NJ Division of Fish and Wildlife
Endangered and Nongame Species Program

Species Status Review of Freshwater Fishes

Final Report
Including review by the
NJ Endangered and Nongame Species Advisory Committee
Conducted on March 16, 2016

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Executive Summary

- Project Manager and compiler for the freshwater fish status review was Jeanette Bowers-Altman, Principal Zoologist, ENSP; she was not a reviewer on the review panel.
- Bureau of Freshwater Fisheries biologists compiled a list of 65 species to be reviewed using the Delphi Technique (Appendix 1). Twelve species were dropped from the review process due to reviewer concerns over species' utilization of marine habitats. Several reviewers suggested that the ENSP conduct a separate status review focusing on anadromous fish species. The statuses of the remaining 53 species were reviewed during four rounds.
- Ten panelists agreed to participate in the review process. One reviewer dropped out during Round 1. Each of the nine remaining panelists participated in all four rounds. Reviewers included experts from NJ Division of Fish and Wildlife and other state agencies, federal agencies, and academia.
- Panelists were provided with information on each species, including current status in NJ and across their range; species range maps created by NatureServe; NJ Bureau of Freshwater Fisheries (BFF) native fish maps of fisheries data collected from 2000 to 2012 (data were extracted from the BFF FishTrack Database and compiled with data from DEP's Freshwater and Biological Monitoring, the Pinelands Commission, and USGS); NJ Freshwater and Biological Monitoring/EPA fish distribution maps, Pinelands Commission fish distribution and abundance graphs; Shortnose sturgeon Delaware River occurrences generated from NJDEP Biotics data; and other materials. Appendix III lists reference materials used in the review. Initial information was provided to reviewers through a direct access link on the Conserve Wildlife Foundation of NJ (CWF-NJ) website. Additional materials provided by panelists were distributed via website and/or email at the beginning of each round.
- Round 1 began on February 21, 2014, and the final round was completed on November 13, 2015. Appendix II contains all results from each round.
- Fifty-three species were reviewed and consensus was reached on 48 (see here and in Tables 1 and 2, p. 3-7):
    - 2 species were ranked Endangered
    - 1 species was ranked Threatened
    - 5 species were ranked Special Concern
    - 36 species were ranked Secure/Stable
    - 4 were ranked Not Applicable because they either no longer occur in NJ or are considered non-native.
    - 5 species remained unresolved after four rounds:
        - American brook lamprey (*Lampetra appendix*)
        - Bowfin (*Amia calva*)
        - Bridle shiner (*Notropis bifrenatus*)
        - Mud sunfish (Acantharchus pomotis)
        - Blackbanded sunfish (*Enneacanthus chaetodon*)
- These results were reviewed by ENSP and Bureau of Freshwater Fisheries staff and presented to the Endangered and Nongame Species Advisory Committee on March 16, 2016. The Committee made recommendations for adoption of the statuses reached by consensus of the Delphi Panel, as well as the statuses for 6 species as noted in Appendix IV.

TABLE 1. Delphi species status review final results (4 rounds): Freshwater Fishes

SCIENTIFIC NAME	PRIMARY COMMON NAME	CURRENT NJ STATUS	CONSENSUS ROUND #	CONSENSUS STATUS	CONFIDENCE LEVEL
CONSENSUS STATUS = ENDANGERED					
Acipenser brevirostrum	Shortnose sturgeon	Endangered	1	ENDANGERED	6.8
Notropis chalybaeus	Ironcolor shiner	None	2	ENDANGERED	6.6
CONSENSUS STATUS = THREATENED					
Cottus cognatus	Slimy sculpin	None	2	THREATENED	5.2
CONSENSUS STATUS = SPECIAL CONCERN					
Notropis amoenus	Comely shiner	None	4	SPECIAL CONCERN	5.3
Hypentelium nigricans	Northern hog sucker	None	2	SPECIAL CONCERN	5.5
Salvelinus fontinalis	Brook trout	None	4	SPECIAL CONCERN	5.8
Gambusia holbrooki	Eastern mosquitofish	None	2	SPECIAL CONCERN?	6.0
Percina peltata	Shield darter	None	4	SPECIAL CONCERN	5.1
CONSENSUS STATUS = SECURE/STABLE					
Petromyzon marinus	Sea lamprey	None	1	SECURE/STABLE	5.6
Anguilla rostrata	American eel	None	1	SECURE/STABLE	6.5
Cyprinella analostana	Satinfin shiner	None	1	SECURE/STABLE	6.3
Cyprinella spiloptera	Spotfin shiner	None	1	SECURE/STABLE	6.5
Exoglossum maxillingua	Cutlips minnow	None	1	SECURE/STABLE	6.0
Hybognathus regius	Eastern silvery minnow	None	1	SECURE/STABLE	6.0
Luxilus cornutus	Common shiner	None	1	SECURE/STABLE	7.6
Notemigonus crysoleucas	Golden shiner	None	1	SECURE/STABLE	7.8
Notropis hudsonius	Spottail shiner	None	1	SECURE/STABLE	7.1
Notropis procne	Swallowtail shiner	None	1	SECURE/STABLE	6.5
Rhinichthys atratulus	Blacknose dace	None	1	SECURE/STABLE	7.6
Rhinichthys cataractae	Longnose dace	None	1	SECURE/STABLE	7.3
Semotilus atromaculatus	Creek chub	None	1	SECURE/STABLE	7.9
Semotilus corporalis	Fallfish	None	1	SECURE/STABLE	7.1
Carpiodes cyprinus	Quillback	None	2	SECURE/STABLE	5.1
Catastomus commersoni	White sucker	None	1	SECURE/STABLE	7.9
Erimyzon oblongus	Creek chubsucker	None	1	SECURE/STABLE	7.3

SCIENTIFIC NAME	PRIMARY COMMON NAME	CURRENT NJ STATUS	CONSENSUS ROUND #	CONSENSUS STATUS	CONFIDENCE LEVEL
Ameiurus catus	White catfish	None	2	SECURE/STABLE	5.6
Ameiurus natalis	Yellow bullhead	None	1	SECURE/STABLE	7.3
Ameiurus nebulosus	Brown bullhead	None	1	SECURE/STABLE	7.7
Noturus gyrinus	Tadpole madtom	None	1	SECURE/STABLE	5.9
Noturus insignis	Margined madtom	None	1	SECURE/STABLE	6.5
Esox americanus americanus	Redfin pickerel	None	1	SECURE/STABLE	6.8
Esox niger	Chain pickerel	None	1	SECURE/STABLE	7.7
Umbra pygmaea	Eastern mudminnow	None	1	SECURE/STABLE	7.6
Aphredoderus sayanus	Pirate perch	None	1	SECURE/STABLE	6.8
Fundulus diaphanus	Banded killifish	None	1	SECURE/STABLE	7.6
Fundulus heteroclitus	Mummichog	None	1	SECURE/STABLE	7.3
Morone americana	White perch	None	1	SECURE/STABLE	7.1
Enneacanthus gloriosus	Bluespotted sunfish	None	1	SECURE/STABLE	6.6
Enneacanthus obesus	Banded sunfish	None	2	SECURE/STABLE	6.0
Lepomis auritus	Redbreast sunfish	None	1	SECURE/STABLE	7.3
Lepomis gibbosus	Pumpkinseed	None	1	SECURE/STABLE	7.9
Etheostoma fusiforme	Swamp darter	None	2	SECURE/STABLE	5.9
Etheostoma olmstedi	Tessellated darter	None	1	SECURE/STABLE	7.8
Perca flavescens	Yellow perch	None	1	SECURE/STABLE	7.4
CONSENSUS STATUS = NOT APPLICABLE					
Lepisosteus osseus	Longnose gar	None	1	NOT APPLICABLE	6.7
Margariscus margarita	Pearl dace	None	3	NOT APPLICABLE	6.1
Pimephales notatus	Bluntnose minnow	None	2	NOT APPLICABLE	5.8
Ameiurus melas	Black bullhead	None	2	NOT APPLICABLE	6.6

NO CONSENSUS REACHED			
Lampetra appendix	American brook lamprey	None	NO CONSENSUS
Amia calva	Bowfin	None	NO CONSENSUS
Notropis bifrenatus	Bridle shiner	None	NO CONSENSUS
Acantharchus pomotis	Mud sunfish	None	NO CONSENSUS
Enneacanthus chaetodon	Blackbanded sunfish	None	NO CONSENSUS

TABLE 2. Delphi species status review final results (4 rounds): Freshwater Fishes, listed taxonomically.

SCIENTIFIC NAME	PRIMARY COMMON NAME	CURRENT NJ STATUS	CONSENSUS ROUND #	CONSENSUS STATUS	CONFIDENCE LEVEL
Lampetra appendix	American brook lamprey	None	NO CONSENSUS		
Petromyzon marinus	Sea lamprey	None	1	SECURE/STABLE	5.6
Acipenser brevirostrum	Shortnose sturgeon	Endangered	1	ENDANGERED	6.8
Lepisosteus osseus	Longnose gar	None	1	NOT APPLICABLE	6.7
Amia calva	Bowfin	None	NO CONSENSUS		
Anguilla rostrata	American eel	None	1	SECURE/STABLE	6.5
Cyprinella analostana	Satinfin shiner	None	1	SECURE/STABLE	6.3
Cyprinella spiloptera	Spotfin shiner	None	1	SECURE/STABLE	6.5
Exoglossum maxillingua	Cutlips minnow	None	1	SECURE/STABLE	6.0
Hybognathus regius	Eastern silvery minnow	None	1	SECURE/STABLE	6.0
Luxilus cornutus	Common shiner	None	1	SECURE/STABLE	7.6
Margariscus margarita	Pearl dace	None	3	NOT APPLICABLE	6.1
Notemigonus crysoleucas	Golden shiner	None	1	SECURE/STABLE	7.8
Notropis amoenus	Comely shiner	None	4	SPECIAL CONCERN	5.3
Notropis bifrenatus	Bridle shiner	None	NO CONSENSUS		
Notropis chalybaeus	Ironcolor shiner	None	2	ENDANGERED	6.6
Notropis hudsonius	Spottail shiner	None	1	SECURE/STABLE	7.1
Notropis procne	Swallowtail shiner	None	1	SECURE/STABLE	6.5
Pimephales notatus	Bluntnose minnow	None	2	NOT APPLICABLE	5.8
Rhinichthys atratulus	Blacknose dace	None	1	SECURE/STABLE	7.6
Rhinichthys cataractae	Longnose dace	None	1	SECURE/STABLE	7.3
Semotilus atromaculatus	Creek chub	None	1	SECURE/STABLE	7.9
Semotilus corporalis	Fallfish	None	1	SECURE/STABLE	7.1
Carpiodes cyprinus	Quillback	None	2	SECURE/STABLE	5.1
Catastomus commersoni	White sucker	None	1	SECURE/STABLE	7.9
Erimyzon oblongus	Creek chubsucker	None	1	SECURE/STABLE	7.3
Hypentelium nigricans	Northern hog sucker	None	2	SPECIAL CONCERN	5.5
Ameiurus catus	White catfish	None	2	SECURE/STABLE	5.6
Ameiurus melas	Black bullhead	None	2	NOT APPLICABLE	6.6

