to prevent extreme flooding and damage to property (7.2.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Coordinate the County Extension Agents and VDWR Fisheries Biologists to educate landowners on the importance of maintaining submerged vegetation in their ponds and lakes. Prevent removal using Grass Carp (Ctenopharyngodon idella) (5.4.4).		
54	Miniellus scabriceps	New River shiner	Freshwater Fish	Freshwater Fish	II	c	Creeks and Rivers	9.1, 9.3, 11.3	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Changes in Temperature Regimes	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change.	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Decrease fossil fuel emmisions. Increase stream shading by planting riparian buffers to cool stream temperatures (11.3).		
55	Noturus gilberti	Orangefin madtom	Freshwater Fish	Freshwater Fish	II	b	Creeks and Rivers	9.3, 9.1, 7.2	Agricultural and Forestry Effluents / Domestic and Urban Wastewater / Dams and Water Management/Use	Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), develop, biologically meaningful standards for the waste water effluent (9.1), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2)		

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56	Polyodon spathula	Paddlefish	Freshwater Fish	Freshwater Fish	IV	c	Creels and Rivers, Large Tidal Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2)		
57	Percina crassa	Piedmont darter	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
58	Notropis ariommus	Popeye shiner	Freshwater Fish	Freshwater Fish	II	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

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1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
59	Moxostoma carinatum	River redhorse	Freshwater Fish	Freshwater Fish	IV	b	Creeks and Rivers, Large Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
60	Ambloplites cavifrons	Roanoke bass	Freshwater Fish	Freshwater Fish	I	a	Creeks and Rivers, Large Rivers	8.1.3, 9.3, 7.2	Aquatic Animals / Agricultural and Forestry Effluents / Dams and Water Management/Use	/ Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Develop and enforce regulations to prevent the introduction of Rock Bass (*Ambloplites rupestris*) into waters containing Roanoke Bass.(8.1.3), Increase partnerships to implement best management practices such as alternate water sources for cattle and protecting/establishing vegetated stream buffers for agriculture and forestry. (9.3.2), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2)		
61	Percina rex	Roanoke logperch	Freshwater Fish	Freshwater Fish	II	a	Creeks and Rivers	4.2.2, 9.3, 7.2	Oil and Gas Pipelines / Agricultural and Forestry Effluents / Dams and Water Management/Use	infrastructure network for transporting oil and natural has products aboveground or underground, including seismic lines, but excluding extraction sites (Threat 3.1) / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with USFWS to monitor and assess impacts of pipeline and powerline projects within the species range (4.2.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2)		
62	Notropis semperasper	Roughhead shiner	Freshwater Fish	Freshwater Fish	I	b	Creeks and Rivers	8.1.3, 9.3, 7.2	Aquatic Animals / Agricultural and Forestry Effluents / Dams and Water Management/Use	/ Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Develop regulations to prevent the introduction of non-native minnows (Leuscisids) into waters containing Roughhead Shiner. Educate the public of the potential harm in releasing unused bait and moving aquatic organisms, (8.1.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2)		

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1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
63	Thoburnia hamiltoni	Rustyside sucker	Freshwater Fish	Freshwater Fish	III	c	Headwater Streams, Creeks and Rivers	8.1.3, 9.3, 7.2	Aquatic Animals / Agricultural and Forestry Effluents / Dams and Water Management/Use	/ Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Develop regulations to prevent the introduction of the Torrent Sucker (Thoburnia rhothoeca) into waters containing Rustyside Sucker. Educate the public of the potential harm of releasing unused bait and moving aquatic organisms (8.1.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofitted to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
64	Miniellus stramineus	Sand shiner	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofitted to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
65	Sander canadensis	Sauger	Freshwater Fish	Freshwater Fish	III	b	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofitted to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2)		
66	Lythrurus fasciolaris	Scarlet shiner	Freshwater Fish	Freshwater Fish	IV	c	Headwater Streams, Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Develop, biologically meaningful standards for the waste water effluent (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofitted to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

