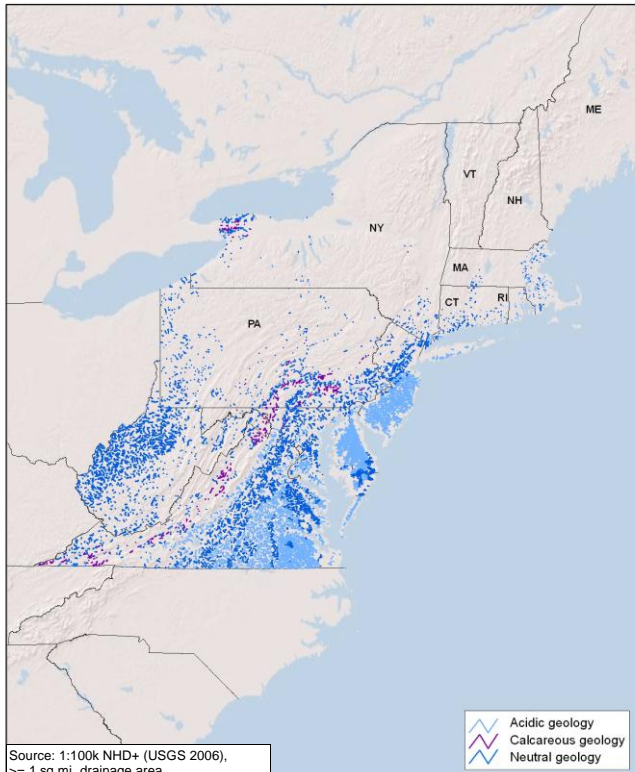


# Low Gradient, Warm, Headwaters and Creeks

## Macrogroup: Headwaters and Creeks

This map is based on a model and has had little field-checking. Contact your State Natural Heritage Ecologist or State Fish Game Agency for more information about this habitat.



Small Creek in Maryland, © MD DNR

### Description:

Warm, slow-moving, headwaters and creeks of low-elevation flat, marshy settings. These small streams of the Mid-Atlantic region occur at moderate to low elevations on flats or very gentle slopes in watersheds less than 39 sq.mi in size. The warm slow-moving waters may have high turbidity and be somewhat poorly oxygenated. Instream habitats are dominated by glide-pool and ripple-dune systems with runs interspersed by pools and a few short or no distinct riffles. Bed materials are predominantly sands, silt, and only isolated amounts of gravel. Some examples flow through wetlands and these segments may be dominated by silt, muck, peat, marl deposits, organic matter, and woody or leafy debris. These low-gradient streams may have high sinuosity, but are usually only slightly entrenched with adjacent floodplain and riparian wetland ecosystems. Warm water temperatures in these streams means the fish community will contain a higher proportion of warmwater species relative to coolwater species, and are unlikely to support any resident coldwater species. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain watersheds less than 4 sq.mi, and have an average bankfull width of 16 feet or 2) Creeks that include larger streams with watersheds up to 39 sq.mi. and have an average bankfull width of 32 feet.

### Similar Habitat Types:

Headwaters and creeks also occur at higher elevations and on higher slopes, but these tend to have coarser substrates, faster, and cooler water. Warm low gradient streams typically flow into low gradient warm rivers.

### Places to Visit this Habitat:

North Branch Metedeconk River headwaters, Turkey Swamp | NJ  
 Manasquan River headwaters, Manasquan River Linear Park | NJ  
 South Branch Rahway River headwaters, Merrill Park | NJ  
 Little Gunpowder Falls, Gunpowder Falls State Park | MD  
 Wolf Den Branch, Cedarville State Forest | MD

**State Distribution:** CT, DE, DC, MD, MA, NH, NJ, NY, PA, RI, VT, VA, WV

**Total Habitat (mi):** 17,704

**% Conserved:** 9.0 Unit = Acres of 100m Riparian Buffer

State	State Habitat %	Miles of Habitat	Acres GAP 1 - 2	Acres GAP 3	Total Acres Unsecured
VA	42	7455	26	162	5449
WV	15	2649	24	56	1898
NJ	13	2360	266	231	1337
MD	10	1727	58	145	1119
PA	9	1637	48	38	1148
DE	6	1087	23	59	761
NY	3	473	4	14	341
MA	1	161	5	29	93
CT	1	123	5	9	82
RI	0	29	2	6	15
DC	0	1	0	0	1
NH	0	1	0	0	0

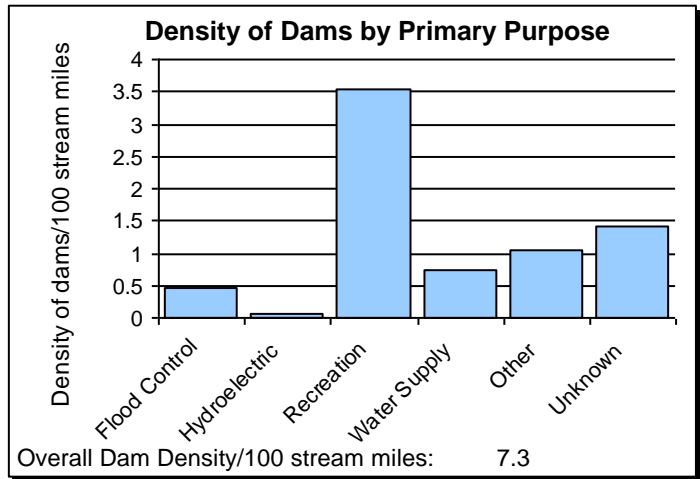
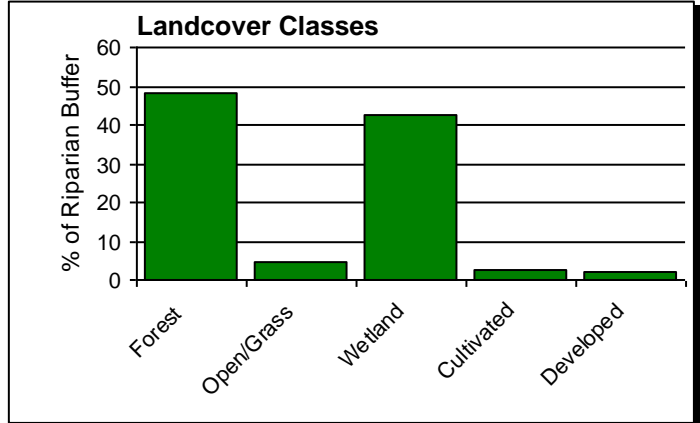
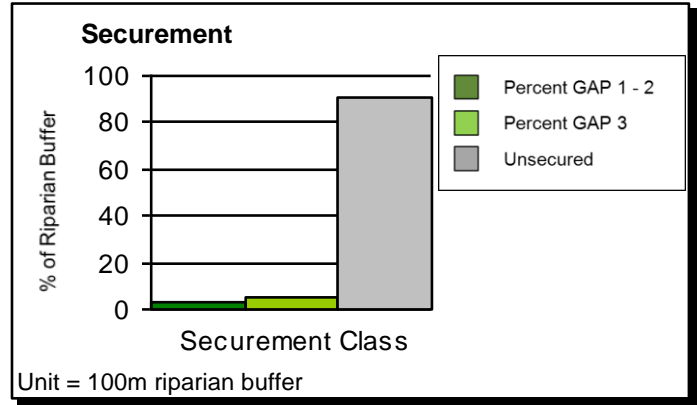
**Associated Fish:**

