1 0 1 110 11	В		D .	E F	F G	H	L L	P	T T	U	V
1 Scientific_Name	Common_Name	Grouping	Туре	Tier CO	R Habitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes
								Withdrawal of fresh surface water for human consumption, crop production or			
								other purposes. E.g., withdrawal by municipalities, spring water bottling	Virginia Marine Resources Commission to enact BMPs		
								companies and farmers; reservoirs for firefighting, creation of man-made	for water withdrawals to reduce entrainment and		
								lakes. / Periods in which temperatures of the air, water or soil either exceed or	impingement. Encourage natural flows to help		
								fall below the normal range of variation. Events that may or may not be related	ameliorate saltwater intrusion and warming		
								to climate change. / Facilities or activities that alter the natural water regime	impactsEncourage natural flows to help ameliorate saltwater intrusion and warming impacts. Limit impacts		
								(flow or water levels).	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		
					Tidal headwaters, Tidal Creeks				effective passage of alewife on functional dams that will		
					and Rivers, Large Rivers, Tidal				not be removed (7.2).		
					Big Rivers, Tidal Wetlands,		Withdrawal of Surface Water / Changes in		,		
					Estuaries, Marine Nearshore,		Temperature Regimes / Dams and Water				
2 Alosa pseudoharengus	Alewife	Freshwater Fish	Fish	IV a		7.2.6, 11.3, 7.2	Management/Use				
								/ Wastewater (pollutants) that is generated by agricultural, silvicultural and	Coordinate with VDWR biologists to prevent stocking		
								aquacultural activities. These discharges are transported primarily in drainage			
								systems, runoff and eroded; they (may) contain various nutrients, toxic	into waters containing pearl dace (8.1.3), Increase		
								substances, chemicals, etc. Excludes erosion and sedimentation that is	partnerships to implement best management practices		
								associated with drainage systems in agriculture and forestry (7.2) or oil spills	to reduce ALL sources of agriculture and forestry		
								from machinery (9.2) / Periods in which temperatures of the air, water or soil	pollution (9.3), Decrease fossil fuel emmisions. Increase		
							Aquatic Animals / Agricultural and Forestry	either exceed or fall below the normal range of variation. Events that may or	stream shading by planting riparian buffers to cool		
							Effluents / Changes in Temperature	may not be related to climate change.	stream temperatures (11.3).		
3 Margariscus margarita	Allegheny pearl dace	Freshwater Fish	Freshwater Fish	IV b	Creeks and Rivers	8.1.3, 9.3, 11.3	Regimes				
	.0 . ,,,					,,		Point or non-point source wastewater from residential and urban areas; these	Develop, biologically meaningful standards for the waste		
								discharges (may) contain nutrients, sediments, toxic substances, chemicals,	water effluent (9.1), Increase partnerships to implement		
								etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural	best management practices to reduce ALL sources of		
								and aquacultural activities. These discharges are transported primarily in	agriculture and forestry pollution (9.3), Avoid		
								drainage systems, runoff and eroded; they (may) contain various nutrients,	construction of new dams and remove old, non-		
								toxic substances, chemicals, etc. Excludes erosion and sedimentation that is	functioning dams. Dams that cannot be replaced should		
								associated with drainage systems in agriculture and forestry (7.2) or oil spills	be retrofited to allow fish passage. Coordinate with the		
								from machinery (9.2) / Facilities or activities that alter the natural water	Virginia Department of Transportations to replace and		
							Domestic and Urban Wastewater /	regime (flow or water levels).	install new culverts that allow movement of aquatic		
	American brook						Agricultural and Forestry Effluents / Dams		species (7.2).		
4 Lethenteron appendix	lamprey	Freshwater Fish	Freshwater Fish	IV c	Creeks and Rivers	9.1, 9.3, 7.2	and Water Management/Use				
	- F - 7					, , , ,		Harvesting of aquatic species for commercial purposes that is governed by	Coordinate with the Virginia Department of Marine		Additional conservation actions my include,
								management measures for which the environmental impact is primarily on the	Resources to develop regulations to prevent the bycatch		coordinate with the Virginia Department of
								species (as opposed to habitat damage from sea bottom trawling, Threat	of anadromous fishes by commercial fisheries, and		Marine Resources to enforce regulations to
								7.3.6). Includes bycatch but excludes ghost fishing gear entangling wildlife	develop, promote, and enforce sustainable fishing		prevent the poaching of glass eels (5.4.3),
								(Threat 9.4.4). E.g., commercial fisheries, use of nets and fishing gear for eels,	practices (5.4.2), Avoid construction of new dams and		Continued coordination with FERC, USFWS,
					Headwater Streams, Creeks and			factory ships, marine mammals caught in industrial fishing nets. // Facilities	remove old, non-functioning dams. Dams that cannot		and NMFS to address eel passage in new
					Rivers, Large Rivers, Tidal			or activities that alter the natural water regime (flow or water levels).	be replaced should be retrofited to allow fish passage.		projects and facilities undergoing re-
					Headwaters, Tidal Creeks and			or assirtates trial area rates regime (rear or rates to total).	Coordinate with the Virginia Department of		licensing (3.3.1)
					Rivers, Tidal Large Rivers, Lakes,				Transportations to replace and install new culverts that		
					Ponds, Tidal Wetlands,	1			allow movement of aquatic species (7.2).		
					Estuaries, Marine Nearshore,		Commercial Fishing / Hydroelectric Dams				
5 Anguilla rostrata	American eel	Freshwater Fish	Fish	II 3	Marine Offshore and Oceanic	5 4 2 3 2 1 7 2	/ Dams and Water Management/Use				
J mgama rostiata	, amonoun cot	T TOOMWALL I TOTAL	1 1311	па	Trainic Stranoic and Oceanic	0.7.2, 0.0.1, /.2	, Damo and Water Flandgement Ose	Withdrawal of fresh surface water for human consumption, crop production or	Limit impacts of freshwater withdrawals through proper		
								other purposes. E.g., withdrawal by municipalities, spring water bottling	placement and operation (time of year restrictions) and		
								companies and farmers; reservoirs for firefighting, creation of man-made	require best practices for intake design. (7.2.6),		
								lakes. / Harvesting of aquatic species for commercial purposes that is	Continue moratorium on fishing to allow for rebuilding		
									of stocks. (5.4.2), Put tight restrictions on and limit the		
								governed by management measures for which the environmental impact is	construction of new dams. Remove obsolete dams to		
								primarily on the species (as opposed to habitat damage from sea bottom	restore and increase spawning and rearing habitat.		
					Creeks and Rivers Large Divers			trawling, Threat 7.3.6). Includes bycatch but excludes ghost fishing gear	Require safe, timely and effective passage of American		
					Creeks and Rivers, Large Rivers,			entangling wildlife (Threat 9.4.4). E.g., commercial fisheries, use of nets and	shad on functional dams that will not be removed. (7.2)		
					Tidal Creeks and Rivers, Tidal			fishing gear for eels, factory ships, marine mammals caught in industrial			
					Large Rivers, Tidal Wetlands,		Withdrawal of Surface Water / Commercial	fishing nets. / Facilities or activities that alter the natural water regime (flow or			
·					Estuaries, Marine Nearshore,		Withdrawal of Surface Water / Commercial	water teveto).			
6 Alosa sapidissima	American shad	Freshwater Fish	Fish	II b	Marine Offshore and Oceanic	70654070	Fishing / Dams and Water Management/Use				