SCIENTIFIC NAME	PRIMARY COMMON NAME	CURRENT NJ STATUS	CONSENSUS ROUND #	CONSENSUS STATUS	CONFIDENCE LEVEL
Ameiurus natalis	Yellow bullhead	None	1	SECURE/STABLE	7.3
Ameiurus nebulosus	Brown bullhead	None	1	SECURE/STABLE	7.7
Noturus gyrinus	Tadpole madtom	None	1	SECURE/STABLE	5.9
Noturus insignis	Margined madtom	None	1	SECURE/STABLE	6.5
Esox americanus americanus	Redfin pickerel	None	1	SECURE/STABLE	6.8
Esox niger	Chain pickerel	None	1	SECURE/STABLE	7.7
Umbra pygmaea	Eastern mudminnow	None	1	SECURE/STABLE	7.6
Salvelinus fontinalis	Brook trout	None	4	SPECIAL CONSERN	5.8
Aphredoderus sayanus	Pirate perch	None	1	SECURE/STABLE	6.8
Fundulus diaphanus	Banded killifish	None	1	SECURE/STABLE	7.6
Fundulus heteroclitus	Mummichog	None	1	SECURE/STABLE	7.3
Gambusia holbrooki	Eastern mosquitofish	None	2	SPECIAL CONCERN?	6.0
Cottus cognatus	Slimy sculpin	None	2	THREATENED	5.2
Morone americana	White perch	None	1	SECURE/STABLE	7.1
Acantharchus pomotis	Mud sunfish	None	NO CONSENSUS		
Enneacanthus chaetodon	Blackbanded sunfish	None	NO CONSENSUS		
Enneacanthus gloriosus	Bluespotted sunfish	None	1	SECURE/STABLE	6.6
Enneacanthus obesus	Banded sunfish	None	2	SECURE/STABLE	6.0
Lepomis auritus	Redbreast sunfish	None	1	SECURE/STABLE	7.3
Lepomis gibbosus	Pumpkinseed	None	1	SECURE/STABLE	7.9
Etheostoma fusiforme	Swamp darter	None	2	SECURE/STABLE	5.9
Etheostoma olmstedi	Tessellated darter	None	1	SECURE/STABLE	7.8
Perca flavescens	Yellow perch	None	1	SECURE/STABLE	7.4
Percina peltata	Shield darter	None	4	SPECIAL CONCERN	5.1

TABLE 3: Round 1 and Final (round 4) results: summary

	Round 1 Findings			Final Results (Round 4)		
Consensus Status	**Species Count**	**% of reviewed spp.**	**% of consensus spp.**	**Species Count**	**% of reviewed spp.**	**% of consensus spp.**
Endangered	1	2%	3%	2	4%	4%
Threatened	0	0%	0%	1	2%	2%
Special Concern	0	0%	0%	5	9%	10%
Stable Secure	32	60%	94%	36	68%	75%
Undetermined	0	0%	0%	0	0%	0%
Not Applicable	1	2%	3%	4	8%	8%
Consensus Spp.	34	64%		48	91%	
Non-consensus Spp.	19	36%		5	9%	

APPENDIX I: LIST OF SPECIES REVIEWED WITH IUCN STATUS, GLOBAL AND NJ BIOTICS RANK, FEDERAL AND NJ STATE STATUS, AMERICAN FISHERIES SOCIETY STATUS, AND STATUS IN SURROUNDING STATES.

SCIENTIFIC NAME	PRIMARY COMMON NAME	IUCN CLASSIFICATION	GLOBAL RANK	NJ STATE RANK	US ESA	NJ STATE STATUS	AFS STATUS**	STATUS IN SURROUNDING STATES
Lampetra appendix	American brook lamprey	Least Concern	G4	S2		N		CT (S1), DE (S2), NY (S3), PA (S4)
Petromyzon marinus	Sea lamprey	Least Concern	G5	S5		N		CT (S5), DE (S4), NY (S4), PA (S4)
Acipenser brevirostrum	Shortnose sturgeon	Vulnerable	G3	S1	E	N	E	CT (S1), DE (S3N), NY (S1), PA (S1)
Lepisosteus osseus	Longnose gar	Least Concern	G5	SH		N		DE (S4), NY (S3), PA (S4S5)
Amia calva	Bowfin	Least Concern	G5	SNA		N		CT (SNA), NY (S4), PA (S2S3)
Anguilla rostrata	American eel		G4	S5		N		CT (S5), DE (S5), NY (S3), PA (S5)
*Alosa aestivalis**	Blueback herring	Vulnerable	G3G4	S5	SC	N		CT (S5), DE (S5), NY (S3), PA (S3S4)
*Alosa pseudoharengus**	Alewife	Least Concern	G5	S5	SC	N		CT (S3), DE (S4S5), NY (S5), PA (S3S4)
*Alosa mediocris**	Hickory shad	Least Concern	G4	SNR		N		CT (S2), DE (S2), NY (S2), PA (S3)
*Alosa sapidissima**	American shad	Least Concern	G5	S4		N		CT (S3), DE (S4), NY (S4, PA (S4)
*Dorosoma cepedianum**	Gizzard shad	Least Concern	G5	S4		N		CT (SNA), DE (S5), NY (S3), PA (S5)
Cyprinella analostana	Satinfin shiner	Least Concern	G5	S5		N		DE (S4), NY (S3), PA (S5)
Cyprinella spiloptera	Spotfin shiner	Least Concern	G5	S4		N		DE (S3), NY (S4), PA (S5)
Exoglossum maxillingua	Cutlips minnow		G5	S4		N		CT (S3), DE (S4), NY (S5), PA (S5)
Hybognathus regius	Eastern silvery minnow	Least Concern	G5	S4		N		DE (S4), NY (S4), PA (S4)
Luxilus cornutus	Common shiner	Least Concern	G5	S5		N		CT (S5), DE (S4), NY (S5), PA (S5)
Margariscus margarita	Pearl dace	Least Concern	G4	S1		N		CT (S1), NY (S4), PA (S4)
Notemigonus crysoleucas	Golden shiner	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S5), PA (S5)
Notropis amoenus	Comely shiner	Least Concern	G5	S4		N		DE (S2), NY (S3), PA (S4)
Notropis bifrenatus	Bridle shiner	Near Threatened	G3	S4		N	V	CT (S3), DE (S1), NY (S5), PA (S1)
Notropis chalybaeus	Ironcolor shiner		G4	S1S2		N	V	DE (S1), NY (S1), PA (S1)
Notropis hudsonius	Spottail shiner	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S5), PA (S5)
Notropis procne	Swallowtail shiner	Least Concern	G5	S4		N		CT (S4), DE (S4), NY (S2), PA (S5)
Pimephales notatus	Bluntnose minnow	Least Concern	G5	SU		N		CT (S1), NY (SU), PA (S5)
Rhinichthys atratulus	Blacknose dace	Least Concern	G5	S5		N		CT (S5), DE (S4), NY (S5), PA (S5)
Rhinichthys cataractae	Longnose dace	Least Concern	G5	S5		N		CT (S5), DE (S4), NY (S5), PA (S5)
Semotilus atromaculatus	Creek chub	Least Concern	G5	S5		N		CT (S5), DE (S4), NY (S5), PA (S5)
Semotilus corporalis	Fallfish	Least Concern	G5	S5		N		CT (S5), DE (S4), NY (S5), PA (S5)
Carpiodes cyprinus	Quillback	Least Concern	G5	SNA		N		NY (S2), PA (S5)
Catostomus commersoni	White sucker	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S5), PA (S5)
Erimyzon oblongus	Creek chubsucker	Least Concern	G5	S5		N		CT (S3), DE (S5), NY (S4), PA (S4)
Hypentelium nigricans	Northern hog sucker	Least Concern	G5	SU		N		NY (S5), PA (S5)

SCIENTIFIC NAME	PRIMARY COMMON NAME	IUCN CLASSIFICATION	GLOBAL RANK	NJ STATE RANK	US ESA	NJ STATE STATUS	AFS STATUS**	STATUS IN SURROUNDING STATES
Ameiurus catus	White catfish	Least Concern	G5	S5		N		CT (SNA), DE (S5), NY (S4), PA (S3)
Ameiurus melas	Black bullhead	Least Concern	G5	SNA		N		CT (SNA), NY (S4), PA (S1)
Ameiurus natalis	Yellow bullhead	Least Concern	G5	S5		N		CT (SNA), DE (S3S4), NY (S5), PA (S5)
Ameiurus nebulosus	Brown bullhead	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S5), PA (S5)
Noturus gyrinus	Tadpole madtom	Least Concern	G5	S4		N		DE (S4), NY (S3), PA (S1)
Noturus insignis	Margined madtom	Least Concern	G5	S4		N		DE (S2), NY (S3S4), PA (S5)
Esox americanus americanus	Redfin pickerel	Least Concern	G5	S5		N		CT (S4), DE (S5), NY (S4), PA (S4)
Esox niger	Chain pickerel	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S5), PA (S5)
Umbra pygmaea	Eastern mudminnow	Least Concern	G5	S5		N		DE (S5), NY (S3), PA (S3)
*Osmerus mordax**	Rainbow smelt	Least Concern	G5	SU	SC	N		CT (S1), NY (SU), PA (SH)
Salvelinus fontinalis	Brook trout		G5	S3		N		CT (S5), DE (SNA), NY (S5), PA (S5)
Aphredoderus sayanus	Pirate perch	Least Concern	G5	S4		N		DE (S5), NY (S3S4), PA (SX)
Fundulus diaphanus	Banded killifish	Least Concern	G5	S5		N		CT (S4), DE (S4), NY (S5), PA (S5)
Fundulus heteroclitus	Mummichog	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S3), PA (S5)
*Fundulus luciae**	Spotfin killifish	Least Concern	G4	S3		N		DE (S5), NY (S1)
*Lucania parva**	Rainwater killifish	Least Concern	G5	S4		N		CT (SNR), DE (S4)
Gambusia holbrooki	Eastern mosquitofish	Least Concern	G5	S3		N		DE (S5), NY (SNA), PA (SNR)
*Apeltes quadracus**	Fourspine stickleback	Least Concern	G5	S4		N		CT (S3S4), DE (S2), NY (S4), PA (S4)
*Gastereosteus aculeatus**	Threespine stickleback	Least Concern	G5	S4		N		CT (SNR), DE (S4), NY (S4), PA (S1)
*Pungitius pungitius**	Ninespine stickleback	Least Concern	G5	S4		N		CT (S3), NY (SU)
Cottus cognatus	Slimy sculpin	Least Concern	G5	S3		N		CT (S3S4), NY (S4), PA (S5)
Morone americana	White perch	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S4), PA (S5)
Acantharchus pomotis	Mud sunfish	Least Concern	G4G5	S4		N		DE (S2), NY (SH), PA (SX)
Enneacanthus chaetodon	Blackbanded sunfish		G3G4	S4		N	V	DE (S2), PA (SX)
Enneacanthus gloriosus	Bluespotted sunfish	Least Concern	G5	S4		N		DE (S5), NY (S3), PA (S4)
Enneacanthus obesus	Banded sunfish	Least Concern	G5	S4		N		CT (S3), DE (S2), NY (S1S2), PA (S1)
Lepomis auritus	Redbreast sunfish	Least Concern	G5	S5		N		CT (S5), DE (S4), NY (S3), PA (S5)
Lepomis gibbosus	Pumpkinseed	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S5), PA (S5)
Etheostoma fusiforme	Swamp darter	Least Concern	G5	S4		N		CT (S2), DE (S4), NY (S1S2), PA (SX)
Etheostoma olmstedi	Tessellated darter	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S5), PA (S5)
Perca flavescens	Yellow perch	Least Concern	G5	S5		N		CT (S5), DE (S5), NY (S5), PA (S5)
Percina peltata	Shield darter	Least Concern	G5	S3		N		DE (S1), NY (S3), PA (S5)
*Trinectes maculatus**	Hogchoker	Least Concern	G5	SNR		N		CT (SNR), DE (SNR), NY (S3), PA (SNR)

* Species dropped from review

**American Fisheries Society Status as of August 1, 2008

List based on: (1) NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: January 15, 2014). (2) IUCN Red List of Threatened Species. Version 2013.2 <www.iucnredlist.org>, (Accessed: January 23, 2014).