Most Abundant: white sucker, pumpkinseed, redbreast sunfish, goldern shiner, eastern blacknose dace, bluntnose minnow, tessellated darter, mottled sculpin, longnose dace, central stoneroller, fantail darter, bluehead chub, bluegill, black crappie, creek chub, common shiner, striped shiner, american eel, emerald shiner, spottail shiner, rosyside dace, swallowtail shiner, banded killifish, yellow perch, chain pickerel, brown bullhead, yellow bullhead, swamp darter.

Less Abundant: creek chubsucker, redfin pickerel, banded sunfish, satinfin shiner, pearl dace, fallfish, eastern mudminnow, rock bass, green sunfish, mummichog, margined madtom, northern hog sucker, banded sculpin, crescent shiner, golden shiner, creek chubsucker, greensidedarter, johnny darter, river chub, smallmouth bass, mountain redbelly dace, spotfin shiner, rainbow darter, silverjaw minnow, pirate perch, longear sunfish, fathead minnow, torrent sucker, largemouth bass, cutlip minnow, rosyface shiner, bluespotted sunfish, sandshiner, saffron shiner, roanoke darter, bigeye chub.

**Species of Concern (G1 - G4):**

Fishes: carolina darter, kanawha minnow, tennessee dace, potomac sculpin, blackbanded sunfish, glassy darter, tonguetied minnow, speckled killifish, american brook lamprey, whitemouth shiner, ironcolor shiner, new river shiner, appalachia darter, stripeback darter  
Crayfish, Mussels, and Snails: chowanoke crayfish, dwarf wedgemussel, cumberland bean, yellow lance, tennessee clubshell, tennessee pigtoe, roanoke slabshell, tennessee heelsplitter, slippershell mussel, eastern pondmussel, kidneyshell  
 See Appendix 2 for scientific names

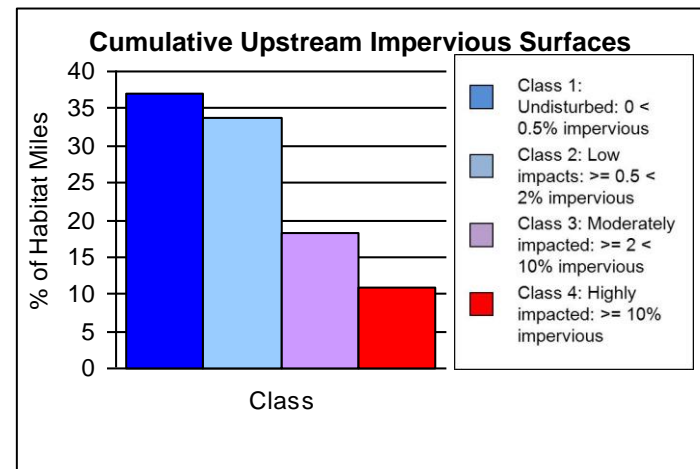


**Crosswalk to State Names:**

New York: Marsh headwater stream, Coastal plain stream. Maryland: Coastal Plain Streams, Blackwater Streams, Limestone Streams, Piedmont Streams: low gradient variant. Pennsylvania: Atlantic Basin Fish Warmwater Community 1, Ohio-Great Lakes Basins Fish Warmwater Stream Community



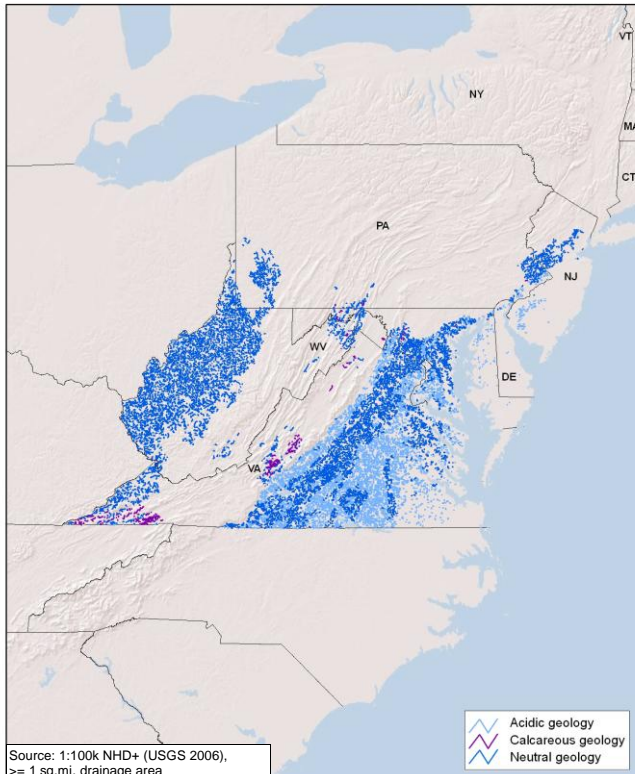
DNR  
Bluntnose minnow, © OH



# Moderate Gradient, Warm, Headwaters and Creeks

## Macrogroup: Headwaters and Creeks

This map is based on a model and has had little field-checking. Contact your State Natural Heritage Ecologist or State Fish Game Agency for more information about this habitat.