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1 Scientific_Name	Common_Name	Grouping	Туре	Tier COR	Habitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes
								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	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		
								drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and sedimentation that is	forestry pollution (9.3), Decrease fossil fuel emmisions. Increase stream shading by planting riparian buffers to		
								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	cool stream temperatures (11.3).		
							Domestic and Urban Wastewater / Agricultural and Forestry Effluents /	may not be related to climate change.			
7 Percina gymnocephala	Appalachia darter	Freshwater Fish	Freshwater Fish	III c	Creeks and Rivers, Large Rivers	9.1, 9.3, 11.3	Changes in Temperature Regimes	Wastewater (pollutants) from industrial and military sectors, including mines, energy production sectors and other resource extraction industries. These	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop		
								effluents may result from deliberate or accidental spills that are legal or illegal and (may) contain various nutrients, sediments, toxic substances and	meaningful biological standands for coal and gas extraction. (9.2), Increase partnerships to implement best management practices such as alternate water		
								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	sources for cattle and protecting/establishing vegetated stream buffers for agriculture and forestry. (9.3.2),		
								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	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		
								likely to result from an indirect threat increasing exposure and to which conservation actions can be matched. /Wastewater (pollutants) that is	Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species. (7.2)		
								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			
							Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams	activities that alter the natural water regime (flow or water levels).			
8 Allohistium cinereum	Ashy darter	Freshwater Fish	Freshwater Fish	l b	Creeks and Rivers	9.2, 9.3, 7.2	and Water Management/Use	Harmaning of annualis and single for a name or in language when it of a name of his	Coardinate with the Wirginia Department of Marine		Additional appropriation actions may include
								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).
9 Acipenser oxyrinchus	Atlantic sturgeon	Freshwater Fish	Fish	l b	Tidal Large Rivers, Estuaries, Marine Nearshore	5.4.2, 7.2, 8.1.3	Commercial Fishing / Dams and Water Management/Use / Aquatic Animals				
								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	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, nonfunctioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the		
							Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams	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).	Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		
10 Moxostoma ariommum	Bigeye jumprock	Freshwater Fish	Freshwater Fish	III c	Creeks and Rivers	9.1, 9.3, 7.2	and Water Management/Use	Periods in which temperatures of the air, water or soil either exceed or fall	Decrease fossil fuel emissions. Develop partnerships		
								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	with landowners to increase stream shading by planting riparian buffers to cool stream temperatures (11.3), Increase partnerships to implement best management		
								primarily in drainage systems, runoff and eroded; they (may) contain various nutrients, toxic substances, chemicals, etc. Excludes erosion and	practices to reduce ALL sources of agriculture and forestry pollution (9.3), Avoid construction of new dams		
								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).	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 pay subjects that		
							Changes in Temperature Regimes /		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	Agricultural and Forestry Effluents / Dams and Water Management/Use				
i i Joottas parteyi	Diaok Soutpill	i roonwater i foll	i realiwatel Hall	1 V C		11.0, 0.0, 7.2	and tracer rianagement USC			1	

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1 Scientific Name	Common Name	Grouping			R Habitats	Threat Code	Threat_Description	Threat Long	Actions	Working Lands	Notes	
12 Enneacanthus chaetodon		Freshwater Fish	Freshwater Fish	l a	Creeks and Rivers, Ponds, Non	7.2.2, 9.3, 5.4.4	Beaver Dam Management / Agricultural and Forestry Effluents / Management/Control of Aquatic Species		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) 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, nonfunctioning dams. Dams that cannot be replaced show the 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).	f ld ld lee	Notes	
Chrosomus (Phoxinus) cumberlandensis Apple 14 Percina maculata	Blackside dace	Freshwater Fish Freshwater Fish		II a		9.2, 9.3, 7.2 9.2, 9.3, 7.2		energy production sectors and other resource extraction industries. These	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, nonfunctioning dams. Dams that cannot be replaced shown 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).	ie		