RANKING TERMS USED IN APPENDIX I			
NJ/US ESA STATUS	STATE/GLOBAL RANK		American Fisheries Society Rank
E- Endangered SC – Special Concern N - None	S/G1- Critically imperiled	S/GNR- Not ranked	E - Endangered V - Vulnerable
	S/G2- Imperiled	S/GX- Presumed extirpated	
	S/G3- Vulnerable	S/GH- Possibly extirpated	
	S/G4- Apparently secure	S/GU- Unrankable (lack of data)	
	S/G5- Secure		
	S/GNA- Not applicable		

APPENDIX II – Species Status Assessments

American brook lamprey (*Lampetra appendix*) **No Consensus**

Status	# of People	Confidence Level
E		
T		
SC	5	4.8
S	2	5.0
U		
NO	2	
NA		

Round 1:

Secure/Stable –

-Based on observations of sampled ammocetes…

-There appear to be a number of records of this, so I can't say SC. However, it is sensitive to disturbance. Ammocoetes are very difficult to tell from sea lamprey, so misidentifications are possible.

-Typically only ammocoetes are collected and there is far less information regarding adults and the number of adults spawning each year. Larval distribution has not changed much. MD threatened.

-Seems to be stable where supportive habitat conditions (silt-free substrate etc) exist. But I have only collected them it in NW NJ. Most, however consider them to be a good indicator species. As waters degrade, this highly intolerant species tends to disappear. If the broader panel considers them to be a species of concern, than I would be willing to change my ranking to SC.

Special Concern

-Intolerant species. pH. Species not widespread in NJ; pop's concentrated/restricted to a few drainages.

Round 2:

Stable

-My perspective on this species remains unchanged.

-Additional information on the number of reproducing adults is needed to make an accurate assessment.

Special Concern

-For a regional perspective: Endangered in CT & NH. Threatened in MA, MD, RI, & VT. State Rank of S2 (Imperiled) in WV & DE. Recommended Special Concern due to limited distribution, regionally and locally disjunct populations, and intolerance to environmental degradation, primarily siltation on spawning habitat.

Round 3:

Stable

-My perspective on this species remains unchanged. Additional information on the number of reproducing adults is needed to make an accurate assessment.

-Based on previous comments and the number of sites where it's found in NJ, a rank of stable seems most appropriate.

-Although some states may consider them to be of special concern, there is currently no data to indicate placing them in that category in NJ.

Special Concern

-I prefer SC. Listed at T, E, or Imperiled 8 of 12 other northeastern states (excluding PA, NY, ME, and VA), coupled with limited NJ distribution, extent of NJ degraded habitats, known environmental sensitivities warrants SC status. I can accept the status of Stable if that is the group consensus.

-My current listing of SC/6 is not based on new information but on the split in previous rounds. I think it meets the SC criteria of intolerant. Whether it's widespread and concentrated in a few drainages probably depends on interpretation of the words, as well as information on status. It may be on the margin of widespread and not restricted, but I think the lack of anyone's confidence in S warrants some precaution.

-Although I have concerns about misidentification with Sea Lamprey, I have not encountered lampreys (of either species) very often when sampling north Jersey waters (and rarely are they much longer than 30 cm). I note that in NJ species maps provided by Delphi panelists that they have found relatively few occurrences of ABL and these are also limited to a small number of watersheds. Given the threatened/imperiled status of ABL in some east coast states, yet oddly not a similar status in PA/NY (see maps below) where there also seems to be few occurrences of ABL in watersheds shared w/ NJ. I don't think we have a good understanding of current ABL population distribution/status in NJ. When I combine this with ABL being an intolerant species and a relatively small # of occurrences in NJ I am not comfortable with listing this species as stable - special concern seems more appropriate.

Round 4:

Special Concern

-Based on information collected by others I can see SC warranted. The American brook lamprey has a fragmented distribution across its known range. I've seen it abundant in some streams, but only in a few localized areas of NJ. It does however require clean substrate, particularly sand and is considered pollution intolerant. The American brook lamprey has been designated as a threatened and special concern species in many other states of the Northeast and Mid-Atlantic.

-I have little experience with this species. Maps show somewhat limited distribution and concentration in specific drainages. Previous comments indicate an inherent vulnerability to degradation and a lack of information on the current population status. All of this equates to SC.

-There is little doubt that this species is intolerant and in general, its distribution is limited to a small number of watersheds in NJ. The question is whether that justifies an SC status in NJ given how little we know of adult spawning populations? However, given the constancy of classification in other states, an SC status in NJ in likely warranted.

-The following comment made by a reviewer during Round 3 concerns me… "Stable-My perspective on this species remains unchanged. Additional information on the number of reproducing adults is needed to make an accurate assessment." If an accurate assessment cannot be made without the additional information, then why would the reviewer choose "Stable" as opposed to "SC" ???
The term Special Concern was defined for us as: "Applies to species that warrant special attention because of inherent vulnerability to environmental deterioration or habitat modification that would result in their becoming Threatened if conditions surrounding the species begin or continue to deteriorate. This category includes species that meet the foregoing criteria and for which, in addition, there is little understanding of their current population status."

No Opinion
-No new information has been presented during 3 rounds, there isn't much confidence in the ranking, and status depends on interpretations of the status groups as much as ecological information on species. I don't see any reason why anyone would change their ranking based on their own views. Given the uncertainty, I would continue to consider it as SC. However, I have changed mine to NO to help lead to some closure. In the end, I expect this to be a call by NJDEP.

Sea lamprey (*Petromyzon marinus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	8	5.6
U		
NO	1	
NA		

Round 1:
Secure/Stable
-Based on observations of sampled ammocetes.
-Typically only ammocoetes are collected and there is far less information regarding adults and the number of adults spawning each year. Larval distribution has not changed much. Dams can impact the fish's migration to the sea and spawning migration of adults. The recent removal of dams could benefit this species.
-Anadromous…

Shortnose sturgeon (*Acipenser brevirostrum*) **Consensus: Endangered**

Status	# of People	Confidence Level
E	5	6.8
T		
SC		
S		
U		
NO	4	
NA		

Round 1:
Endangered
-Federally listed, multiple stressors to habitat.
-A federally listed, endangered, and very rare species in NJ due to exceedingly low population numbers.

No Opinion
-Only occurs in Delaware River; unsure of population status/size.
-Thorough studies of this species provide more information than my opinion. Federal status probably makes a difference, as well.

Longnose gar (*Lepisosteus osseus)* **Consensus: Not Applicable**

Status	# of People	Confidence Level
E		
T		
SC		
S		
U	1	7
NO	1	
NA	7	6.7

Round 1:
Not Applicable
-Group must form consensus on historical presence of species (native vs. nonnative) in NJ. "Zoogeography of North American Freshwater Fishes" Hocutt & Wiley 1986 considers this species *native* to Delaware & Hudson drainages. If native, then it should be considered endangered or extirpated. Marine Fisheries may have data to contribute. Pat Hamilton, Consider it extirpated or possibly non-native; not familiar with historical occurrences.
-Extirpated from NJ.
-Extirpated.

-I have seen no evidence of its current occurrence.
-I have never collected this species in NJ, and most consider them to be completely extirpated from the state.

Bowfin (*Amia calva*) **No Consensus**

Status	# of People	Confidence Level
E		
T		
SC		
S	2	6.5
U		
NO	1	
NA	6	6.0

Round 1:
Secure/Stable
-Population appears to be growing based on angler reports. However due to the presence of the northern snakeheads many individuals confuse snakeheads with bowfin which may contribute to additional reports. Population appears to be limited to the lower Delaware River.
-We've caught few individuals in few places, though it is said to be common in places.
-Typically a large river species. NJ conducts little monitoring on larger rivers overall like the Delaware River. PA Fish & Boat commission should be contacted for data regarding bowfin on the Delaware River.
-Stable and relatively tolerant, especially in low gradient systems with low DO.

Special Concern
-Know of limited occurrences in the upper Delaware and Wallkill drainages; suspect it might be more widespread in lower Delaware drainages than recent data sets suggest.

Not Applicable
-Group must form consensus on historical presence of species (native vs. nonnative) in NJ. "Zoogeography of North American Freshwater Fishes" Hocutt & Wiley 1986 considers this species *introduced* to Delaware, Long Island, & Hudson Drainages.
-Regularly captured by anglers in Lower Delaware River and its larger tributaries. Listed as Special Concern in Pennsylvania.

Undetermined
-Additional sampling locations on lower Delaware River and tributaries may be warranted to determine status

No Opinion
-Native status questionable.

Round 2:
Stable
-Native status is dubious for NJ – Apparently introductions were common in the 1970's in NY, NJ & CT. Smith (1985) indicate non-native status for S. NY and LI and Jenkins and Burkhead (1994) consider the records in the Atlantic slope drainages to be derived from introductions. Additionally, Rohde et al. (1994), indicate that the Bowfin is absent from Delaware, but has been introduced into Piedmont streams. Interestingly, however, Nelson (1994) and Berra (2001) indicate that the fossil record is much more geographically extensive than the current distribution may suggest with specimens identified from marine and freshwater deposits from N. America, Brazil, Europe, Asia, Saudi Arabia, and Africa. Some of these records go back to the Jurassic period. So, if we are only talking about contemporary native status (i.e., post Pleistocene glaciation), then the Bowfin probably belongs in the "NA" status as it does not appear to be indigenous to the State. If that is the consensus of the group, then you can change my status to "NA 7"……
-Bowfin were collected in two impoundments in the lower Delaware drainage (Salem County) that were previously sampled and not encountered. Population has significantly expanded is range.
-Additional data from large rivers are needed to make an accurate assessment.

No Opinion
-Native status questionable.

Not Applicable
-Critical for panel to establish native v. nonnative to NJ, as arguments can be made on either side of the status spectrum based on this distinction.

Round 3:
Stable
-My perspective on this species remains unchanged.

Not Applicable
-Comments lean towards Bowfin as nonnative to NJ. I would lean the same way, with the understanding that there is a reasonable chance we are wrong and it is native.
-Weight of zoogeographical evidence suggest nonnative status in NJ.
-"Bowfin are native species, actually dating back 250 million years and should be released unharmed. However, snakeheads are invasive and should be destroyed and submitted to the Division of Fish and Wildlife for verification" (http://www.state.nj.us/dep/fgw/aquatic_invasives.htm).
-Previous comments question whether or not this species is native to NJ. In addition to citations provided in previous comments, Fuller et al. (1999) also say bowfin was introduced into northern NJ and cite Stiles (1978) and Lee et al. (1980) for this information. Similarly, Page and Burr (1991) do not include NJ in the native range. Although I have no experience with this species, it appears likely that it was introduced and is not native to NJ.