Eightmile River, © Tom Henthorn

### Description:

Warm, moderately fast-moving, headwaters and creeks of low-elevation hills and gentle slopes. These small streams of the Mid-Atlantic region occur on hills and slopes at low to moderate elevations in watersheds less than 39 sq.mi in size. They have warm, moderately fast moving water with good oxygenation. Instream habitats are dominated by riffle-pool development with low sinuosity, moderately entrenchment, and moderately narrow valleys. They have substrates dominated by cobble, gravel, and sand with occasional small patches of boulder. The predominant source of energy to the stream is terrestrial leaf litter or organic matter (these are allochthonous streams). Warm water temperatures in these streams means the fish community will contain a higher proportion of warmwater species relative to coolwater species. These systems are unlikely to support any resident coldwater species. Additional variation in the stream biological community is associated with acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota. The habitat can be further subdivided into 1) headwaters that drain watersheds less than 4 sq.mi, and have an average bankfull width of 16 feet or 2) Creeks that include larger streams with watersheds up to 39 sq.mi. and have an average bankfull width of 32 feet.

### Similar Habitat Types:

These moderate gradient streams are transitional types and often exhibit some characteristics of both the higher and lower gradient streams. Warm moderate gradient streams typically flow into moderate or low gradient warm rivers in areas of less topography.

### Places to Visit this Habitat:

Hammond Branch, Hammond Park | MD Locketong Creek, Westcott Nature Preserve | NJ Patterson Creek, George Washington And Jefferson National Forest | VA Pimmit Run, Potomac Hills City Park | VA Panther Creek, Panther State Forest | WV

**State Distribution:** DE, DC, MD, NJ, NY, PA, VA, WV

**Total Habitat (mi):** 16,894

**% Conserved:** 4.3 Unit = Acres of 100m Riparian Buffer

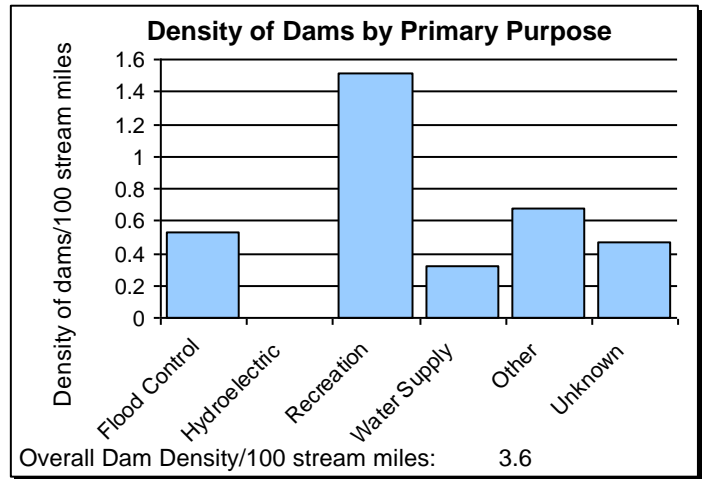
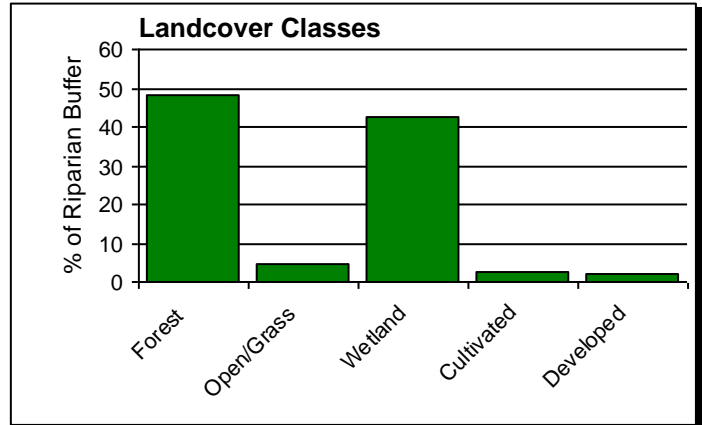
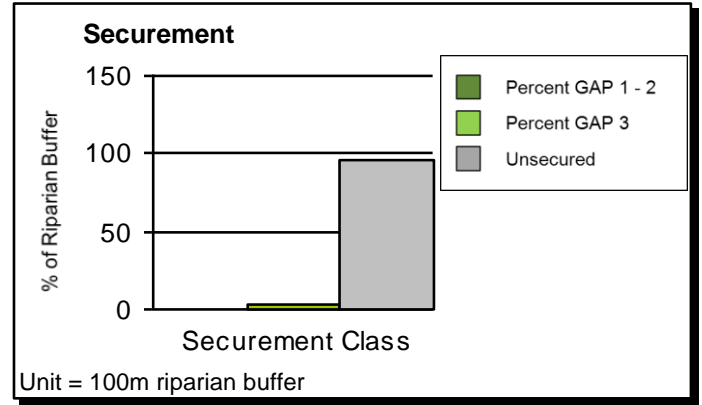
State	State Habitat %	Miles of Habitat	Acres GAP 1 - 2	Acres GAP 3	Total Acres Unsecured
VA	56	9413	11	234	7101
WV	28	4717	17	66	3603
MD	9	1591	30	150	1062
PA	5	784	8	20	584
NJ	2	365	16	9	268
DE	0	18	0	3	11
DC	0	4	0	0	3
NY	0	2	0	0	1