A	В	С	D	E F	G	Н	L	Р	Т	U V
1 Scientific_Name	Common_Name	Grouping	Туре	Tier COR	Habitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands Notes
							-		Coordinate with the Virginia Department of	
								energy production sectors and other resource extraction industries. These	Environmental Quality and Virginia Energy to develop	
								effluents may result from deliberate or accidental spills that are legal or illegal	meaningful biological standands for coal and gas	
								and (may) contain various nutrients, sediments, toxic substances and	extraction (9.2), Increase partnerships to implement	
								chemicals. Among others. Considering the difficulty in identifying	best management practices to reduce ALL sources of	
								contaminants or contaminant "cocktails" that are responsible for	agriculture and forestry pollution (9.3), Avoid	
1 1								environmental damage, other unknown contaminants from industries will be	construction of new dams and remove old, non-	
								listed with Threat 9.2. This section excludes natural sources of contaminants	functioning dams. Dams that cannot be replaced should	
								that are found in the environment (e.g., mercury found in soils or in river	be retrofited to allow fish passage. Coordinate with the	
1 1								substrates). Intoxication due to natural sources of these contaminants are	Virginia Department of Transportations to replace and	
								likely to result from an indirect threat increasing exposure and to which	install new culverts that allow movement of aquatic	
1 1								conservation actions can be matched. / Wastewater (pollutants) that is	species (7.2).	
								generated by agricultural, silvicultural and aquacultural activities. These		
1 1								discharges are transported primarily in drainage systems, runoff and eroded;		
1 1								they (may) contain various nutrients, toxic substances, chemicals, etc.		
1 1								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		
1 1								activities that alter the natural water regime (flow or water levels).		
							Industrial and Military Effluents /	3 (
					Headwater Streams, Creeks and		Agricultural and Forestry Effluents / Dams			
15 Erimystax insignis	Blotched chub	Freshwater Fish	Freshwater Fish	III c	· ·	9.2, 9.3, 7.2	and Water Management/Use			
. J Emilyotak molgillo	Diotorica criab	i recinwater i ion	1 TOSHWARET 1 ISH	0		J.L, J.O, 7.L		Wastewater (pollutants) from industrial and military sectors, including mines,	Coordinate with the Virginia Department of	
								energy production sectors and other resource extraction industries. These	Environmental Quality and Virginia Energy to develop	
									meaningful biological standands for coal and gas	
								and (may) contain various nutrients, sediments, toxic substances and	extraction (9.2), Increase partnerships to implement	
								chemicals. Among others. Considering the difficulty in identifying	best management practices to reduce ALL sources of	
1 1									agriculture and forestry pollution (9.3), Avoid	
								contaminants or contaminant "cocktails" that are responsible for environmental damage, other unknown contaminants from industries will be	construction of new dams and remove old, non-	
1 1								listed with Threat 9.2. This section excludes natural sources of contaminants	functioning dams. Dams that cannot be replaced should	
1 1									be retrofited to allow fish passage. Coordinate with the	
1 1								that are found in the environment (e.g., mercury found in soils or in river	Virginia Department of Transportations to replace and	
								substrates). Intoxication due to natural sources of these contaminants are	install new culverts that allow movement of aquatic	
1 1								likely to result from an indirect threat increasing exposure and to which	species (7.2)	
1 1								conservation actions can be matched. / Wastewater (pollutants) that is		
1 1								generated by agricultural, silvicultural and aquacultural activities. These		
1 1								discharges are transported primarily in drainage systems, runoff and eroded;		
1 1								they (may) contain various nutrients, toxic substances, chemicals, etc.		
1 1								Excludes erosion and sedimentation that is associated with drainage systems		
1 1								in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or		
1 1								activities that alter the natural water regime (flow or water levels).		
							Industrial and Military Effluents /			
							Agricultural and Forestry Effluents / Dams			
16 Percina burtoni	Blotchside logperch	Freshwater Fish	Freshwater Fish	II a	Creeks and Rivers	9.2, 9.3, 7.2	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	placement and operation (time of year restrictions) and	
								companies and farmers; reservoirs for firefighting, creation of man-made	require best practices for intake design. (7.2.6), Put tight	
								lakes. / Facilities or activities that alter the natural water regime (flow or water	restrictions on and limit the construction of new dams.	
								levels). / Harvesting of aquatic species for commercial purposes that is	Remove obsolete dams to restore and increase	
								governed by management measures for which the environmental impact is	spawning and rearing habitat. Require safe, timely and	
								primarily on the species (as opposed to habitat damage from sea bottom	effective passage on functional dams that will not be removed. Ensure BMP adherance for surface water	
								trawling, Threat 7.3.6). Includes bycatch but excludes ghost fishing gear	withdrawals and maintain groundwater levels that	
								entangling wildlife (Threat 9.4.4). E.g., commercial fisheries, use of nets and	ensure base flows. (7.2), Coordinate with VMRC, NMFS,	
								fishing gear for eels, factory ships, marine mammals caught in industrial	and ASMFC to develop harvest strategies to reduce	
					Creeks and Rivers, Tidal Creeks			fishing nets.	commercial bycatch of Mid-Atlantic stock (i.e.	
					and Rivers, Tidal Large Rivers,				observers, caps) (5.4.2)	
					Tidal Wetlands, Estuaries,		Withdrawal of Surface Water / Dams and		5555. Vers, cups, (57.2)	
					Marine Nearshore, Marine		Water Management/Use / Commercial			
17 Alosa aestivalis	Blueback herring	Freshwater Fish	Fish	IV a	Offshore and Oceanic	7.2.6, 7.2, 5.4.2	Fishing			
								Point or non-point source wastewater from residential and urban areas; these	Develop, biologically meaningful standards for the waste	
								discharges (may) contain nutrients, sediments, toxic substances, chemicals,	water effluent (9.1), Increase partnerships to implement	
								etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural	best management practices to reduce ALL sources of	
								and aquacultural activities. These discharges are transported primarily in	agriculture and forestry pollution (9.3), Avoid	
								drainage systems, runoff and eroded; they (may) contain various nutrients,	construction of new dams and remove old, non-	
								toxic substances, chemicals, etc. Excludes erosion and sedimentation that is	functioning dams. Dams that cannot be replaced should	
								associated with drainage systems in agriculture and forestry (7.2) or oil spills	be retrofited to allow fish passage. Coordinate with the	
								from machinery (9.2) / Facilities or activities that alter the natural water	Virginia Department of Transportations to replace and	
								regime (flow or water levels).	install new culverts that allow movement of aquatic	
					Headwater Streams, Creeks and		Agricultural and Forestry Effluents / Dams		species (7.2).	
18 Etheostoma jessiae	Blueside darter	Freshwater Fish	Freshwater Fish	III c	· ·	9.1, 9.3, 7.2	and Water Management/Use			
10 Ethicostoffia Jesside	שנעכשועב עמו נכו	i restiwatet FISH	i reanwater fibil	ını C	1117013	0.1, 0.0, /.2	and water management/05e		I .	