-The comments above give evidence that it's non-native. I haven't seen anyone state evidence (e.g., historic occurrence) that it is native. In his 1881 Fishes of PA, Cope stated that no records were known from the Delaware. I assume there was historically more good vegetated habitat (e.g., which supported longnose gar), the bowfin would likely have been historically more common if it were present. With the intensity of different types of fisheries (e.g., gill nets for shad), it should have been detected (though, of course, not necessarily reported to managers or biologists). The fossil information is interesting, but I don't think it relevant. Channel catfish fossils are known from the Chesapeake, but it is routinely treated as non-native.
-As a result of the argument above, I continue to put NA. If the state wants to be precautionary and protect fish which might be native, than S is fine with me, though its likely non-native status should be noted.
-I've revised my status for this species radically, from SC/4 to S/4 to now NA.
I recently asked A. Bruce Pyle, retired Chief of the NJDFW Bureau of Freshwater Fisheries what his opinion was on Bowfin being native/non-native to NJ. He worked for that agency from the late 1950's until the early 1990's. This is what he said: *"Regarding the Bowfin, it has never been my belief that they have ever native to NJ. I believe that they were a "gift" of the aquarium trade; i.e., they were sold as cute little things or interesting predators for home aquariums. And, when they got too large or their owners had reason to dispose of them, they were released into the wild. Unfortunately, they apparently do well in some of the aquatic environments we provided for them and have become established."* Considering his remarks, the NJ maps (very few sightings), the 2010 NatureServe map that shows US distribution in SE & Mississippi drainage, and the Round 2 comments, I am comfortable rating this species as not indigenous to NJ.

Round 4:
No Opinion
-I would agree the weight of zoogeographical evidence would put the species as nonnative.

Not Applicable
-Previous comments point to this species being nonnative (NA).
-Based on the mounting weight of evidence of Bowfin as a non-native (that is, not indigenous or should not be considered indigenous to NJ), I have changed my rating from S to NA.
-Species should not be considered indigenous to NJ.
-I am very pleased with the comments and interpretations of the comments regarding the historical presence of Bowfin. As a result, I have increased confidence in their status of Non-native, therefore NA is most appropriate.
-I continue to think that this is a nonnative species, which should be listed as NA. The state may choose to manage it, as it does other non-native species.

American eel (*Anguilla rostrata*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC	1	6
S	8	6.5
U		
NO		
NA		

Round 1:
Secure/Stable
-Cannot comment on abundance, but certainly one of most widely distributed species in NJ freshwaters.
-Species is abundant and widespread, but is possibly vulnerable to threats outside of the state.
-Still should be monitored. Significant population declines have been observed in other drainages of the Northeast and Great Lakes.
-This species is found in most stream systems in the state with access to the coast and is common in the Pinelands, especially in the lower segments of coastal streams.
-Research should be conducted to understand why American eel populations are declining in every mid-Atlantic state, but NJ populations are stable.

Special Concern
-Now a species of concern, especially since overharvesting of elvers and changes in stream habitat availability has reduced population numbers.

Satinfin shiner (*Cyprinella analostana*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	8	6.3
U		
NO	1	
NA		

Round 1:
Secure/Stable
-We've caught this species in only one site other than the Delaware River.
-Fairly tolerant and well distributed.

Spotfin shiner (*Cyprinella spiloptera*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T	1	4
SC		
S	6	6.5
U		
NO	2	
NA		

Round 1:
Secure/Stable
-Fairly well distributed.

Threatened
-Not widespread in NJ; seldom encountered despite tolerance to different habitats; abundant where found (?).

Cutlip minnow (*Exoglossum maxillingua*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC	1	5
S	6	6.0
U		
NO	2	
NA		

Round 1:
Secure/Stable
-Intolerant species.
-We've caught this in relatively few places in NJ, but commonly in a few. It is in Delaware River, where it can be common.
-Restricted in distribution in NJ because of range, but certainly not a species of special concern

Special Concern,
-Though range is restricted to NW Jersey, where I have encountered them (larger rivers, clean/cool water), they are fairly abundant.

Eastern silvery minnow (*Hybognathus regius*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC	1	7
S	6	6.0
U		
NO	2	
NA		

Secure/Stable
-Considered by some as intolerant species, but seems to tolerate relatively degraded waters of Lower Delaware River tributaries. Relatively few occurrences statewide.
-Documents don't indicate occurrence in mainstream Delaware.
-Population seems to fluctuate, but this species seems to survive, and possible even thrive, in mildly degraded systems like Bound Brook, for example.

Special Concern
-Population range has decreased in NJ and is primarily collected in urban/moderately impaired rivers and streams.

No Opinion
-Fairly low # of occurrences & size of individual pop's in the data sets not provided; may be present/abundant in large rivers (?).

Common shiner (*Luxilus cornutus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	7	7.6
U		
NO	2	
NA		

Round 1:
Secure/Stable
-Fairly tolerant and well distributed.

Pearl dace (*Margariscus margarita*) **Consensus: Not Applicable**

Status	# of People	Confidence Level
E		
T		
SC		
S		
U		
NO	1	1.0
NA	8	6.1

Round 1:
Endangered
-I have never personally collected this species in NJ, but it is considered to be among the most critically endangered species in the state.

Not Applicable
-Group must form consensus on historical presence of species (native vs. nonnative) in NJ. "Zoogeography of North American Freshwater Fishes" Hocutt & Wiley 1986 considers this species *native* to Delaware & Hudson Drainages. If native, then it should be considered endangered or extirpated. Moderately Tolerant.
-Never encountered; unsure of historical presence and native vs. non-native.
-Is there any historical documentation of this species in NJ?
-Nonnative.

No Opinion
-I have no information on occurrence of this species in the state.

Round 2:
Undetermined
-Pearl Dace occurs in the Delaware drainage in PA, so there's no reason to consider it non-native. However, none of the reviewers, including me, have any NJ records to indicate endangered or extirpated status. I put it as U.

Not Applicable
-The Pearl dace appears to be widely distributed across boreal and north-temperate regions and range widely from Canada and N. US down through the Appalachians to the southern limit of the Valley and Ridge Province where populations may be quite localized (Jenkins and Burkhead,1994; Rhode et al., 1994). Smith (1985) indicates that the Pearl dace is widely distributed in NY, and many historic collections have been made along the southern tier region of and Scott and Crossman (1973) suggest that their distribution ranges from Canada and Maine south to Virginia. Intuitively, this suggests that the Pearl dace was likely in NJ historically, but are now locally extinct or extirpated from their historic range. Given that there have been no confirmed records of this species in NJ in decades; a status of "NA" is probably the best course of action.
-Is there any historical data on this species in NJ?
-Never encountered; unsure of historical presence and native vs. non-native. Is there any historical documentation of this species in NJ? Nonnative.
-Critical for panel to establish native v nonnative to NJ, as arguments can be made on either side of the status spectrum based on this distinction.

Round 3:
Not Applicable
-I ranked the Pearl Dace as NA because I believe it is a native species that should be considered extirpated. Fishes of New Jersey, Annual Report of the New Jersey State Museum, 1905 reports "This species (*Leuciscus margarita* aka Gold Thread Shiner at the time) is known from the Delaware basin, where the Assanpink enters it, according to Dr. Abbott, by several specimens associated with *Lueciscus vandoisulus*. They were determined by Cope himself Dr. Abbott assures me." There is also a citation under its previous name (*Clinostomus margarita* Abbott, Geol. N. J., 1868 (1869), p. 824 that I have not secured. I believe we should settle on "Extirpated" with the understanding that should it be rediscovered during fisheries surveys, that it should then be considered for Endangered status.
-No collection records in NJ and zoographical evidence suggest nonnative status.
-In addition to the citations provided in previous comments, Page and Burr (1991) and Fuller et al. (1999) agree that NJ is not part of the native or introduced range for the pearl dace. Considering the total lack of information for this species in NJ and questions regarding its native vs non-native status, a rank of U or NA is warranted. I'm going with NA.

-Even though prior distributional records indicate that the Perl Dace is / was native to NJ such records are more than 30 years old and by definition, this species should be in the "NA" category.
-Originally said NO because did not feel I was knowledgeable enough (never encountered them in NJ). There are no occurrences on the all the recent NJ maps provided, yet their status is unclear (native/extirpated or non-native). Upon further review of input from others, I have now changed my status from NO to NA ("species does not occur in NJ w/ regularity or predictability"). I question if it ever occurred in NJ, particularly since it appears it has not been documented adjacent PA/NY watersheds. (But it's possible that it may have been extirpated so not convinced that calling it non-native is a good idea.)

Golden shiner (*Notemigonus crysoleucas*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.8
U		
NO		
NA		

Round 1:
Secure/Stable
-Found in Pinelands stream systems where the pH is elevated with upstream development and upland agriculture.
-Tolerant and well distributed.

Comely shiner (*Notropis amoenus*) **Consensus: Special Concern**

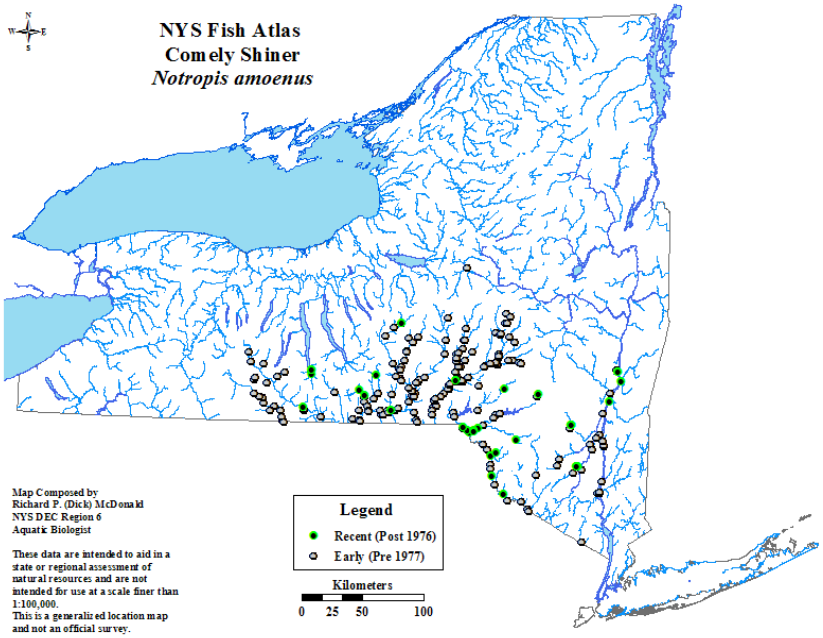
Status	# of People	Confidence Level
E		
T	1	5
SC	7	5.3
S		
U		
NO	1	
NA		

Round 1:
Secure/Stable
-Distribution of this species is hard to explain. I've rarely found it common, but it occurs in a variety of stream and river types, including some with some quality/habitat issues. It also occurs in the main stem Delaware.

Special Concern
-Range has decreased slightly. Comely shiners are collected very infrequently and in low abundance. It is unclear if this species is at the edge of its range in NJ. MD threatened.
-Although most might rank this species similar to Spottail or Swallowtail shiner, I consider this to be a species the state might want to keep an eye on because it tends to be found in much lower numbers than the two aforementioned species and this may be linked to habitats degradation associated with anthropogenic process.

Threatened
-Relatively few collections in NJ. Seems to be declining in NY in Chemung and Susquehanna watersheds.
-Very few occurrences in NJ, with range restricted to a few drainages; NJ on the periphery of species range (NY-NC).

Round 2:
Threatened
-For a regional perspective: Threatened (S2/imperiled) in MD, S2/imperiled in DE, S3/rare in state in NY and WV. Without regard to the Delaware River, for which the extent of their presence/abundance is not apparent, they have a very limited distribution in NJ. Data from NY indicates the species is susceptible to loss http://www.dec.ny.gov/animals/85681.html (see graphic below). These data may represent what may have also occurred in NJ (in lieu of historical data in NJ). Maryland considers it to be 1 of 12 species "most sensitive to pollution." Recommended Threatened due to few occurrences 19 of over 1900 surveys, limited distribution, regionally and locally disjunct populations, and intolerance to environmental degradation, primarily siltation on spawning habitat.



Special Concern

-I think the reviewers are pretty consistent on status, but not on what to call it: the species occurs in relatively few drainages, may be at the edge of its range, and is rarely common, which could make it sensitive to change, make it hard to detect change, but also may make it look like it's on it way out when it may be stable and uncommon. I'm ok with SC as an intermediate position, but without a whole lot of confidence.