**Associated Fish:**

Most Abundant: eastern blacknose dace, creek chub, bluehead chub, mountain redbelly dace, central stoneroller, roside dace, fantail darter, striped shiner, crescent shiner, bluntnose minnow, white sucker. Less Abundant: rainbow darter, tessellated darter, silverjaw minnow, torrent sucker, bluegill, longnose dace, margined madtom, green sunfish, johnny darter, redbreast sunfish, mottled sculpin, northern hog sucker, banded sculpin, rock bass, cutlip minnow, fallfish, american eel, pumpkinseed, greenside darter, common shiner, roanoke hog sucker, rosefin shiner, creek chubsucker, highscale shiner, golden shiner, smallmouth bass, rosyface shiner, fantail darter

**Species of Concern (G1 - G4):**

Fishes: clinch dace, blackside dace, redbreast dace, tennessee dace, rustyside sucker, blackbanded sunfish, speckled killifish, bigmouth chub, new river shiner, appalachia darter, stripeback darter  
Crayfish, Mussels, and Snails: elk river crayfish, spiny scale crayfish, littlewing pearlymussel, tennessee heelsplitter, kidneyshell, appalachian springsnail  
 See Appendix 2 for scientific names

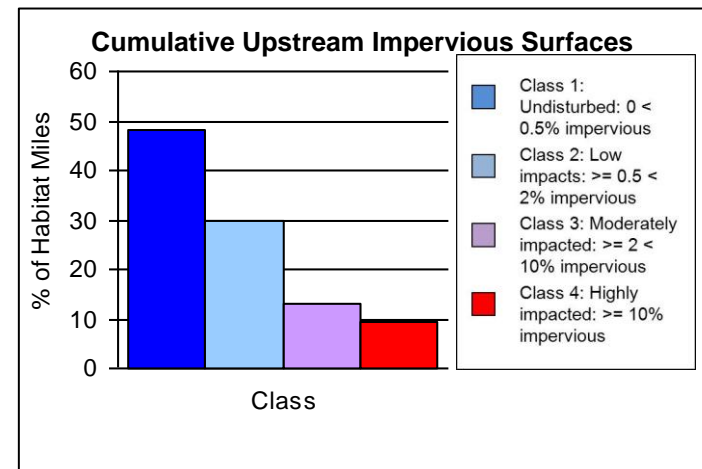


**Crosswalk to State Names:**

Maryland: Piedmont Streams. Pennsylvania: Atlantic Basin Fish Warmwater Community 1, Ohio-Great Lakes Basins Fish Warmwater Stream Community.



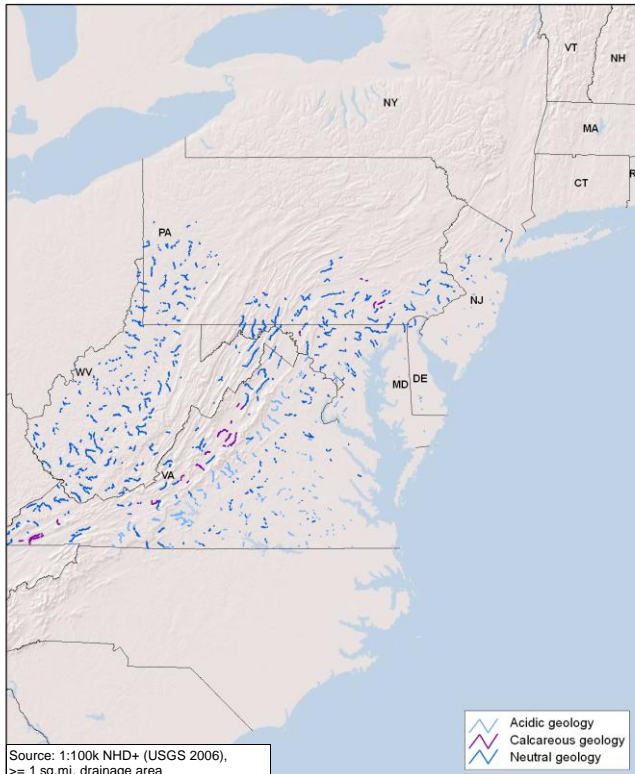
Bluehead Chub, © Outdoor Alabama



# Moderate Gradient, Warm, Small River

Macrogroup: Small River

This map is based on a model and has had little field-checking. Contact your State Natural Heritage Ecologist or State Fish Game Agency for more information about this habitat.



Sideling Creek, © Doug Samson

## Description:

Warm, moderately fast-moving, small rivers of the southern Mid-Atlantic region. These small rivers of the south drain watersheds up to 200 sq.mi and have an average bankfull width of 69 feet. The moderately fast-moving waters are dominated by a well-defined pattern of alternating pools, riffles, and runs. Their substrate is composed of sand, gravel, and cobble, and they often have high water clarity and are well oxygenated. These moderate gradient rivers exhibit moderate to low sinuosity with moderately narrow valleys and adjacent riverside upland communities. Warm water temperatures in these rivers means the fish community will contain a higher proportion of warmwater species relative to coolwater species. These systems are unlikely to support any resident coldwater species. Additional variation in the biological community is expected in acidic, calcareous, and neutral geologic settings where the pH of the water will limit the distribution of certain macroinvertebrates, plants, and other aquatic biota.

**State Distribution:** DE, DC, MD, NJ, NY, PA, VA, WV

**Total Habitat (mi):** 3,664

**% Conserved:** 8.3 Unit = Acres of 100m Riparian Buffer

State	State Habitat %	Miles of Habitat	Acres GAP 1 - 2	Acres GAP 3	Total Acres Unsecured
VA	41	1501	4	26	918
WV	26	973	16	32	577
PA	21	773	14	24	456
MD	9	323	23	40	144
NJ	2	77	8	5	34
DE	1	20	0	3	10
DC	0	10	0	0	7
NY	0	1	0	0	1

## Similar Habitat Types:

These moderate gradient rivers are transitional types and often exhibit some characteristics of both the higher and lower gradient streams. Warm moderate gradient small rivers typically flow into moderate or low gradient warm larger rivers in areas of less topography.