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1 Scientific_Name	Common_Name	Grouping	Туре	Tier COR		Threat_Code	Threat_Description	Threat Long	Actions	Working_Lands	Notes	
- Gorenano_rume	Common_name	or out ping	1,700	nei oon	Hubituts	micut_couc	Timed_Besonption	Wastewater (pollutants) from industrial and military sectors, including mines,	Coordinate with the Virginia Department of	Working_Lunus		
								energy production sectors and other resource extraction industries. These	Environmental Quality and Virginia Energy to develop			
								effluents may result from deliberate or accidental spills that are legal or illegal	meaningful biological standands for coal and gas			
									extraction (9.2), Increase partnerships to implement			
								and (may) contain various nutrients, sediments, toxic substances and	best management practices to reduce ALL sources of			
								chemicals. Among others. Considering the difficulty in identifying	agriculture and forestry pollution (9.3), Avoid			
								contaminants or contaminant "cocktails" that are responsible for	construction of new dams and remove old, non-			
								environmental damage, other unknown contaminants from industries will be	functioning dams. Dams that cannot be replaced should			
								listed with Threat 9.2. This section excludes natural sources of contaminants	be retrofited to allow fish passage. Coordinate with the			
								that are found in the environment (e.g., mercury found in soils or in river	Virginia Department of Transportations to replace and			
								substrates). Intoxication due to natural sources of these contaminants are	install new culverts that allow movement of aquatic			
								likely to result from an indirect threat increasing exposure and to which	species (7.2).			
								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).				
							Industrial and Military Effluents /					
					Headwater Streams, Creeks and		Agricultural and Forestry Effluents / Dams					
19 Cottus en 1	Bluestone sculpin	Freshwater Fish	Freshwater Fish			9.2, 9.3, 7.2	and Water Management/Use					
19 Cottus sp. 1	Bluestone sculpin	i iconwatei FiSII	i realiwatei Fiall	III a	IUVOIO	J.L, J.J, /.L	and water management/056	Doint or non-noint source wastewater from residential and urban executables	Increase partnerships to implement host management			
								Point or non-point source wastewater from residential and urban areas; these	Increase partnerships to implement best management			
								discharges (may) contain nutrients, sediments, toxic substances, chemicals,	practices to reduce ALL sources of urban pollution (9.1),			
								etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural	Increase partnerships to implement best management			
								and aquacultural activities. These discharges are transported primarily in	practices to reduce ALL sources of agriculture and			
								drainage systems, runoff and eroded; they (may) contain various nutrients,	forestry pollution (9.3), Avoid construction of new dams			
								toxic substances, chemicals, etc. Excludes erosion and sedimentation that is	and remove old, non-functioning dams. Dams that cannot be replaced should be retrofited to allow fish			
								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	passage. Coordinate with the Virginia Department of			
								regime (flow or water levels).	Transportations to replace and install new culverts that			
							Domestic and Urban Wastewater /		allow movement of aquatic species (7.2).			
							Agricultural and Forestry Effluents / Dams					
20 Moxostoma sp.	Brassy jumprock	Freshwater Fish	Freshwater Fish	IV c	Creeks and Rivers	9.1, 9.3, 7.2	and Water Management/Use					
								Facilities or activities that alter the natural water regime (flow or water levels).	Avoid construction of new dams and remove old, non-			
								/ Wastewater (pollutants) that is generated by agricultural, silvicultural and	functioning dams. Dams that cannot be replaced should			
								aquacultural activities. These discharges are transported primarily in drainage	be retrofited to allow fish passage. Coordinate with the			
								systems, runoff and eroded; they (may) contain various nutrients, toxic	Virginia Department of Transportations to replace and			
								substances, chemicals, etc. Excludes erosion and sedimentation that is	install new culverts that allow movement of aquatic			
								associated with drainage systems in agriculture and forestry (7.2) or oil spills	species (7.2), Increase partnerships to implement best			
								from machinery (9.2) / Deliberately killing individuals of an aquatic species for	management practices to reduce ALL sources of			
								human gain that is governed by management measures. E.g., control of	agriculture and forestry pollution (9.3), Coordinate with			
									County Extension Agents and VDWR Fisheries Biologists			
								lampreys using lampricides, control of mosquitos in their aquatic larval stage	to educate landowners on the importance of			
								(BTi), water weed cutting.	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).			
							Dams and Water Management/Use /					
					Creeks and Rivers, Large Rivers,		Agricultural and Forestry Effluents /					
21 Notropis bifrenatus	Bridle shiner	Freshwater Fish	Freshwater Fish	I a	Large Tidal Rivers, Ponds	7.2, 9.3, 5.4.4	Management/Control of Aquatic Species					
								Wastewater (pollutants) from industrial and military sectors, including mines,	Coordinate with the Virginia Department of			
								energy production sectors and other resource extraction industries. These	Environmental Quality and Virginia Energy to develop			
								effluents may result from deliberate or accidental spills that are legal or illegal	meaningful biological standands for coal and gas			
								and (may) contain various nutrients, sediments, toxic substances and	extraction (9.2), Increase partnerships to implement			
								chemicals. Among others. Considering the difficulty in identifying	best management practices to reduce ALL sources of			
								contaminants or contaminant "cocktails" that are responsible for	agriculture and forestry pollution (9.3), Avoid			
								environmental damage, other unknown contaminants from industries will be	construction of new dams and remove old, non-			
								listed with Threat 9.2. This section excludes natural sources of contaminants	functioning dams. Dams that cannot be replaced should			
								that are found in the environment (e.g., mercury found in soils or in river	be retrofited to allow fish passage. Coordinate with the			
								substrates). Intoxication due to natural sources of these contaminants are	Virginia Department of Transportations to replace and			
									install new culverts that allow movement of aquatic			
								likely to result from an indirect threat increasing exposure and to which	species (7.2).			
								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).				
							Industrial and Military Effluents /					
							Agricultural and Forestry Effluents / Dams					
22 Labidesthes sicculus	Brook silverside	Freshwater Fish	Freshwater Fish	III c	Creeks and Rivers	9.2, 9.3, 7.2	and Water Management/Use					