-As previously stated – this is a species I believe should be given more attention due to its overall low abundance in places where it is known to persist. Populations numbers appear to be declining with increasing urbanization and habitat loss, however, this may also be because it is near the edge of its northern range as Smith (1985) indicates that it is primarily found across the Atlantic coastal plain from the Hudson River down to North Carolina.

-Range has decreased slightly. Comely shiners are collected very infrequently and in low abundance. It is unclear if this species is at the edge of its range in NJ. MD threatened.

-Collected infrequently and typically just 1 or 2 specimens are collected.

Stable

-Distribution of this species is hard to explain. I've rarely found it common, but it occurs in a variety of stream and river types, including some with some quality/habitat issues. It also occurs in the main stem Delaware.

Round 3:

Special Concern

-Populations are generally very localized and disjunct. When collected they are found in low abundance. Recent surveys conducted in NY in the Susquehanna and Delaware drainages show a significant reduction of locations they are currently present compared to the historical record for the species.

-I have no experience with this species. However, previous comments that highlight its narrow distribution in NJ, general rarity within its NJ range, low abundance when found, and potential vulnerability to water-quality degradation suggest a status of SC.

-It looks like the general consensus is that this species should be either considered of special concern or threatened. Personally, the "Threatened" category should be reserved only for those species whose habitat and distribution is threatened and are one step away from being "Endangered". I do not believe the Comely shiner is in that category.

-I'll go with the crowd for SC. Even if widespread in the main stem Delaware, it can fit the definition of SC. I don't know that it is intolerant. Rarity or decrease may be assigned to intolerance, but there are other possible reasons. I've found it in some pretty cruddy places.

Threatened

-Citation in "Fishes of New Jersey, Annual Report of the New Jersey State Museum, 1905 reports", Abbott reported the Comely Shiner as rare, which appears to be true today, however when looking at the NYS Fish Atlas graphic above, it appears that it was found widespread throughout southcentral NY prior to 1977 and greatly reduced in data after 1978. I would think that this best addresses the question of the species being "naturally rare" versus "reduced from historic levels." As a result, I stand by Threatened, but would accept the consensus of SC.

-I stayed with T. The only place I've encountered them was in the lower Raritan River in the early 1980's. Since then, I've sampled mostly headwaters/small streams (north Jersey) more often than larger rivers and would expect they seldom/never occur in these headwater streams. I suspect this species may be a little more widely distributed (in larger rivers) than the NJ maps indicate, but likely not all that much. If we sampled large rivers more regularly we might document more occurrences. The # of occurrences in NJ is very limited so feel T is more appropriate than SC.

Round 4:

Special Concern

-The species appears restricted to the main stem Delaware River and medium sized streams in the Raritan drainage. My collections using electrofishing have always found them in low abundance, but the species doesn't have such a restricted range to warrant threatened status. Would be good to return to sites sampled in early 90's and see if they are still present. This might answer the question of whether the species currently has a significant population decline.

-I have no experience with this species. Previous comments highlight its narrow distribution in NJ, general rarity within its NJ range, low abundance when found, and potential vulnerability to water quality degradation. These traits indicate a status of T or SC. Most commenters have voted SC so that feels most appropriate.

-Without further research I think it would be highly presumptive to put this species into the "T" category as a fall back. Although limited in distribution, this species is often found "mixed-in" with schools of spotfin and swallowtail shiners in streams that I would not consider at all pristine. As previously mentioned (round 1), it is certainly a species that NJ should watch more closely and I recommend that further research be done to evaluate more specifically its distribution, especially in the Raritan River drainage where I expect it occurs broadly in the lower reaches of many tributaries and in the mainstem. For now I believe SC is the appropriate category for this species.

-I will change my recommendation from Threatened to Special Concern, with anticipation that there is a concerted effort to fill data gaps in our larger river systems in subsequent years. I recommend that we reevaluate this species upon data collection efforts within the next few years.

-As with other species, by now there isn't much new to say. I looked at NY data on the species. Despite the apparent decline, it is not listed in NY. New York data show an average and median catch per collection of 5.3 and 2 individuals before 1977, and 6.7 and 2 individuals after 1977. Many of the pre-1977 collections are from the stream survey in the 30's. At this time, it was still considered a subspecies of *N. rubellus* and intergrades were noted. It was much more frequent in the Susquehanna (20%) than Delaware (5%) collections. I suspect that some of the identifications of comely shiner may have been rosyface shiner. The second main group of pre-1977 data are from the 40's through 60's by Raney, Suttkus, Bailey, Miller, and Lachner. Some of these were for Cornell ichthyology courses, and I suspect there may have been additional efforts to collect the species because of systematic questions about it. Thus, it is typical for the species to be caught in low numbers. The figure seems to show a decline in occurrence of the species in the main stem Delaware along the PA-NY border. We surveyed this area for NPS and found the shiner pretty widespread (we also found it widespread in the PA-NJ part of the river in XXXX).

Bridle shiner (*Notropis bifrenatus*) **No Consensus**

Status	# of People	Confidence Level
E	7	4.9
T	2	5.5
SC		
S		
U		
NO		
NA		

Round 1:

Threatened

-Very few occurrences in NJ, with range restricted to a few drainages; NJ on the periphery of species range (Quebec/ME – VA).

-Limited range with pockets of small populations. In addition, NJ state historical data suggest the species occurrence has declined. Distribution has declined. Stable populations exist in a few remaining drainages. PA endangered; MD endangered.

Endangered

-Considered by some to be intolerant species. Range-wide decline. Listed as Endangered in Pennsylvania. Found in 15 lakes in the 1950's, but only found in 1 of the 15 when surveyed specifically looking for them since 2008.

-Definitely rare and declining in many places. I think it's probably declining in former area of occurrence around Royce Brook. However, it occurs in large abundance in some areas and probably has undiscovered populations. It may warrant T status (i.e., I'm reliable on E or T, but risky on E).

-One of the most critically imperiled species in NJ now only found in a few locations relative to its historic range. Considered to be a highly vulnerable to habitat change.

Round 2:

Endangered

-Lots of agreement for E or T. I think it has definitely decreased. It occurs commonly in some places and may have undiscovered populations, but its short life span may make it sensitive to changes in these areas.

-Species distribution has declined to all but a few relic populations (e.g., Royce Brook) and is considered to be endangered in peripheral states (e.g., PA). This is one of the few species that probably deserves endangered species status in NJ……

-Endangered in DE, PA, WV. Threatened in NH. SC in CT, MA, ME. Extirpated in MD. Extirpated from many watersheds rangewide http://www.conservewildlifenj.org/downloads/cwnj_543.pdf, however map is very inaccurate for NJ. Typically life span of 2 years makes isolated populations extremely vulnerable to winking out. Species must warrant E or T status.

-Found in an additional unnamed tributary to XXXX near a previous known location a during a NJDFW survey in 2014.

Round 3:

Endangered

-My assignment of Endangered remains unchanged. Citing Fishes of New Jersey, Annual Report of the New Jersey State Museum, 1905 reports "This minnow is found locally abundant." and "They are abundant in Crosswicks Creek and in the Passaic River." I don't believe there are any recent records found in either location.

-At present only a few populations exist in NJ. Unless there are significant under sampled populations in NJ, current fish collection records suggest bridle shiner occurrence is very uncommon compared to other NJ freshwater fishes.

-My perspective on this species remains unchanged.

-Bridle Shiner clearly has a spotty range and has decreased in adjacent states and probably decreased in NJ. I agree that its short life span makes it vulnerable to a few bad years. I think it also vulnerable to introduction of predators.

-Sticking with E. Very few sightings, appears to be declining, occurs in smaller streams so feel they are more vulnerable, and high level status in surrounding states.

Threatened
-Based on previous comments and the maps, I think a threatened status seems most appropriate for this species.

Round 4:
Endangered
-Based on the evidence provided by others an E status could be warranted. Populations are restricted to very few locations, but they can have high abundances. Compared to other cyprinids in NJ like the comely shiner, bridle shiner appear significantly more restricted in range with populations reduced to pockets. There is also reasonable evidence that the bridle shiner historically had good populations ranging across waterbodies (streams and lakes) in NJ. My assignment of E is however placed with some risk. Sampling geared specifically toward favorable bridle habitat may turn up additional isolated pockets with good populations.
-Going with the flow (E).
-At this point the classification between T & E for this species is probably sematic as based on an individual's perspective and interpretation of existing information; it could easily be placed in either category. My classification for this species remains unchanged because the simple fact that this species is "in immediate danger due to loss or degradation of habitat" should be enough to place it into the "E" category.
-I see no compelling comments to assign Threatened status. I stick with Endangered.
-Again, not much new information. There seems to be consensus that it has greatly declined in abundance, is found in relatively few sites, is sensitive to habitat degradation (and possibly to introduced predators), and is vulnerable because of its short life span. Given the uncertainty, I switched from T to E.

Ironcolor shiner (*Notropis chalybaeus*) **Consensus: Endangered**

Status	# of People	Confidence Level
E	7	6.6
T		
SC		
S		
U		
NO	2	
NA		

Round 1:
Threatened
-Limited distribution, narrow habitat affinity.

Endangered
-Considered by some to be intolerant species. Apparently only 2 disjunct populations left in NJ. Listed as Endangered in Pennsylvania. Listed as Special Concern in New York. Found in XXXX (Cumberland Co.), XXXX (Atlantic Co.), XXXX (Mercer Co.), and XXXX (Salem Co.) during 1950's surveys, but only encountered in XXXX in 2000's.
-Very few occurrences in NJ, with range restricted to a few drainages; NJ appears to be the northernmost edge of species range (NJ – FL/LA).
-Greatly decreased in NJ and other parts of the range. It doesn't appear common in upper Maurice sites, where it was once common.
-Historically widespread throughout the Inner Coastal Plain. BFBM has not collected a single specimen in 7 years of monitoring in the coastal plain. PA endangered; MD endangered.
-Although considered to be historically indigenous to NJ, its current status or distribution is not well known. It is likely to be a highly imperiled species in NJ, but without more substantive info on numbers, its status is more of a guess than it is definitive.

Round 2:
Endangered
-Seems to fit endangered: it is found in few places now, has decreased in occurrence historically, and it appears to have decreased or disappeared in other parts of its range. Its main areas of occurrence in the state, Pine Barrens and Inner Coastal Plain have been pretty well sampled and it's usually not a hard species to capture, so the lack of information speaks to loss rather than uncertainty. In adjacent states, I know of only 1 site in NY and 1 native site in PA (plus nearby introduction sites).
-Remain unconvinced that the status of this species should be anything but E……
-Typically life span of 2 years makes isolated populations extremely vulnerable to winking out. Probably most imperiled species in NJ and must warrant E status.

Spottail shiner (*Notropis hudsonius*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	8	7.1
U		
NO	1	
NA		

Round 1:
Secure/Stable
-Fairly tolerant & well distributed.

Swallowtail shiner (*Notropis procne*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC	1	4
S	6	6.5
U		
NO	2	
NA		

Round 1:

Secure/Stable

-Appears to be present in moderately impacted habitats and areas of high species richness. Threats seem to be primarily from non-native species.
-Fairly tolerant & well distributed.

Special Concern

-Low # of occurrences in data sets; size/stability of individual pop's unknown.

Bluntnose minnow (*Pimephales notatus*) **Consensus: Not Applicable**

Status	# of People	Confidence Level
E		
T		
SC		
S		
U	1	5
NO	2	
NA	6	5.8

Round 1:

Secure/Stable

-I have little experience with the species in the state. It is absent from adjacent SE PA, but is common to the north and west. Arndt states that it is introduced.
-A non-native that is fairly tolerant & well distributed – much more so now due to bait bucket introductions.