## Places to Visit this Habitat:

Deer Creek, Rocks State Park | MD Gunpowder Falls, Gunpowder Falls State Park | MD Sideling Hill Creek, Sideling Hill Wildlife Management Area | PA Pennypack Creek, Penny Pack Park | PA Cranberry River, Monongahela National Forest | WV

## Associated Fish:

**Most Abundant:** central stoneroller, bluntnose minnow, white sucker, redbreast sunfish, river chub, american eel, eastern blacknose dace, warpaint shiner, rock bass, common shiner, northern hog sucker, greenside darter, tennessee shiner, telescope shiner, rosyface shiner, tessellated darter, creek chub, crescent shiner, redline darter, bigeye chub, longnose dace, striped shiner. **Less Abundant:** rainbow darter, mimic shiner, smallmouth bass, mottled sculpin, cutlip minnow, banded sculpin, banded darter, whitetail shiner, fantail darter, mountain shiner, margined madtom, bluehead chub, gizzard shad, fallfish, black redhorse, bigmouth chub, green sunfish, spotfin shiner, johnny darter, bluegill, creek chubsucker, rosefin shiner, spottail shiner, longear sunfish, largemouth bass, shield darter, golden redhorse.

## Species of Concern (G1 - G4):

**Fishes:** duskytail darter, yellowfin madtom, cheat minnow, roanoke logperch, roughhead shiner, orangefin madtom, blotchside logperch, sickle darter, sharphead darter, candy darter, tippecanoe darter, ohio lamprey, mountain brook lamprey, popeye shiner, longhead darter, fatlips minnow, kanawha minnow, potomac sculpin, gravel chub, bluebreast darter, greenfin darter, bluespar darter, swannanoa darter, glassy darter, tonguetied minnow, american brook lamprey, river redhorse, bigmouth chub, new river shiner, mirror shiner, tangerine darter, channel darter, gilt darter, appalachia darter, stripeback darter. **Crayfish, Mussels, and Snails:** elk river crayfish, big sandy crayfish, spiny scale crayfish, new river crayfish, cumberlandian combshell, shiny pigtoe, littlewing pearlymussel, james spinymussel, purple bean, yellow lance, atlantic pigtoe, clubshell, tennessee clubshell, tennessee pigtoe, slabside pearlymussel, fluted kidneyshell, brook floater, atlantic spike, snuffbox, yellow lampmussel, tennessee heelsplitter, green floater, salamander mussel, tan riffleshell, elktoe, triangle floater, slippershell mussel, northern lance, eastern pondmussel, round hickorynut, round pigtoe, kidneyshell, spiny riversnail

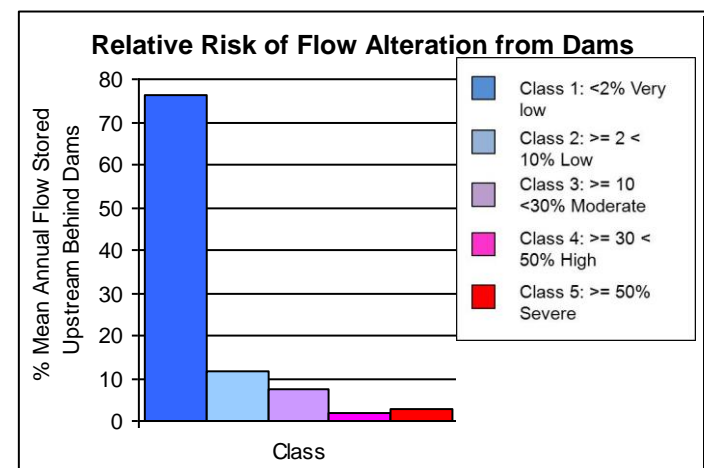
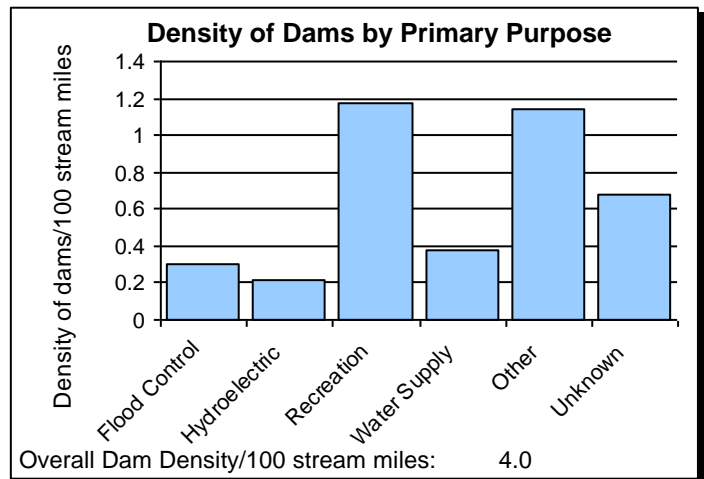
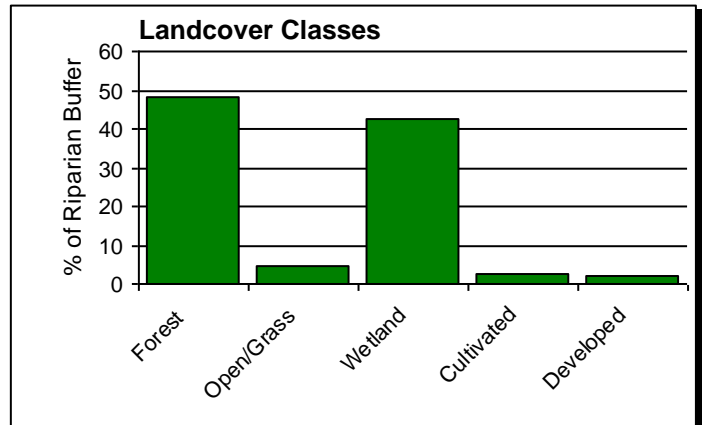
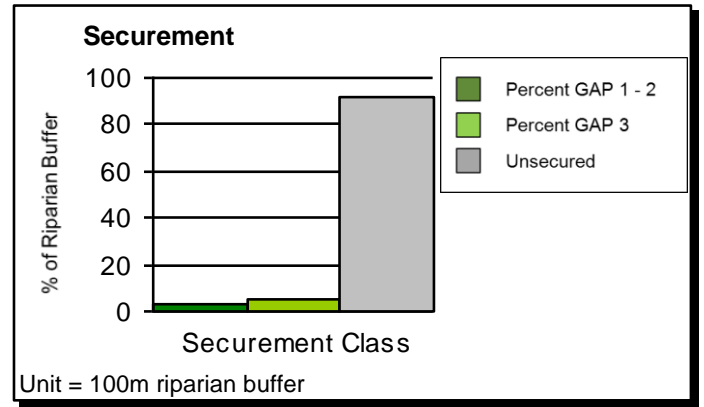
See Appendix 2 for scientific names