А	R	C	D D	E F	G I	н	ı	Р	т	U		V
1 Scientific Name	Common Name	Grouping		Tier COR		Threat Code	Threat_Description	Threat_Long	Actions	Working Lands	Notes	•
					Headwater Streams, Creeks and	11.3, 9.3, 8.1.3	·	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).			
23 Salvelinus fontinalis	Brook trout	Freshwater Fish	Freshwater Fish	IV a	Rivers	11.3, 9.3, 8.1.3	<u>'</u>	Point or non-point source wastewater from residential and urban areas; these	Increase partnerships to implement best management			
24 Pimenhales vidilay	Bullhead minnow	Freshwater Fish	Frachwater Fish	IV. c	Creeks and Rivers	01 02 72	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams	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).	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).			
24 Pimephales vigilax	Duttileau Hillillow	i restiwatel FISH	Freshwater Fish	IV c	Olegka glin Ulvela	9.1, 9.3, 7.2	and Water Management/Use	/ Wastewater (pollutants) that is generated by agricultural, silvicultural and	Develop and enforce regulations that prevent the			
25 Etheostoma osburni	Candy darter	Freshwater Fish	Freshwater Fish	I a	Creeks and Rivers	8.1.3, 9.3, 11.2		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 physiochemical makeups	, , , , , , , , , , , , , , , , , , , ,			
26 Etheostoma collis	Carolina darter	Freshwater Fish	Freshwater Fish	II c		11.3, 9.3, 7.2		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. / 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).			
	m Carolina fantail darter			IV c	Headwater Streams, Creeks and	11.3, 9.3, 7.2		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. / 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	В	С	D I	Е	F	G	Т н	T L	P	Т	U		V
1	cientific Name	Common_Name	Grouping			-	Habitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes	•
	ercina 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	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop, implement, and enforce 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).			
						ŀ	Headwater Streams, Creeks and		Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams	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).			
	chrosomus sp. cf. saylori		Freshwater Fish Freshwater Fish	Freshwater Fish Freshwater Fish	IV c		Headwater Streams	9.2, 9.3, 8.1.3	Industrial and Military Effluents / Agricultural and Forestry Effluents / Aquatic Animals	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	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	Туре	Tier COR	<u> </u>	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes
							·		Coordinate with the Virginia Department of		
								energy production sectors and other resource extraction industries. These	Environmental Quality and Virginia Energy to develop		
								effluents may result from deliberate or accidental spills that are legal or illegal			
								and (may) contain various nutrients, sediments, toxic substances and	extraction (9.2), Increase partnerships to implement		
								chemicals. Among others. Considering the difficulty in identifying	best management practices to reduce ALL sources of		
								contaminants or contaminant "cocktails" that are responsible for	agriculture and forestry pollution (9.3), Avoid construction of new dams and remove old, non-		
								environmental damage, other unknown contaminants from industries will be	functioning dams. Dams that cannot be replaced should		
								listed with Threat 9.2. This section excludes natural sources of contaminants	be retrofited to allow fish passage. Coordinate with the		
								that are found in the environment (e.g., mercury found in soils or in river	Virginia Department of Transportations to replace and		
								substrates). Intoxication due to natural sources of these contaminants are	install new culverts that allow movement of aquatic		
								likely to result from an indirect threat increasing exposure and to which	species (7.2).		
								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).			
							Industrial and Military Effluents /	detivities that after the hatarat water regime (new or water tovels).			
							Agricultural and Forestry Effluents / Dams				
31 Cottus sp. 4	Clinch sculpin	Freshwater Fish	Freshwater Fish	III c	Headwater Streams	9.2, 9.3, 7.2	and Water Management/Use				
F							100 1 22	Wastewater (pollutants) from industrial and military sectors, including mines,	Coordinate with the Virginia Department of		
								energy production sectors and other resource extraction industries. These	Environmental Quality and Virginia Energy to develop		
								effluents may result from deliberate or accidental spills that are legal or illegal	meaningful biological standands for coal and gas		
								and (may) contain various nutrients, sediments, toxic substances and	extraction (9.2), Increase partnerships to implement		
								chemicals. Among others. Considering the difficulty in identifying	best management practices to reduce ALL sources of		
								contaminants or contaminant "cocktails" that are responsible for	agriculture and forestry pollution (9.3), Avoid		
								environmental damage, other unknown contaminants from industries will be	construction of new dams and remove old, non-		
								listed with Threat 9.2. This section excludes natural sources of contaminants	functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the		
								that are found in the environment (e.g., mercury found in soils or in river	Virginia Department of Transportations to replace and		
								substrates). Intoxication due to natural sources of these contaminants are	install new culverts that allow movement of aquatic		
								likely to result from an indirect threat increasing exposure and to which	species (7.2).		
								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).			
							Industrial and Military Effluents /				
22 Doroino agioro	Duolaydortor	Frankwatar Fiah	Frankruster Field		Crooks and Divors	000070	Agricultural and Forestry Effluents / Dams				
32 Percina sciera	Dusky darter	Freshwater Fish	Freshwater Fish	III c	Creeks and Rivers	9.2, 9.3, 7.2	and Water Management/Use	Westewater (nell stants) that is generated by agricultural cibicultural and	Increase partnerships to implement host management		
								Wastewater (pollutants) that is generated by agricultural, silvicultural and aquacultural activities. These discharges are transported primarily in drainage	Increase partnerships to implement best management		
								systems, runoff and eroded; they (may) contain various nutrients, toxic	protecting/establishing vegetated stream buffers for		
								substances, chemicals, etc. Excludes erosion and sedimentation that is	agriculture and forestry. (9.3), Coordinate with the		
								associated with drainage systems in agriculture and forestry (7.2) or oil spills	Virginia Department of Health to determine which		
								from machinery (9.2) / Liquid domestic waste that is produced by urban	homes in the Copper Creek watershed are straight		
								centers and discharged primarily by the sewage system. E.g., discharges from	piping and provide incentives to connect to municipal		
								municipal waste treatment plants, leaks from sewers/septic tanks, untreated	sewer lines or septic tanks. (9.1.1), Develop and		
								discharged, pit toilets, medical components in water (birth control hormones,	implement techniques to prevent the invasion of the		
								antidepressants, antibiotics), toxoplasmosis, etc. / Plants and animals that	Fantail Darter (Etheostoma flabellare) into remaining		
								were originally present in ecosystem(s), but whose populations have increased	Duskytail Darter habitat. (8.2)		
								to a level where they are now "out of control" or overabundant as a direct or			
								indirect result of certain human activities.			
							Agricultural and Forestry Effluents /				
							Domestic Wastewater / Problematic Native				
33 Etheostoma percnurun	n Duskytail darter	Freshwater Fish	Freshwater Fish	I a	Creeks and Rivers	9.3, 9.1.1, 8.2	Plants and Animals				
								Periods in which temperatures of the air, water or soil either exceed or fall	Work toward decreasing fossil fuel emmisions. Develop		
								below the normal range of variation. Events that may or may not be related to	partnerships with landowners to increase stream		
								climate change. / Wastewater (pollutants) that is generated by agricultural,	shading by planting riparian buffers to cool stream		
								silvicultural and aquacultural activities. These discharges are transported	temperatures (11.3), Increase partnerships to		
								primarily in drainage systems, runoff and eroded; they (may) contain various	implement best management practices to reduce ALL		
								nutrients, toxic substances, chemicals, etc. Excludes erosion and	sources of agriculture and forestry pollution (9.3), Avoid		
								sedimentation that is associated with drainage systems in agriculture and	construction of new dams and remove old, non-		
								forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that	functioning dams. Dams that cannot be replaced should be retrofited to allow fish passage. Coordinate with the		
								alter the natural water regime (flow or water levels).	Virginia Department of Transportations to replace and		
									install new culverts that allow movement of aquatic		
									species (7.2)		
.							Changes in Temperature Regimes /				
							Agricultural and Forestry Effluents / Dams				
34 Phenacobius crassilab	rum Fatlips minnow	Freshwater Fish	Freshwater Fish	II c	Creeks and Rivers	11.3, 9.3, 7.2	and Water Management/Use				

Δ	R	С	l D	Е	F G	Тн	1	Р	Т	1	U		V
1 Scientific Name	Common Name	Grouping					Threat Description	ı ·	Actions	Wor		Notes	*
35 Aplodinotus grunniens	Freshwater drum	Freshwater Fish	Freshwater Fish	II c		9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams	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). 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 storm 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 natu	Coordinate with the Virginia Department Environmental Quality and Virginia Energy meaningful biological standands for coal a extraction (9.2), Increase partnerships to best management practices to reduce ALI agriculture and forestry pollution (9.3), Au construction of new dams and remove old functioning dams. Dams that cannot be rebe retrofited to allow fish passage. Coord Virginia Department of Transportations to install new culverts that allow movement species (7.2). Coordinate with the Virginia Department Environmental Quality and Virginia Energy meaningful biological standands for coal a extraction (9.2), Increase partnerships to best management practices to reduce ALI agriculture and forestry pollution (9.3), Au construction of new dams and remove old functioning dams. Dams that cannot be rebe retrofited to allow fish passage. Coord Virginia Department of Transportations to install new culverts that allow movement species (7.2).	of y to develop and gas implement L sources of void d, non- replaced should dinate with the o replace and of aquatic of y to develop and gas implement L sources of void d, non- replaced should dinate with the o replace and	rking_Lands	Notes	
Nothonotus Nothonotus Societa Societ	Golden darter Greenfin darter	Freshwater Fish Freshwater Fish	Freshwater Fish Freshwater Fish	II b	Creeks and Rivers Creeks and Rivers	9.3, 7.2, 11.3		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 in practices such as alternate water sources protecting/establishing vegetated stream agriculture and forestry. (9.3.2), Avoid coinnew dams and remove old, non-functionin Dams that cannot be replaced should be in allow fish passage. Coordinate with the V Department of Transportations to replace new culverts that allow movement of aquing (7.2), Decrease fossil fuel emmisions. Inconstanding by planting riparian buffers to contemperatures. (11.3)	ifor cattle and buffers for nstruction of ing dams. retrofited to //irginia e and install uatic species. crease stream			