Not Applicable

-Group must form consensus on historical presence of species (native vs. nonnative) in NJ. "Zoogeography of North American Freshwater Fishes" Hocutt & Wiley 1986 considers this species *native* to Delaware & Hudson Drainages. If native, then it should be considered endangered or extirpated.
-No data provided for this species; never encountered; unsure of historical presence/distribution in NJ.
-Native status is questionable. However, the species is common in the upper Delaware River.
-Conflicting references regarding native status.
-Native to the Wallkill drainage but no record of its capture in NJ. Nonnative.

Round 2:

Undetermined

-I don't know much historical data to indicate native or introduced status. Arndt doesn't state why he considered it introduced. He noted it as "scattered" occurrence, but his map shows a distribution in Delaware River, a few Delaware River tributaries, a Raritan site (near XXXX) and Walkill, which doesn't seem obviously introduced to me. I have only one record of it in New Jersey, XXXX in 2001 (same site as *Notropis amoenus*), so it may not be extirpated. With uncertainty about current range and status, I think U is the best course.

Not Applicable

-This species appears to be native to much of eastern and central United States (Arndt 2004), however it is considered by most to be an introduced species in NJ. They are widely distributed throughout lakes, ponds, and streams in NY with the exception of LI (Smith 1985) and are found throughout many northwestern drainages in Virginia (Jenkins & Burkhead, 1994) and parts of the mid-Atlantic including NC and the upper TN (Rhode et al., 1994). However populations in NJ appear to be more recent and may be the result of bait bucket introductions. So, the Bluntnose minnow should probably be considered an "NA" or non-indigenous species in NJ.
-Critical for panel to establish native v nonnative to NJ, as arguments can be made on either side of the status spectrum based on this distinction.

Blacknose dace (*Rhinichthys atratulus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	8	7.6
U		
NO	1	
NA		

Round 1:
Secure/Stable
-A wildly distributed and well represented species in northern NJ often associated with trout streams. But, it appears to thrive equally as well in clear high-quality high-gradient trout streams as it does in mildly degraded urban streams, as long as dissolved oxygen content is supportive.

Longnose dace (*Rhinichthys cataractae*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	7	7.3
U		
NO	2	
NA		

Round 1:
Secure/Stable
-A well distributed and well represented species in Northern NJ. Appears to thrive equally as well in clear high-quality high-gradient streams as it does in mildly degraded streams, however, unlike the BND, its presence necessitates highly oxygenated riffles.

Creek chub (*Semotilus atromaculatus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	7	7.9
U		
NO	2	
NA		

Round 1:
Secure/Stable
-Fairly tolerant & well distributed.

Fallfish (*Semotilus corporalis*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	8	7.1
U		
NO	1	
NA		

Round 1:
Secure/Stable
-Suspect range has shrunk in northern New Jersey – see them less frequently in streams.
-It is abundant in the main stem Delaware River.
-Tolerant & well distributed, capable of surviving in degraded systems.

Quillback *(Carpiodes cyprinus)* **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	7	5.1
U	1	5
NO	1	
NA		

Round 1:

Secure/Stable

-Abundant in Delaware and Raritan rivers. May lack data in other large river systems within NJ.
-Found in high abundance in lower tidal section of Delaware River. Have not encountered in any other location.
-The quillback is probably most common in the main stem Delaware, which is not reflected in the distribution maps.
-A large river species. NJ conducts little monitoring on larger rivers overall like the Delaware River. PA Fish & Boat commission should be contacted for data regarding quillback on the Delaware River.

Undetermined

-Additional sampling locations on larger rivers may be warranted to determine status.

No Opinion

-Very low # of occurrences in data sets; suspect it might be more widespread in lower Delaware drainages than recent data sets suggest.
-Just don't know enough about their population status to provide a reliable or accurate rating.

Round 2:

Secure/Stable

-We've caught it in the Delaware from Philly up to above the Water Gap, and in the Delaware-Raritan Canal. It looks like a big river species with few records—no indication of decline, but sampling intensity may not be able to show decline. I'd consider it stable, but with relatively low assurance, based on moderate paucity of info.
-I have never collected the quillback in NJ but have in western NY drainages, so I am not qualified to provide a status for this species. However, the consensus appears to be that the populations in NJ, where found (e.g., lower DRB and RRB), are fairly stable. So, I will go with the consensus -- i.e., "S", but with risky reliability on my part……
-The quillback is probably most common in the main stem Delaware, which is not reflected in the distribution maps.
-Additional population data is needed from the Delaware River to make an accurate assessment.

Undetermined

-The 3rd most abundant species (behind gizzard shad and white suckers) documented by video at the XXXX located on the Raritan River since 1996. Known to inhabit larger river systems, a concerted effort should be made to compile data from larger river systems.

White sucker (*Catostomus commersoni*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	8	7.9
U		
NO	1	
NA		

Round 1:

Secure/Stable

-One of the most widespread and tolerant species.
-Tolerant species, widely distributed.

Creek chubsucker (*Erimyzon oblongus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.3
U		
NO		
NA		

Round 1:
Secure/Stable
-Although some might argue, this is a species for NJ to keep an eye on as they seem to be fairly intolerant of habitat changes.
-Widely distributed in the state and abundant in the Pinelands, especially the Oswego River system.

Northern hog sucker (*Hypentelium nigricans*) **Consensus: Special Concern**

Status	# of People	Confidence Level
E		
T	1	5
SC	6	5.5
S		
U		
NO	2	
NA		

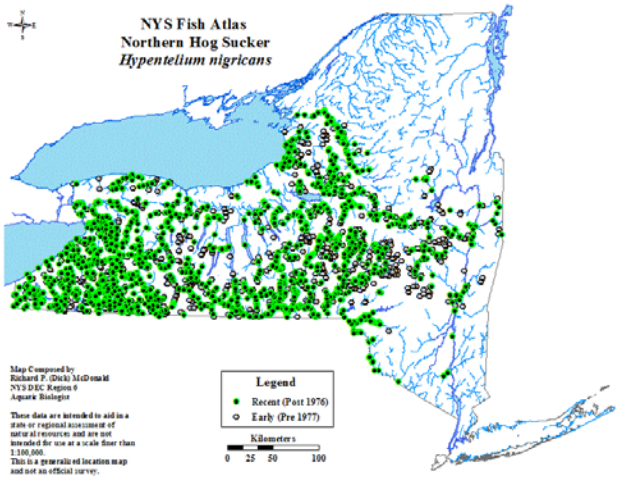
Round 1:
Special Concern
-Found in the upper Delaware River but the species is at the southern range of its occurrence. Rare but found at restricted localities. Although much of the upper Delaware is protected by National Park Service land, the species could be vulnerable to any future changes in water or habitat quality.
-The species is known from few areas, and it rarely has large populations.
-Rare in NJ wadeable streams, but more common in the Delaware River.

Threatened
-Low # of occurrences in NJ data sets (limited to a few northern Del. R. tribs); appears to also be very few occurrences on PA side of Delaware R.; have some concern with species ID (possibly misidentified as white sucker in the past).

Endangered
-Intolerant species. Very common in most of Pennsylvania, but very rare in Delaware Drainage. "Zoogeography of North American Freshwater Fishes" Hocutt & Wiley 1986 considers this species *native* to Delaware & Hudson Drainages. Very few recent records in NJ.

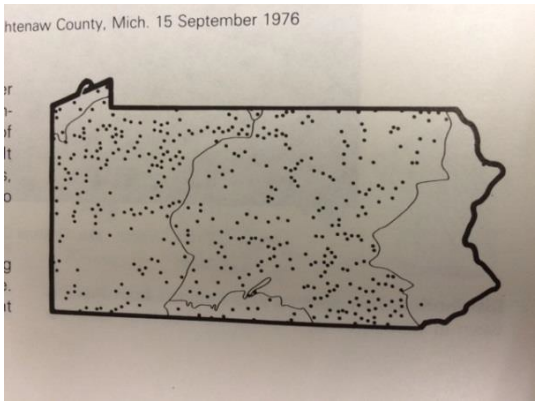
No Opinion
-I am very familiar with the distribution of this species outside of NJ, however, because it is uncommon in NJ, it might be considered "rare" but this is due more to it know range rather than an anthropogenic effect.

Round 2:
Threatened
-There would be very little impact to this species as a whole if it were lost in NJ, as it appears to be abundant and widespread over the core of its range. Data / status in other states indicates it is not particularly vulnerable to loss. Seems vulnerable to state extirpation due to few occurrences NJ, and Delaware River Watershed in neighboring PA (Cooper 1983) (see below), therefore very little chance of geneflow and recolonization.



For example…
http://www.dec.ny.gov/animals/94497.html

Seems vulnerable to state extirpation due to few occurrences NJ, and Delaware River Watershed in neighboring PA (Cooper 1983) (see below), therefore very little chance of geneflow and recolonization.



Special Concern
-We've caught it only in Flat Brook and the Delaware River upstream of the Water Gap. These make more records than Ardnt, but still not very widespread. It's pretty widespread in eastern PA. It may be stable/secure, but since everyone is leaning to SC or above, SC seems reasonable.
-Even though I have only collected this species once or twice in upper Delaware of NJ tributaries (e.g., Big Flatbrook), I would argue, based on the current distribution, that the N. Hog sucker is secure from a conservation perspective and the only reason that it might be considered rare or endangered in NJ is because NJ sits right on the southern tip of the species' historic range. It's very much akin to the Banded sunfish in NY that is a protected species because there is only one known population in the Peconic River in LI, but just south of there in NJ in the Coastal Plain they are fairly common, especially in the Pinelands where their status is secure. I am willing to go with an "SC" status in NJ if that is the broader consensus among the group, but I just can't consider it a T or E species…..

White catfish (*Ameiurus catus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	8	5.6
U		
NO	1	
NA		

Round 1:
Secure/Stable
-Again, the distribution maps don't indicate its abundance in the Delaware and tidal reaches. It is still relatively common, though it may have decreased from historical levels.

Special Concern
-Species does not appear to be overly abundant in NJ; have encountered in lakes, not streams; not sure if pop's in lakes are secure/stable as typically only few individuals are encountered during a survey; non-native catfish a potential threat (?).
-Historical and anecdotal information indicates a decrease in abundance of white catfish possibly due to introduction of channel catfish in the Delaware River. Mullica River (tidal brackish water section) has a substantial white catfish population that has not been represented in sampling maps.

Round 2:
Stable
-Like American Shad, this species may have declined, but not in a conservation sense that would lead to SC or above.
-My perspective on this species remains unchanged.
-Common in some inland lakes and generally common in the large freshwater tidal rivers, including a presence in the degraded freshwater tidal Passaic River. Generally where found they never occur in high abundance
-State Rank in Maryland SU "Possibly rare in MD, but of uncertain status for reasons including lack of historical records, low research effort, cryptic nature of the species, or concerns that the species may not be native to the State…" Distributed geographically throughout NJ, however not that many occurrences. In addition to the Graduate Thesis work conducted by Keller 2010, would be very interested to see existing data compiled on tidal sections of larger rivers and additional data collected where little exists. I would also like to see data indicating historical presence/abundance in NJ to help determine if numbers are declining. This species may warrant SC status.

Black bullhead (*Ameiurus melas*) **Consensus: Not Applicable**

Status	# of People	Confidence Level
E		
T		
SC		
S		
U		
NO	1	
NA	8	6.6

Round 1:
Not Applicable
-Listed as Endangered in Pennsylvania. Group must form consensus on historical presence of species (native vs. nonnative) in NJ. "Zoogeography of North American Freshwater Fishes" Hocutt & Wiley 1986 considers this species *introduced* to Hudson Drainage.
-No data provided for this species; never encountered; suspect it is not native to NJ.
-No evidence of establishment. Any records are probably failed introductions or misidentifications.