## Crosswalk to State Names:

**New York:** Confined river. **Maryland:** Piedmont Streams, Highland Streams, Coastal Plain Streams. **Pennsylvania:** Atlantic Basin Fish Warmwater Community 2, Atlantic Basin Fish Warmwater Community 1, Ohio-Great Lakes Basins Fish Warmwater Stream Community, Ohio - Great Lakes Basins Mussels Fluted Shell Mussel Community, Susquehanna - Potomac River Basins Mussels Eastern Elliptio Community.



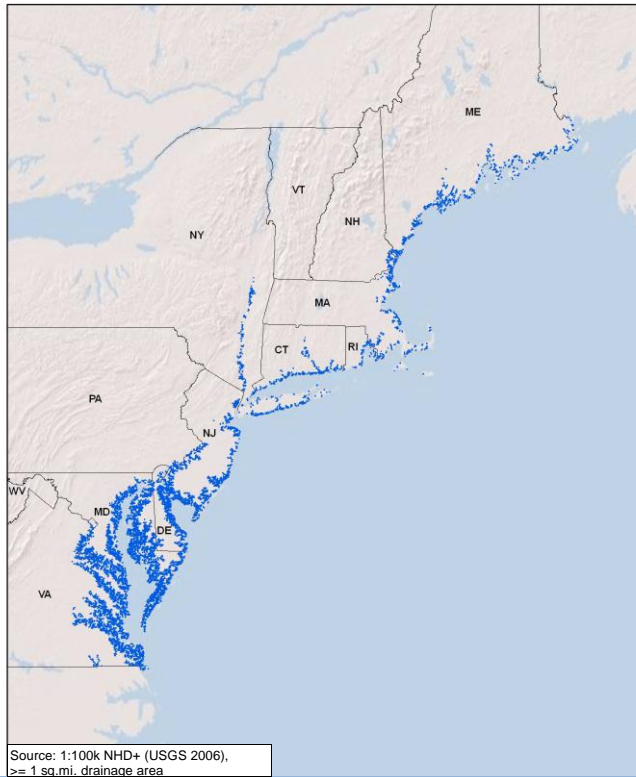
Central stoneroller, © Matthew Pintar



# Tidal Headwaters and Creeks

## Macrogroup: Tidal Headwaters and Creeks

This map is based on a model and has had little field-checking. Contact your State Natural Heritage Ecologist or State Fish Game Agency for more information about this habitat.



Source: 1:100k NHD+ (USGS 2006), >= 1 sq.mi. drainage area



Quashnet River

### Description:

Slow-moving, shallow, tidally influenced creeks and headwater streams. These tidal creeks and streams connect directly to the ocean or to large tidal rivers estuaries and have watersheds under 39 square miles. The water flow and level in these streams fluctuates with the tides creating subtidal habitat which is permanently flooded and an intertidal habitat exposed at low tide. Salinity typically ranges between 30 and 0.5 ppt and grades into a freshwater system in the upper portions of many of these reaches. Most tidal streams have moderately firm, sandy channel bottoms and vertical banks that are regularly eroded and slump into the creek bottom. Many have a very sinuous pattern as they wind through large salt marshes along the coast. Others have smaller associated brackish or salt marshes along their length and/or intertidal sand and mud flats in their lower portions. These streams and their associated estuaries support a rich diversity of plant and animals and serve as the primary nursery area for many marine fishes. The ecological importance of small tidal streams has historically been undervalued, but recent research is showing their collective influence on estuarine ecosystem function may equal or exceed that of larger tidal rivers.

### Similar Habitat Types:

Tidal headwaters and creeks may drain directly to the coast or into larger tidal rivers and their estuaries. High gradient examples of tidal creeks and streams are rare but do occur occasionally along the northern rocky coast of the region.

### Places to Visit this Habitat:

Wye River, Md Environmental Trust Easement | MD Cedar Run, Stafford Forge | NJ Bass River, Edwin B. Forsythe National Wildlife Refuge | NJ Pettaquanscutt River, John H. Chafee National Wildlife Refuge | RI Powhatan Creek, Colonial National Historical Park | VA

**State Distribution:** CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VA

**Total Habitat (mi):** 7,835

**% Conserved:** 13.2 Unit = Acres of 100m Riparian Buffer

State	State Habitat %	Miles of Habitat	Acres GAP 1 - 2	Acres GAP 3	Total Acres Unsecured
VA	31	2402	43	86	1690
MD	29	2307	50	169	1548
NJ	12	906	156	32	511
ME	8	654	29	24	445
DE	6	501	27	52	309
NY	4	336	10	17	238
MA	4	312	14	39	185
CT	3	218	9	12	151
NH	1	95	3	7	61
RI	1	71	3	5	50
PA	0	24	2	1	16
DC	0	7	0	1	6

**Associated Fish:**

Most Abundant: alewife, blueback herring, atlantic silverside, mummichog, striped killifish, sheepshead minnow, fourspine stickleback, threespine stickleback, american eel, winter flounder, black sea bass, bluefish, striped bass, naked goby, northern pipefish.  
Less Abundant: eastern mudminnow, white sucker, tessellated darter, pumpkinseed, redbreast sunfish, largemouth bass, brook trout, satinfin shiner, banded killifish, sea lamprey, golden shiner, banded sunfish.