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1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
67	Nothonotus acuticeps	Sharphead darter	Freshwater Fish	Freshwater Fish	I	a	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
68	Percina oxyrhynchus	Sharpnose darter	Freshwater Fish	Freshwater Fish	II	c	Creeks and Rivers, Large Rivers	11.3, 9.3, 7.2	Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams and Water Management/Use	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Decrease fossil fuel emissions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
69	Acipenser brevirostrum	Shortnose sturgeon	Freshwater Fish	Fish	I	c	Large Tidal Rivers, Estuaries, Marine Nearshore	5.4.2, 7.2, 9.1	Commercial Fishing / Dams and Water Management/Use / Domestic and Urban Wastewater	Harvesting of aquatic species for commercial purposes that is governed by management measures for which the environmental impact is primarily on the species (as opposed to habitat damage from sea bottom trawling, Threat 7.3.6). Includes bycatch but excludes ghost fishing gear entangling wildlife (Threat 9.4.4). E.g., commercial fisheries, use of nets and fishing gear for eels, factory ships, marine mammals caught in industrial fishing nets. / Facilities or activities that alter the natural water regime (flow or water levels). / Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc.	Coordinate with the Virginia Department of Marine Resources to develop and enforce regulations to prevent the overfishing by recreational and commercial fisheries (5.4.2), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2), Domestic wastewater from urban centers via SSO systems and runoff from urban and agricultural development contribute to poor water quality. Coordinate with VDEQ and municipal regulators on water treatment upgrades and water quality improvements (9.1).		An additional conservation action would be to Increase partnerships to implement best management practices such as alternate water sources for cattle and protecting/establishing vegetated stream buffers for agriculture and forestry. (9.3.2)
70	Percina williamsi	Sickle darter	Freshwater Fish	Freshwater Fish	I	c	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

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71	Moxostoma anisurum	Silver redhorse	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers, Large Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
72	Erimystax cahni	Slender chub	Freshwater Fish	Freshwater Fish	I	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop, implement, and enforce meaningful biological standards for coal and gas extraction (9.2),Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2)		
73	Moxostoma breviceps	Smallmouth redhorse	Freshwater Fish	Freshwater Fish	IV	b	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

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74	Ameiurus brunneus	Snail bullhead	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
75	Fundulus rathbuni	Speckled killifish	Freshwater Fish	Freshwater Fish	IV	c	Headwater Streams, Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
76	Erimonax monachus	Spotfin chub	Freshwater Fish	Freshwater Fish	I	a	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop, implement, and enforce meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2)		
77	Cyprinella whipplei	Steelcolor shiner	Freshwater Fish	Freshwater Fish	II	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

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1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
78	Noturus flavus	Stonecat	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
79	Morone saxatilis	Striped bass	Freshwater Fish	Fish	III	a	Headwater Streams, Large Rivers, Tidal Creeks and Rivers, Large Tidal Rivers, Estuaries, Marine Nearshore, Marine Offshore and Oceanic	7.2.6, 7.2.1, 5.4.1	Withdrawal of Surface Water / Water Level Management Using Dams / Recreational of Subsistence Fishing	Withdrawal of fresh surface water for human consumption, crop production or other purposes. E.g., withdrawal by municipalities, spring water bottling companies and farmers; reservoirs for firefighting, creation of man-made lakes. / Construction, operation and water management using non-power dams. Includes the dismantling of man-made dams and excludes dams used for power generation (Threat 3.3.1) but excludes lock system (Threat 4.3.3.) / Harvesting of aquatic species for recreation or subsistence that is governed by management measures. Illegal harvesting by fishing should be classified under “Poaching/persecution of aquatic species” (Threat 5.4.4). Includes bycatch and damage to released individuals, but exercises contamination of habitats due to solid lead from fishing gear (Threat 9.4.2). E.g., recreational fishing of sturgeon, accidental catching of mudpuppies during ice fishing, turtles ingesting hooks, personal collection for fishkeeping with authorized species.	Limit impacts of freshwater withdrawals through proper placement and operation (time of year restrictions) and require best practices for intake design (7.2.6), Continue to work with landowners and state/regional/local entities to remove barriers not critical to energy generation or water management (i.e. low-head dams, perched culverts.) Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2.1), Coordinate with the Virginia Marine Resources Commission to protect spawning fish. Marine Recreational Information Program data show recreational harvest exceeds commercial harvest (5.4.1).		An additional conservation action might include coordinating with the Virginia Department of Marine Resources to develop and enforce regulations to prevent the bycatch of anadromous fishes by commercial fisheries (5.4.2)
80	Phenacobius mirabilis	Suckermouth minnow	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop, implement, and enforce meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