Round 2:
Not Applicable
-I have never collected or encountered this species in NJ although Arndt (2004) indicates that there are about a dozen or so locations where this species has been collected, but he considers this species to be introduced. In NY, it is considered "rare" (Smith, 1985) and some of the older records are considered erroneous (i.e., it was a Brown bullhead that was identified as a Black bullhead etc.) which could easily be the case in NJ as well. It is also possible that black bullheads are inadvertently stocked in local NJ ponds after being acquired from suppliers in the Midwest where the species is much more common.
-Critical for panel to establish native v nonnative to NJ. Should be removed from consideration as I believe it to be non-native.

Yellow bullhead (*Ameiurus natalis*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.3
U		
NO		
NA		

Round 1:
Secure/Stable
-Abundant in Pineland streams and impoundments.

Brown bullhead (*Ameiurus nebulosus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.7
U		
NO		
NA		

Round 1:
Secure/Stable
-Widely distributed in the state and often found in Pinelands streams and impoundments where the pH is elevated with upstream development and agriculture.

Tadpole madtom (*Noturus gyrinus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC	1	4
S	8	5.9
U		
NO		
NA		

Round 1:
Secure/Stable
-Often found in Pinelands streams (not impoundments) where the pH is elevated with upstream development and agriculture.
-The species appears to still be widespread, but seems to have decreased somewhat in range in the state. I catch very few, and don't get it in areas which appear to

be good habitat.
-The range has decreased and tadpole madtoms are now only collected below the fall line. PA endangered.
-Fairly common when habitat is available.

Special Concern

-Pop's essentially limited to south Jersey.

Margined madtom (*Noturus insignis*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	8	6.5
U		
NO	1	
NA		

Round 1:
Secure/Stable
-Intolerant species.
-Common in Delaware River.
-Fairly common when habitat is available.

Redfin pickerel (*Esox americanus americanus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	6.8
U		
NO		
NA		

Round 1:
Secure/Stable
-Commonly found in headwater streams in the Pinelands, especially in bogs and ditches associated with active and abandoned cranberry farms.
-It's decreased in many parts of region. It still appears widespread in state. We've caught it a number of places. However, I don't find it in abundance, and it should be vulnerable to wetland loss, development, etc. It may warrant SC.
-Very common in wetland drained systems, especially in S. NJ.

Chain pickerel (*Esox niger*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.7
U		
NO		
NA		

Round 1:
Secure/Stable
-The most frequently found fish in Pineland streams and impoundments.
-Common & widely distributed.

Eastern mudminnow (*Umbra pygmaea*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.6
U		
NO		
NA		

Round 1:
Secure/Stable

-Listed as Special Concern in PA.
-A common fish in Pinelands streams and impoundments, especially abundant in small ditches associated with active and abandoned cranberry farms.
-Common & widely distributed.

Brook trout (*Salvelinus fontinalis*) **Consensus: Special Concern**

Status	# of People	Confidence Level
E		
T		
SC	8	5.8
S	1	7
U		
NO		
NA		

Round 1:
Secure/Stable
-It appears secure from a conservation standpoint. It is still widespread, but is vulnerable to climate change and virtually all kinds of disturbance.

Special Concern
-Despite relatively high # of occurrences in NJ data sets provided, the range is confined to northern NJ. Pop's found in narrow habitat range (cold, clean headwater streams) - this habitat vulnerable to environmental change (i.e. climate change, habitat destruction/modification). Species considered to survive in less than half their original (pre-colonial) range. Urbanization, barriers (dams & roads), competition with reproducing non-native salmonids have greatly impacted this species distribution in NJ.
-This is especially true for heritage strains of native brook trout. It's been fairly well established in the literature that as impervious surfaces exceed 5%, the numbers of native brook trout tend decline.

Threatened
-Species has a restricted range to upland coldwater streams in northern New Jersey. Range reductions for the species have been documented throughout the eastern United States. The species will be vulnerable to increased stream temperature associated with climate change. The species is sensitive to minor increases of urbanization in watersheds. This is well documented in the peer review literature.

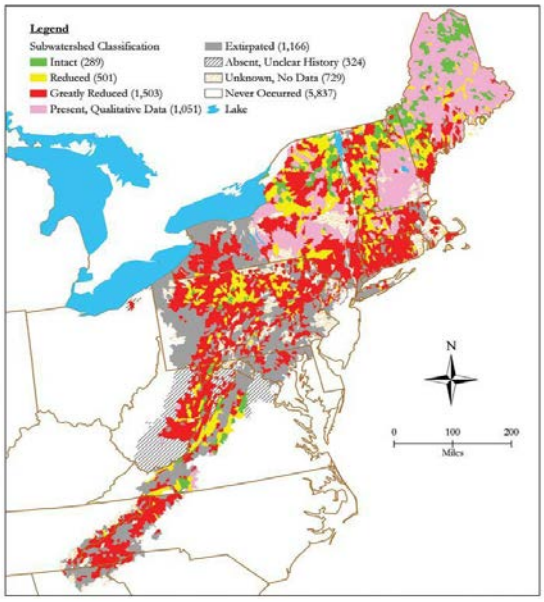
Round 2:
Special Concern
-I think the number of sites of occurrence (I found 20 recent sites in our database), precludes T or E, but all comments above about sensitivity (with which I agree) suggest SC.
-The literature is pretty clear that the native range of this species in NJ and throughout the northeast has been greatly reduced due to habitat loss (i.e., loss of cold headwater streams with excellent water quality), anthropogenic disturbance, dams, and competition from non-natives such the rainbow and brown trout. This loss is likely to continue as a result of climate change impacts and habitat loss due to urbanization. However, in CT, NY, and PA this species is currently considered to be S5 – stable. I believe NJ needs to be ahead of the curve on this, especially regarding heritage book trout strains. Given that NJ is the most populous state (per capita) in the entire US, is highly likely that ongoing development pressures in concert with potential climate change effects will alter flow and habitat and continue to reduce brook trout abundance.
-Brook trout are confined to small cold headwater streams in north Jersey (w/ 1 exception in Camden Co.) typically <5 miles long; their historic range has shrunk due to competition w/ non-native brown and rainbow trout; habitat fragmentation caused by dams and road crossings; loss of stream habitat due to inundation from man-made lakes/ponds; brook trout considered a sentinel species for climate change; 12 of 15 eastern states (including PA) have brook trout listed as a species of special concern.
-Given the high frequency of occurrences throughout suitable physiographic provinces and the large number typically found per survey location, I find it difficult to assess the brook trout as either an E or T species. This is especially true when compared to other species that occur much more diffuse across the state and that are found in low abundance when encountered. With that said, it is apparent that brown trout continue to expand their range into waters that historically held brook trout. The competition and predation brown trout exhorted on brook trout is resulting in replacement. This coupled with known anthropogenic stressors and climate change warrant a SC status.

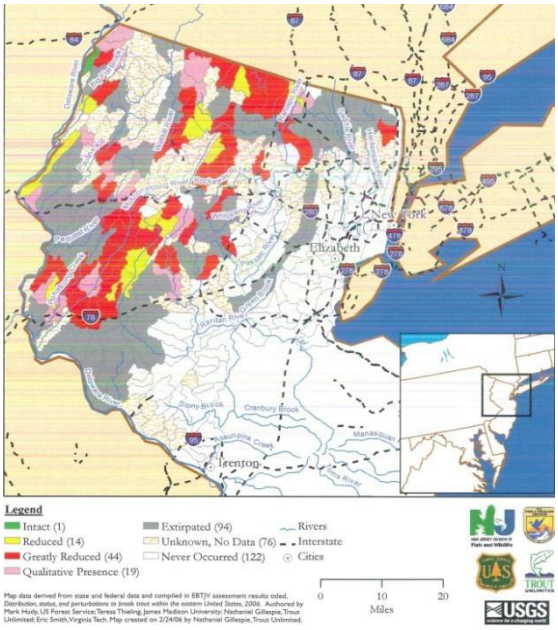
Round 3:
Stable
-Round-one and round-two commenters that recommended a status of SC for brook trout mentioned the large number of sites in NJ and the high abundance when present, and added that these factors exclude a rank of T or E. I agree. The same panelists also described various threats to brook trout, some more tangible, such as development pressures and brown trout, and some less so, such as climate change. A status of SC requires both inherent vulnerability to environmental deterioration and little understanding of their current population status. Based on the knowledge expressed by the commenters and the large amount of scientific literature for brook trout, a lot is known about their distribution and population status within their range as well as in NJ. Therefore, if T, E, and SC are ruled out by definition, a rank of stable is the only one left for this species.

Special Concern
-I agree with all addressed threats to the brook trout, however I remain unchanged at SC and the relatively high number of locations and individuals found when encountered. I am uncertain if continued land use degradation will significantly impact brook trout, as they are primarily found in a region of the state with steep topography, anti-degradation regulations, and many within public land, therefore land use impacts may not be the most severe threat. I have greater concern with competition from naturalized brown trout and potential impacts from climate change. I find it difficult to elevate the concern to T or E when we have several other fish species that merit greater attention. I remain steadfast in SC status for brook trout.
-Brook trout is not in immediate danger of becoming endangered, so I could recommend SC status, but with some risk. Nonetheless, for the reasons stated previously, brook trout do have very specific habitat and water quality requirements and slight deterioration of these conditions could quickly make the species threatened in NJ.
-Again, unless we are specifically discussing "Heritage" brook trout populations, there is currently no justification to place this species in a category any higher than "Special Concern".

-It is currently found at more sites than most species I'd consider SC, but it is intolerant to a variety of threats (increased temperature, reduced ground water, development, competition) which are likely to increase. I'll go with SC; it may very well be a consensus SC the next time status is evaluated.
-I am concerned that the panelists (myself included) may be relying too heavily on simply the number of occurrences (i.e. "dots on a map") when deciding upon the species' status. The maps we are using are helpful but they do not depict/document losses – just presence/absent over a rather narrow time frame. It is very important to know if there have been losses, particularly for species that appear to have a "reasonable #" of documented occurrences on the map yet occur only in specific areas or have narrow habitat affinities (such as the Pinelands or Ridge & Valley/ Highlands headwater streams). If I know a species range is shrinking because of impacts, and that it is being pushed/relegated to the inner sanctum of, say, the protected Pinelands or headwater streams then I am not comfortable calling a species "secure-stable."
-I apply this line of thinking to Brook Trout. Even though there appear to be a "decent # of dots" on the map, the range of Brook Trout in NJ is shrinking because of environmental stressors that have impacted/continue to impact this species' distribution (i.e. competition with non-native salmonids and human-induced stressors such as loss of connectivity, high water temperature, sedimentation). Stream surveys conducted by NJDFW (1968 – 2003) documented wild trout (brook/brown/rainbow) populations in 175 streams, or stream sections (NJDFW Coldwater Fisheries Management Plan, available: http://www.state.nj.us/dep/fgw/cwfmp.htm). Of these 175, 94 were allopatric Brook Trout, 27 were Brook Trout in sympatry with Brown and/or Rainbow Trout, and the remaining 54 streams had only Brown Trout and/or Rainbow Trout. I think it is reasonable to say that Brook Trout likely once occupied many of those 54 streams that are now occupied by just Brown and/or Rainbow Trout, but they died out due to habitat changes or were driven out/replaced by more tolerant non-native trout.
-There is electrofishing data that documents Brook Trout (BKT) losses. A study completed by NJDFW involved re-surveying 68 Trout Production streams (68 surveys total). This study provided data sets for 2 periods (1968 – 1971 and 2001 – 2010), 33-39 yrs apart. Comparing the historical to the modern data set:
28 allopatric BKT surveys: only 16 stayed allopatric, 7 now have both Brook & Brown Trout, 2 have only browns, and 3 have no trout
9 surveys w/ both BKT & brown trout: 4 stayed the same, 3 became brown trout only, and 2 actually switched to allopatric BKT.
3 surveys w/ both BKT & rainbow trout: 1 switched to brook/brown, 1 switched to brown/rainbow, and 1 switched to allopatric BKT.
28 other surveys (combinations of Brown only, Rainbow only, both Brown & Rainbow): 5 BKT combined w/ brown and/or rainbow, 16 various combinations of brown and/or rainbow, 3 now allopatric BKT, and 4 notrout.
Summary: 40 surveys that had BKT – 9 no longer have BKT; 28 surveys that didn't have BKT – 8 now have BKT; 7 streams do not have any trout. Allopatric BKT – started w/ 28, ended with 22.
Admittedly there are shortcomings with the study (differences in sampling gear effectiveness, short distances sampled may not reflect the trout population in the stream as a whole due to trout movement, etc). One could say the Brook Trout gains (8) and losses (9) balance out, but starting out with 28 allopatric BKT and ending with 22 is a net lost for the species to be concerned about.