**Species of Concern (G1 - G4):**

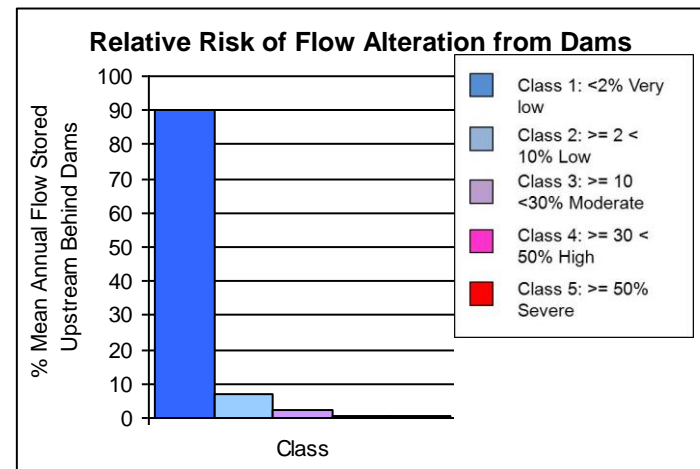
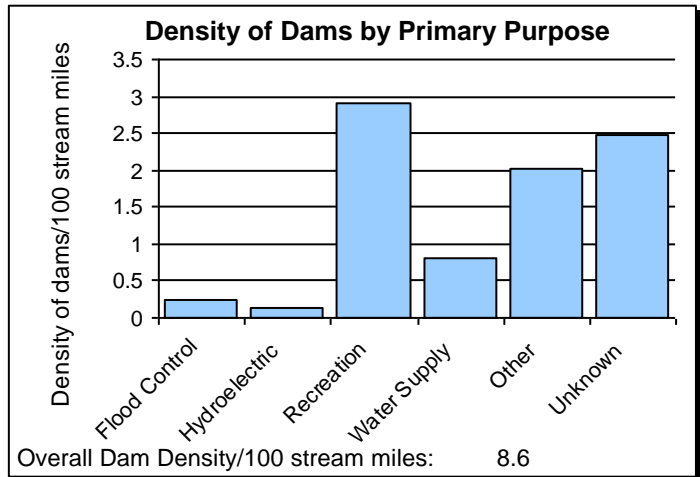
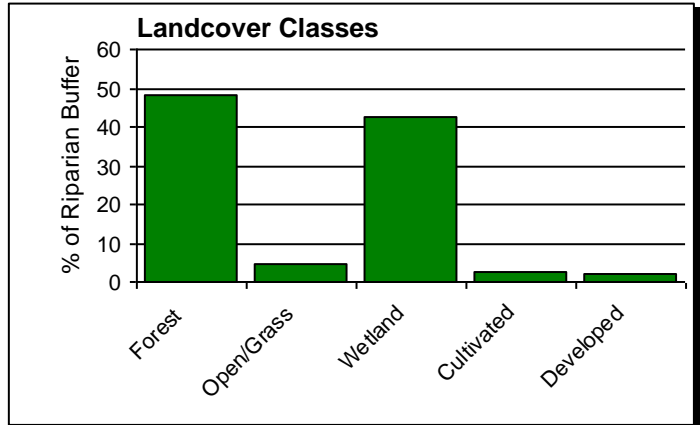
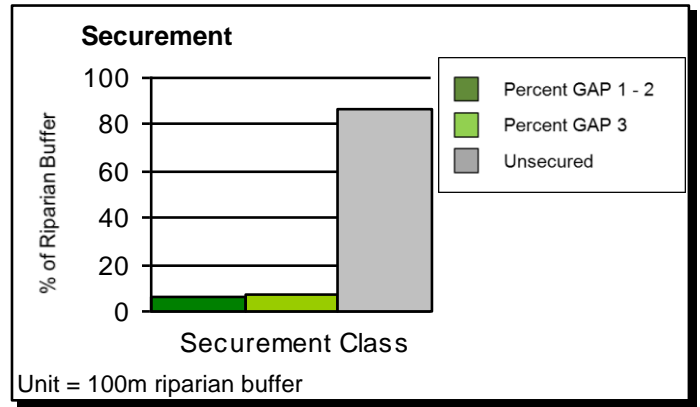
Fishes: bridle shiner, glassy darter, spotfin killifish, american brook lamprey, ironcolor shiner  
Crayfish, Mussels, and Snails: tidewater mucket, eastern pondmussel, new england siltsnail  
 See Appendix 2 for scientific names

**Crosswalk to State Names:**

New York: Brackish interdunal swales, Brackish intertidal mudflats, Brackish intertidal shore, Brackish meadow, Brackish subtidal aquatic bed, Brackish tidal marsh, Coastal salt pond, Freshwater intertidal mudflats, Freshwater intertidal shore, Freshwater tidal creek, Freshwater tidal marsh, Freshwater tidal swamp, High salt marsh, Low salt marsh, Salt panne, Salt shrub, Saltwater tidal creek.  
Maryland: Tidal Streams, Coastal Plain Streams, Blackwater Streams.



Alewife, © USDA Forest Service





## Macrogroup: Tidal Large River

This map is based on a model and has had little field-checking. Contact your State Natural Heritage Ecologist or State Fish Game Agency for more information about this habitat.