1 Scientific_Name	Common Name	Grouping	Type D	Tier CC	F G R Habitats	Threat Code	Threat_Description	Threat Long	Actions	U 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	5	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.		TOTAL STATE OF THE	An additional conservation action would include coordinating with the Virginia Marine Resources Commission to establish 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		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		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).			
					Creeks and Rivers, Non-tidal		Beaver Dam Management / Soil Erosion, Sedimentation / Management/Control of	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).		

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47 Lepomis megalotis Longear sunfish Freshwater Fish Freshwater Fish IV b Creeks and Rivers 8.1.3, 9.3, 7.2 Management/Use				.2 M	reeks and Rivers 8.1.3	IV b	Freshwater Fish	Freshwater Fish	Longear sunfish	47 Lepomis megalotis

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Protection of the service states of the service states and the servi									Agricultural and Forestry Effluents / Dams	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	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		
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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 splits 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 "coctalis" that are responsible for environmental damage, other unknown contaminants from industries will be listed with Threat 9.2. This section excludes a shart as sources of contaminants that are found in the environment (e.g., mercury found in soils or in river substances). 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, shirkcultural and aquacultural activities. These discharges are transported primarily in drainage systems in agriculture and forestry (7.2) or oil splits from machinery (9.2) / Factilities or activities and administration that is associated with drainage systems in agriculture and forestry (7.2) or oil splits from machinery (9.2) / Factilities or activities that alter the natural water regime (flow or water levels).	SO Johthyomyzon greelevi	Mountain brook lampres	r Freshwater Fish	Freshwater Fish		н	eadwater Streams	919372	Agricultural and Forestry Effluents / Dams	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	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		
Agricultural and Forestry Effluents / Dame	,,,									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	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, nonfunctioning 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	В	С	D	Е	F	G	Н	L I	P	Т	U		V
1	Scientific_Name	Common_Name	Grouping	Туре	Tier C	OR H	abitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes	
										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 of activities that alter the natural water regime (flow or water levels).	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, nonfunctioning 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).			
	Landhamana Bara	Manustalia alalia an	For a broad and File b	For a boot and Finds	n,		and Division	000070						
	Lythrurus lirus Acantharchus pomotis	Mountain shiner Mud sunfish	Freshwater Fish	Freshwater Fish	IV c	He Ri	eadwater Streams, Creeks and ivers, Ponds, Non-tidal	7.2.2, 9.3, 5.4.4			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).			
		New River shiner	Freshwater Fish	Freshwater Fish	II c	e Gi		9.1, 9.3, 11.3		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.	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).			
	Noturus gilberti		Freshwater Fish	Freshwater Fish	II b			9.3, 9.1, 7.2		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, nonfunctioning 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		

Ι	D		D	_E	F G	Т	1	P P	Т	Т п	T v
1 Scientific Name	Common_Name	Grouping	Туре	Tior (COR Habitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	
56 Polyodon spathula	Paddlefish	Freshwater Fish	Freshwater Fish	IV (Creels and Rivers, Large Tidal	9.2, 9.3, 7.2	Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams and Water Management/Use	-	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, nonfunctioning 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)	i	
57 Percina crassa	Piedmont darter	Freshwater Fish	Freshwater Fish	IV C		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			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).			

А	В	С	D	E F	G	Н	L	P	Т	U		V
1 Scientific_Name	Common_Name	Grouping		Tier COR		Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes	
								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, nonfunctioning 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).	I		
59 Moxostoma carinatum	River redhorse	Freshwater Fish	Freshwater Fish	IV b	Creeks and Rivers, Large Rivers	9.2. 9.3. 7.2	and Water Management/Use					
60 Ambloplites cavifrons	Roanoke bass	Freshwater Fish	Freshwater Fish		Creeks and Rivers, Large Rivers			/ 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 (<i>Ambloplites rupestris</i>) 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		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, nonfunctioning 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	l b	Creeks and Rivers	8.1.3, 9.3, 7.2		/ 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)	ı		