	A	B	C	D	E	F	G	H	L	P	T	U	V
1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
81	Etheostoma swannanoa	Swannanoa darter	Freshwater Fish	Freshwater Fish	IV	b	Headwater Streams, Creeks and Rivers	11.3, 9.3, 7.2	Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams and Water Management/Use	Periods in which temperatures of the air, water or soil either exceed or fall below the normal range of variation. Events that may or may not be related to climate change. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Decrease fossil fuel emissions. Develop partnerships with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
82	Chrosomus (Phoxinus) tennesseensis	Tennessee dace	Freshwater Fish	Freshwater Fish	I	a	Headwater Streams	8.1.3, 9.3, 7.2	Aquatic Animals / Agricultural and Forestry Effluents / Dams and Water Management/Use	/ Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Develop regulations to prevent the introduction non-native leuciscids into waters containing Tennessee Dace. Educate the public on the potential harm of releasing unused bait and moving aquatic organisms (8.1.3), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2)		
83	Exoglossum laurae	Tonguetied minnow	Freshwater Fish	Freshwater Fish	III	c	Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
84	Etheostoma variatum	Variegate darter	Freshwater Fish	Freshwater Fish	II	a	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant “cocktails” that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (3.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Coordinate with the Virginia Department of Health to determine which homes or businesses in the Big Sandy watershed are straight piping and provide incentives to connect to municipal sewer lines or septic tanks. (9.1.1)		

	A	B	C	D	E	F	G	H	L	P	T	U	V
1	**Scientific_Name**	**Common_Name**	**Grouping**	**Type**	**Tier**	**COR**	**Habitats**	**Threat_Code**	**Threat_Description**	**Threat_Long**	**Actions**	**Working_Lands**	**Notes**
85	Ammocrypta clara	Western sand darter	Freshwater Fish	Freshwater Fish	IV	c	Creeks and Rivers	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standands for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
86	Miniellus alborus	Whitemouth shiner	Freshwater Fish	Freshwater Fish	II	c	Headwater Streams, Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	Point or non-point source wastewater from residential and urban areas; these discharges (may) contain nutrients, sediments, toxic substances, chemicals, etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	Develop, biologically meaningful standards for the waste water effluent (9.1), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
87	Noturus flavipinnis	Yellowfin madtom	Freshwater Fish	Freshwater Fish	I	a	Creeks and Rivers	9.2, 9.3, 8.1.3	Industrial and Military Effluents / Agricultural and Forestry Effluents / Aquatic Animals	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and chemicals. Among others. Considering the difficulty in identifying contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes natural sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substrates). Intoxication due to natural sources of these contaminants are likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. / Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is associated with drainage systems in agriculture and forestry (7.2) or oil spills from machinery (9.2) /	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop meaningful biological standards for coal and gas extraction (9.2), Increase partnerships to implement best management practices to reduce ALL sources of agriculture and forestry pollution (9.3), Develop regulation to prevent the non-native madtoms (Noturus spp.) into waters containing Yellowfin Madtom. Educate the public on the potential harm of releasing unused baits and the moving aquatic organisms (8.1.3).		