Source: 1:100k NHD+ (USGS 2006), >= 1 sq.mi. drainage area



Connecticut River, © Jerry Monkman

### Description:

Slow moving, large, deep, tidally influenced rivers. These very large rivers connect directly to the ocean or to large estuaries and their water flow and level fluctuates with the tides. They have large upstream watersheds >1000 sq.mi and average bankfull widths of over 300 feet. In the river there is a vertical salinity gradient, with a surface layer of fresh water (salinity less than 0.5 ppt) floating over a deeper layer of brackish water (salinity between 0.5 and 18.0ppt). Salinities at any one place in the river may fluctuate as the tides flow in and out because the "salt wedge" of brackish water alternately rises and falls with the tides. Vegetational and faunal communities found in and along the river are determined by both depth and salinity. Commonly associated communities include brackish and salt marshes, swamps, and mudflats. Most of these rivers have extensive salt marshes an/or intertidal sand and mud flats at their mouths. These rivers and their associated estuaries support a rich diversity of plant and animals and serve as the primary nursery area for many marine, estuarine, and anadromous fishes.

### Similar Habitat Types:

Large tidal rivers typically have a number of connected smaller tidal rivers and creeks.

**State Distribution:** CT, DE, DC, ME, MD, MA, NJ, NY, PA, VA

**Total Habitat (mi):** 1,026

**% Conserved:** 15.9 Unit = Acres of 100m Riparian Buffer

State	State Habitat %	Miles of Habitat	Acres GAP 1 - 2	Acres GAP 3	Total Acres Unsecured
VA	41	412	9	42	358
NY	15	146	5	16	87
ME	12	116	1	2	61
CT	10	99	6	8	59
NJ	8	77	10	11	45
MD	5	48	2	5	31
PA	5	46	1	3	29
MA	3	26	1	1	18
DE	2	25	9	2	9
DC	1	6	0	0	5

### Places to Visit this Habitat:

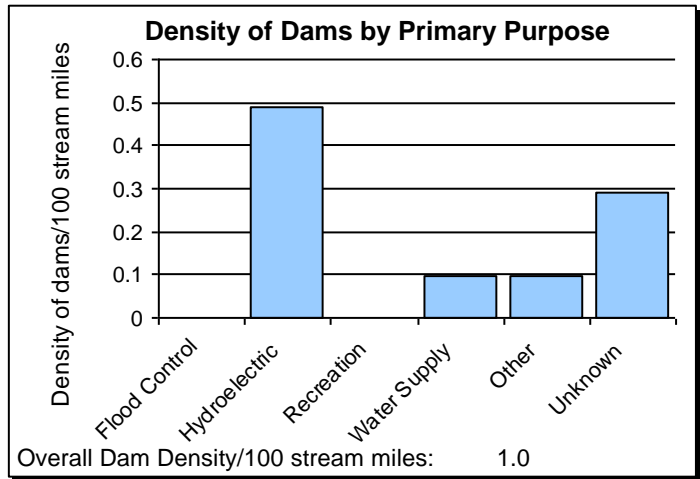
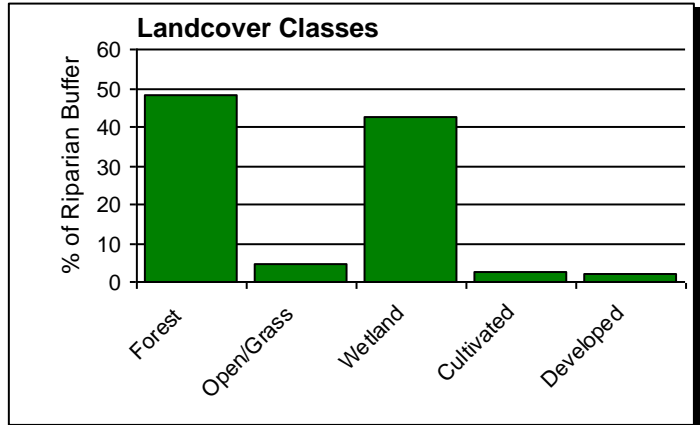
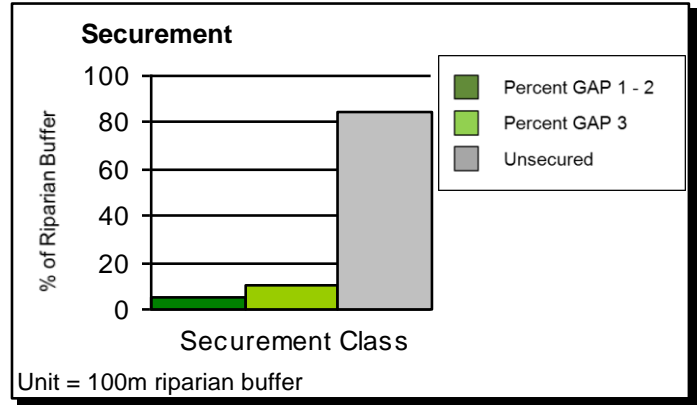
Connecticut River, Windsor Meadows State Park | CT Hudson River, Peebles Island | NY Schuylkill River, Fairmont Park | PA James River, James River National Wildlife Refuge | VA Delaware River, Supawna Meadows NWR | NJ

**Associated Fish:**

Most Abundant: atlantic sturgeon, shortnose sturgeon, atlantic salmon, alewife, blueback herring, american shad, hickory shad, gizzard shad, striped bass, atlantic tomcod, american eel, sea lamprey, hogchoker, banded killifish, spottail shiner, tessellated darter, pumpkinseed, bay anchovy, white perch. Less Abundant: spottail shiner, pumpkinseed, yellow perch, redbreast sunfish, largemouth bass, eastern silvery minnow, white sucker, fallfish, inland silverside.

**Species of Concern (G1 - G4):**

Fishes: shortnose sturgeon, atlantic sturgeon  
Crayfish, Mussels, and Snails: tidewater mucket, eastern pondmussel, new england siltsnail  
 See Appendix 2 for scientific names



**Crosswalk to State Names:**

New York: Brackish interdunal swales, Brackish intertidal mudflats, Brackish intertidal shore, Brackish meadow, Brackish subtidal aquatic bed, Brackish tidal marsh, Coastal salt pond, Freshwater intertidal mudflats, Freshwater intertidal shore, Freshwater tidal marsh, Freshwater tidal swamp, High salt marsh, Low salt marsh, Salt panne, Salt shrub, Tidal river.



Atlantic sturgeon © VA Park Staff