A	В	С	D	E F G	Н	L	Р	Т	U V
1 Scientific_Name	Common_Name	Grouping	Туре	Tier COR Habitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands Notes
						·	/ Wastewater (pollutants) that is generated by agricultural, silvicultural and	Develop regulations to prevent the introduction of the	
							aquacultural activities. These discharges are transported primarily in drainage	Torrent Sucker (Thoburnia rhothoeca) into waters	
							systems, runoff and eroded; they (may) contain various nutrients, toxic	containing Rustyside Sucker. Educate the public of the	
							substances, chemicals, etc. Excludes erosion and sedimentation that is	potential harm of releasing unused bait and moving	
							associated with drainage systems in agriculture and forestry (7.2) or oil spills	aquatic organisms (8.1.3), Increase partnerships to	
							from machinery (9.2) / Facilities or activities that alter the natural water	implement best management practices to reduce ALL	
							regime (flow or water levels).	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	
						Aquatic Animals / Agricultural and Forestry		species (7.2).	
				Headwater Streams, Creeks and		Effluents / Dams and Water			
3 Thoburnia hamiltoni	i Rustyside sucker	Freshwater Fish	Freshwater Fish	III c Rivers	8.1.3, 9.3, 7.2	Management/Use			
	,				,,		Wastewater (pollutants) from industrial and military sectors, including mines,	Coordinate with the Virginia Department of	
							energy production sectors and other resource extraction industries. These	Environmental Quality and Virginia Energy to develop	
							9. 1	meaningful biological standands for coal and gas	
							and (may) contain various nutrients, sediments, toxic substances and	extraction (9.2), Increase partnerships to implement	
1							chemicals. Among others. Considering the difficulty in identifying	best management practices to reduce ALL sources of	
1							contaminants or contaminant "cocktails" that are responsible for	agriculture and forestry pollution (9.3), Avoid	
							environmental damage, other unknown contaminants from industries will be	construction of new dams and remove old, non-	
							listed with Threat 9.2. This section excludes natural sources of contaminants	functioning dams. Dams that cannot be replaced should	
1							that are found in the environment (e.g., mercury found in soils or in river	be retrofited to allow fish passage. Coordinate with the	
1							substrates). Intoxication due to natural sources of these contaminants are	Virginia Department of Transportations to replace and	
							likely to result from an indirect threat increasing exposure and to which	install new culverts that allow movement of aquatic	
							conservation actions can be matched. / Wastewater (pollutants) that is	species (7.2).	
							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 forcetry (7.2) or oil apilla from machinery (0.2). (Facilities or		
							in agriculture and forestry (7.2) or oil spills from machinery (9.2) / Facilities or		
						Industrial and Military Effluents /	activities that alter the natural water regime (flow or water levels).		
						Industrial and Military Effluents /			
	O and abin an	For a broad and Finds	For a bound on Finds	N/ Consider and Bissess	000070	Agricultural and Forestry Effluents / Dams			
Miniellus stramineus	s Sand shiner	Freshwater Fish	Freshwater Fish	IV c Creeks and Rivers	9.2, 9.3, 7.2	and Water Management/Use	Mantaurakau (nallukanka) furum induskuial and milikau raakaus inaluding mina	Coordinate with the Virginia Department of	
							, ,	Coordinate with the Virginia Department of Environmental Quality and Virginia Energy to develop	
							energy production sectors and other resource extraction industries. These effluents may result from deliberate or accidental spills that are legal or illegal	meaningful biological standands for coal and gas	
							and (may) contain various nutrients, sediments, toxic substances and	extraction (9.2), Increase partnerships to implement	
								best management practices to reduce ALL sources of	
							chemicals. Among others. Considering the difficulty in identifying	agriculture and forestry pollution (9.3), Avoid	
							contaminants or contaminant "cocktails" that are responsible for	construction of new dams and remove old, non-	
							environmental damage, other unknown contaminants from industries will be	functioning dams. Dams that cannot be replaced should	
							listed with Threat 9.2. This section excludes natural sources of contaminants	be retrofited to allow fish passage. Coordinate with the	
							that are found in the environment (e.g., mercury found in soils or in river	Virginia Department of Transportations to replace and	
1							substrates). Intoxication due to natural sources of these contaminants are	install new culverts that allow movement of aquatic	
							likely to result from an indirect threat increasing exposure and to which	species (7.2)	
1							conservation actions can be matched. / Wastewater (pollutants) that is		
							generated by agricultural, silvicultural and aquacultural activities. These		
1							discharges are transported primarily in drainage systems, runoff and eroded;		
							they (may) contain various nutrients, toxic substances, chemicals, etc.		
1							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).		
						Industrial and Military Effluents /			
I						Agricultural and Forestry Effluents / Dams			
5 Sander canadensis	Sauger	Freshwater Fish	Freshwater Fish	III b Creeks and Rivers	9.2, 9.3, 7.2	and Water Management/Use			
1							Point or non-point source wastewater from residential and urban areas; these		
							discharges (may) contain nutrients, sediments, toxic substances, chemicals,	water effluent (9.1), Increase partnerships to implement	
							etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural	best management practices to reduce ALL sources of	
1							and aquacultural activities. These discharges are transported primarily in	agriculture and forestry pollution (9.3), Avoid	
1							drainage systems, runoff and eroded; they (may) contain various nutrients,	construction of new dams and remove old, non-	
1							toxic substances, chemicals, etc. Excludes erosion and sedimentation that is	functioning dams. Dams that cannot be replaced should	
							associated with drainage systems in agriculture and forestry (7.2) or oil spills	be retrofited to allow fish passage. Coordinate with the	
							from machinery (9.2) / Facilities or activities that alter the natural water	Virginia Department of Transportations to replace and	
						Domestic and Urban Wastewater /	regime (flow or water levels).	install new culverts that allow movement of aquatic	
						Domestic and Orban Wastewater /	regime (now or water tevels).	species (7.2)	
				Headwater Streams, Creeks and		Agricultural and Forestry Effluents / Dams	regime (now or water tereto).	species (7.2).	

Δ	R	T c	П	I E I	F G	Т	T I	D D	Т	T n	V
1 Scientific Name	Common Name	Grouning		_			Threat Description	'	Actions	Working Lands	V
67 Nothonotus acuticeps	Common_Name Sharphead darter Sharpnose darter	Freshwater Fish Freshwater Fish	Freshwater Fish Freshwater Fish	Tier (9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use Changes in Temperature Regimes / Agricultural and Forestry Effluents / Dams and Water Management/Use	Threat_Long 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). 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).	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). 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).		Notes
	Shortnose sturgeon	Freshwater Fish	Fish	I	Large Tidal Rivers, Estuaries,		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 of 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. / 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	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). Increase partnerships to implement best management practices to reduce ALL sources of urban pollution (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 o	C Creeks and Rivers	9.1, 9.3, 7.2	Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams and Water Management/Use	from machinery (9.2) / Facilities or activities that alter the natural water regime (flow or water levels).	passage. Coordinate with the Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).		

А	В	С	D	E F	G	Н	L	P	Т	U	V
1 Scientific_Name	Common_Name	Grouping	Туре	Tier COR	Habitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes
							Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams	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, nonfunctioning 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).		
71 Moxostoma anisurum 72 Erimystax cahni	Silver redhorse Slender chub	Freshwater Fish Freshwater Fish	Freshwater Fish Freshwater Fish	II 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, implement, and enforce 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)		
73 Moxostoma breviceps	Smallmouth redhorse				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).	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, nonfunctioning 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	Туре		R Habitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands		<u> </u>
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).			
7F Eundulus satisburs	Speckled killifish	Freshwater Fish	Frankuster Field	DV -	Headwater Streams, Creeks a		Domestic and Urban Wastewater / Agricultural and Forestry Effluents / Dams	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 76 Erimonax monachus		Freshwater Fish	Freshwater Fish Freshwater Fish	I a	Rivers Creeks and Rivers	9.1, 9.3, 7.2	and Water Management/Use 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 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)			
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, nonfunctioning 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	Туре	Tier COR		Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes	
							Industrial and Military Effluents / Agricultural and Forestry Effluents / Dams	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, nonfunctioning 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).	<u>u</u>		
78 Noturus flavus	Stonecat Striped bass	Freshwater Fish Freshwater Fish			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 unde "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.	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 popularity in grant dams. Dams that cannot		include coordinating	ine Resources to develop ions to prevent the nous fishes by
80 Phenacobius mirabilis	Suckermouth minnow				Creeks and Rivers	9.2, 9.3, 7.2	-	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).	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).			

Α ,	В	С	D I	E F	G	Н	L	Р	Т	U		V
1 Scientific_Name	Common_Name	Grouping		Tier COR	Habitats	Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes	•
			.,,,,				-	Periods in which temperatures of the air, water or soil either exceed or fall	Decrease fossil fuel emissions. Develop partnerships	Tronang_zamas		
								below the normal range of variation. Events that may or may not be related to	with landowners to increase stream shading by planting			
1 1									riparian buffers to cool stream temperatures (11.3),			
1 1								silvicultural and aquacultural activities. These discharges are transported	Increase partnerships to implement best management			
1 1								primarily in drainage systems, runoff and eroded; they (may) contain various	practices to reduce ALL sources of agriculture and			
1 1								nutrients, toxic substances, chemicals, etc. Excludes erosion and	forestry pollution (9.3), Avoid construction of new dams			
1 1								sedimentation that is associated with drainage systems in agriculture and	and remove old, non-functioning dams. Dams that			
1 1								forestry (7.2) or oil spills from machinery (9.2) / Facilities or activities that	cannot be replaced should be retrofited to allow fish			
1 1								alter the natural water regime (flow or water levels).	passage. Coordinate with the Virginia Department of			
1 1									Transportations to replace and install new culverts that			
1 1							Changes in Temperature Regimes /		allow movement of aquatic species (7.2).			
1 1					Headwater Streams, Creeks and		Agricultural and Forestry Effluents / Dams					
81 Etheostoma swannanoa	Swannanoa darter	Freshwater Fish	Freshwater Fish	IV b	Rivers	11.3, 9.3, 7.2	and Water Management/Use					
								/ Wastewater (pollutants) that is generated by agricultural, silvicultural and	Develop regulations to prevent the introduction non-			
1 1								aquacultural activities. These discharges are transported primarily in drainage	native leuciscids into waters containing Tennessee Dace.			
1 1								systems, runoff and eroded; they (may) contain various nutrients, toxic	Educate the public on the potential harm of releasing			
1 1								substances, chemicals, etc. Excludes erosion and sedimentation that is	unused bait and moving aquatic organisms (8.1.3),			
1 1								associated with drainage systems in agriculture and forestry (7.2) or oil spills	Increase partnerships to implement best management			
1 1								from machinery (9.2) / Facilities or activities that alter the natural water	practices to reduce ALL sources of agriculture and			
1 1								regime (flow or water levels).	forestry pollution (9.3), Avoid construction of new dams			
1 1									and remove old, non-functioning dams. Dams that			
1 1									cannot be replaced should be retrofited to allow fish			
1 1									passage. Coordinate with the Virginia Department of			
1 1									Transportations to replace and install new culverts that			
1 1							Aquatic Animals / Agricultural and Forestry		allow movement of aquatic species (7.2)			
Chrosomus (Phoxinus)							Effluents / Dams and Water					
82 tennesseensis	Tennessee dace	Freshwater Fish	Freshwater Fish	I a	Headwater Streams	8.1.3, 9.3, 7.2	Management/Use					
								Point or non-point source wastewater from residential and urban areas; these	Increase partnerships to implement best management			
1 1								discharges (may) contain nutrients, sediments, toxic substances, chemicals,	practices to reduce ALL sources of urban pollution (9.1),			
1 1								etc. / Wastewater (pollutants) that is generated by agricultural, silvicultural	Increase partnerships to implement best management			
1 1								and aquacultural activities. These discharges are transported primarily in	practices to reduce ALL sources of agriculture and			
1 1								drainage systems, runoff and eroded; they (may) contain various nutrients,	forestry pollution (9.3), Avoid construction of new dams			
1 1								toxic substances, chemicals, etc. Excludes erosion and sedimentation that is	and remove old, non-functioning dams. Dams that			
								associated with drainage systems in agriculture and forestry (7.2) or oil spills	cannot be replaced should be retrofited to allow fish			
1 1								from machinery (9.2) / Facilities or activities that alter the natural water	passage. Coordinate with the Virginia Department of			
1 1								regime (flow or water levels).	Transportations to replace and install new culverts that			
1 1							Domestic and Urban Wastewater /		allow movement of aquatic species (7.2).			
1 1							Agricultural and Forestry Effluents / Dams					
83 Exoglossum laurae	Tonguetied minnow	Freshwater Fish	Freshwater Fish	III c	Creeks and Rivers	9.1, 9.3, 7.2	and Water Management/Use					
1 1								Wastewater (pollutants) from industrial and military sectors, including mines,	Coordinate with the Virginia Department of			
1 1								energy production sectors and other resource extraction industries. These	Environmental Quality and Virginia Energy to develop			
1 1								effluents may result from deliberate or accidental spills that are legal or illegal	meaningful biological standands for coal and gas			
1 1								and (may) contain various nutrients, sediments, toxic substances and	extraction (3.2), Increase partnerships to implement			
1 1								chemicals. Among others. Considering the difficulty in identifying	best management practices to reduce ALL sources of			
1 1								contaminants or contaminant "cocktails" that are responsible for	agriculture and forestry pollution (9.3), Coordinate with			
1 1								environmental damage, other unknown contaminants from industries will be	the Virginia Department of Health to determine which			
1 1								listed with Threat 9.2. This section excludes natural sources of contaminants	homes or businesses in the Big Sandy watershed are straight piping and provide incentives to connect to			
1 1								that are found in the environment (e.g., mercury found in soils or in river	municipal sewer lines or septic tanks. (9.1.1)			
1 1								substrates). Intoxication due to natural sources of these contaminants are	mameipai sewei iiiles oi septic taliks. (3.1.1)			
1 1								likely to result from an indirect threat increasing exposure and to which				
1 1								conservation actions can be matched. / Wastewater (pollutants) that is				
1 1								generated by agricultural, silvicultural and aquacultural activities. These				
1 1								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).				
							Industrial and Military Effluents /					
							Agricultural and Forestry Effluents / Dams					
84 Etheostoma variatum	Variegate darter	Freshwater Fish	Freshwater Fish	II a	Creeks and Rivers	9.2, 9.3, 7.2	and Water Management/Use					
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1 Scie	entific_Name	Common_Name	Grouping	Туре				Threat_Code	Threat_Description	Threat_Long	Actions	Working_Lands	Notes	·
	nocrypta clara		Freshwater Fish	Freshwater Fish	IV c			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). 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	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, nonfunctioning 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 Minio	ellus 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	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).	Virginia Department of Transportations to replace and install new culverts that allow movement of aquatic species (7.2).			
									Industrial and Military Effluents /	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 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).			
87 Notu	urus flavipinnis	Yellowfin madtom	Freshwater Fish	Freshwater Fish	l a	1 (Creeks and Rivers	9.2, 9.3, 8.1.3	Agricultural and Forestry Effluents / Aquatic Animals					