Data assembled by the Eastern Brook Trout Joint Venture (EBTJV) paint a rather bleak picture of the rangewide occurrence of brook trout (see below for 2006 EBTJV Eastern US Range Map for Brook Trout, and for NJ; available: http://easternbrooktrout.org/assessment-data/ebtjv-maps).
The assessment for NJ used NJ data in consultation with NJDFW fisheries biologists' best professional judgement. Brook Trout are considered to occur in less than ½ their original range.





Brook trout occupy primarily headwater streams in the Ridge & Valley/Highlands physiographic provinces of NJ. They have fairly narrow habitat requirements and populations have been lost or impacted over time due to human disturbances (land use changes and fish stocking practices). I do not consider it to be "Secure-Stable." Is the Brook Trout vulnerable to environmental deterioration & habitat modification and therefore warrants special attention? My answer is yes, so I must categorize it "Special Concern".

Round 4:
Special Concern
-It doesn't completely fit the definition of SC because we know a lot about their distribution, habitat preference, etc., but it is inherently vulnerable and has been impacted a lot by humans and nonnative trout. The threats are not going to go away.
-Given the weight of the evidence, it is likely that this species requires, at a minimum, an SC status in NJ and it would be considered by most as irresponsible to classify it as stable.
-Most of the earlier arguments were about whether it warranted E or T status, versus something lower. It has also clearly declined in occurrence historically and will be particularly susceptible to climate change. It was widely stocked at various times and some current occurrences probably derive from these introductions. Thus, the range of native strains will be even more restricted than that of the species. Therefore, SC seems warranted.

Pirate perch (*Aphredoderus sayanus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	6.8
U		
NO		
NA		

Round 1:
Secure/Stable
-Commonly found in coastal plain streams throughout the southern part of the state.
-Fairly common throughout their native range, especially in S.NJ streams.

Banded killifish (*Fundulus diaphanus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.6
U		
NO		
NA		

Round 1:
Secure/Stable
-Often found in Pinelands impoundments with elevated pH and upstream development and upland agriculture, and is also stocked in the state as a biological agent for mosquito control.
-Very tolerant and widely distributed.

Mummichog (*Fundulus heteroclitus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	7	7.3
U		
NO	2	
NA		

Round 1:
Secure/Stable
-Increasing reports of low mummichog abundance in tidal brackish water areas. Most likely attributed to salinity levels and rainfall.
-Very tolerant and widely distributed

Eastern mosquitofish (*Gambusia holbrooki*) **Consensus: Special Concern?**

Status	# of People	Confidence Level
E		
T		
SC	2	6.0
S		
U		
NO	7	
NA		

Round 1:
Secure/Stable
-Not sure whether or not this species is native to NJ, but it is stocked for mosquito control and has been found at an increasing number of stream and impoundment sites in the Pinelands as well as off-stream sites, such as natural ponds, excavated ponds, and stormwater basins.
-Tolerant and widely distributed.

Special Concern
-I haven't caught Eastern in NJ. I haven't sampled much for it in Cape May County, and it could still be common there. However, increase of Western mosquitofish is likely a threat to it.

Threatened
-BFBM has collected 1 specimen since 2000. The map created by BFF is inaccurate. All BFBM collections of mosquitofish have been identified to species and specimens are routinely verified by local experts.

No Opinion
-Suspect its presence in NJ may be more widespread than data set suggests due to introductions (stocking to control mosquitoes).
-Group must form consensus on historical presence of species (native vs. nonnative) in NJ. "Zoogeography of North American Freshwater Fishes" Hocutt & Wiley 1986 considers this species *native* to Delaware Drainage and *introduced* Long Island Drainage

Round 2:
Special Concern
-Much of the apparent abundance of this species is probably Western Mosquitofish. Its current range in the state is probably limited, and it could be threatened by Western Mosquitofish there.
-Most if not all mosquito control stockings are Western Mosquitofish. Almost all sampling occurrences are the nonnative Western mosquitofish.

No Opinion
-*Gambusia holbrooki* is an Atlantic slope species which ranges from the southern Great Lakes to Florida (Jenkins and Burkhead,1995). It had long been recognized as a subspecies of *Gambusia affinis* until a genetic study by Wotten et al. (1988) clearly separated the two species; however, these two species readily intergrade. It is widely introduced into impoundments and ponds for mosquito control and Smith (1985) indicate that the three known population on LI are considered to be introduced. There is relatively limited information on whether this species is native to NJ or is introduced? However my brief scan of the systematic literature seems to indicate that this species is probably native to the very southern tip of NJ, but has been widely introduced elsewhere. So, it may be necessary to list this fish as an "NO" until further studies are done.
-The species that is raised at the Hackettstown State Fish Hatchery is *G affinis* not *G holbrooki*. Recent collections of Gambusia sp. made by DFW have been retained and will be sent to the Patrick Center for species level verification. If native to NJ, then it is my understanding that its historical presence may have been limited to approximately Cape May Co.

Slimy sculpin (*Cottus cognatus*) **Consensus: Threatened**

Status	# of People	Confidence Level
E		
T	6	5.2
SC	1	6
S		
U		
NO	2	
NA		

Round 1:
Special Concern
-The slimy sculpin occurs in relatively few places in NJ. It is sensitive to warming. It may be more sensitive than brook trout, since it doesn't move as much and can't find cool groundwater inputs. On the other hand, it may do ok in springfed areas in the limestone belt. Most records outside of XXXX seem to be from carbonate areas, though there aren't many total records.
-Population has declined. Sculpin are more likely to be found in smaller headwater streams, but the distribution in these streams is patchy.
-Definitely a species to keep an eye on as waters in Northern NJ continue to degrade due to agricultural and urban-transitional processes. These species require cool high-quality environments to thrive, thus, their abundance will likely decline with continued loss of high gradient waters with gravel substrate,

Threatened
-Intolerant species. Fewer than ten disjunct populations.
-Range restricted (usually co-occurs with brook trout, which has similar habitat requirements, but sculpin distribution is more restricted than brook trout); high risk due narrow habitat preference – cold, clean water required.
-Has the same vulnerabilities as the brook trout. More restricted in range than the brook trout at upland coldwater streams of New Jersey. Often populations only found at spring water seep areas of upland streams. The species range and population will certainly be impacted by increased stream temperatures caused by climate change.

Round 2:
Threatened
-Reviewers' comments seem consistent: apparently fewer populations and more sensitive than Brook Trout. Although springheads might provide habitat, Slimy Sculpin seems pretty restricted even in limestone belt.

-I was on the fence on this one --- that is, whether to consider it an "SC" or a "T", however, based on other Delphi panel comments, the fact that its range is even more limited than Brook trout, and that there are relatively few existing populations left in NJ, I am willing to give it a "T" rating if that is the broader consensus of the group.
-Range restricted (usually co-occurs with brook trout, which has similar habitat requirements, but sculpin distribution is more restricted than brook trout); high risk due narrow habitat preference – cold, clean water required
-S1(Critically Impaired in West Virginia)

White perch (*Morone americana*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	8	7.1
U		
NO	1	
NA		

Round 1:
Secure/Stable
-Should distinguish between 2 life forms (anadromous & landlocked); status/confidence levels the same for both.
-Tolerant and widely distributed.

Mud sunfish (*Acantharchus pomotis*) **No Consensus**

Status	# of People	Confidence Level
E		
T		
SC	2	6.0
S	7	5.7
U		
NO		
NA		

Round 1:
Secure/Stable
-Populations should remain stable with the protection of the Pinelands.
-Although rarely abundant where found, this species is present at many streams and impoundments in the Pinelands, especially those draining active and abandoned cranberry farms.
-Range has decreased in NJ, but population does appear to be stable. NY threatened.

Special Concern
-Although fairly abundant in south Jersey, NJ appears to be the northern limit for the species range.
-I consider this to be a species of concern because even thought is can be found throughout its native range in the NJ Pinelands, its population status is not well-known. And when you do find them, their abundance is extremely low.

Threatened
-Listed as Threatened in New York. Extirpated from Pennsylvania. Moderately tolerant species. Common in Coastal Plain of NJ and rarely encountered the northern portion of State. Apparently displaced from inner coastal plain region. Have not been ecountered in eight lakes that had them when surveyed in the 1950's. Vulnerable to water quality changes such as eutrophication, increase in pH, etc., which contributes to establishment of non-native centrarchids and increased predation. Concerned with potential impacts of snakehead (which can tolerate acidic and low dissolved oxygen conditions) if/when it expands its range into the Pinelands.

Round 2:
Special Concern
-Appears to be stable in the Pinelands, but clearly displaced from previous occurrences in northern and central NJ. Concerned with threats from water quality changes and predation from non-native centrarchids and the expanding range of the snakehead.

Stable
-My perspective on this species remains unchanged, i.e., that even in areas such as the Pinelands where it is considered to be common, it is found in extremely low numbers < 2 per 100 meters. However, if the broader consensus of the group is that it is stable, then I am willing to classify it as stable with the caveat that its status be reevaluated every 5 years or so that it does not slip through the cracks, especially given that this species is considered to be Threatened in NY.
-For Round 2, see the distribution map with summary statistics and relative abundance graphs for the mud sunfish for streams and impoundments surveyed in the Pinelands. This species should be listed as stable in NJ because:
1. The distribution map shows that the mud sunfish is widely distributed in the Pinelands, and, based on other maps provided, is also found at other stream sites outside the Pinelands.
2. It was found at almost one-half (45%) of the streams and impoundments surveyed in the Pinelands.
3. Because even at known sites it is not very abundant (see abundance graphs), it may not always be collected when present, so it may be even more widely distributed than thought within its NJ range.

4. Most of the streams that support mud sunfish drain land that is permanently protected or designated by Pinelands rules as either Preservation Area District (most protective category), Forest Area (second most protective category), or Special Agricultural Area (areas reserved mostly for growing cranberries and blueberries). These four types of land are shaded green on the map.
-Common in the Pinelands and has been collected throughout the Inner Coastal Plain and a few locations in Northern NJ.

Round 3:

Stable

-The mud sunfish is one of the top native aquatic predators in the naturally depauperate waters of the Pinelands, which may be a reason that they are normally low in overall abundance. However, in relatively small sections of some streams, I have found over 30 individuals present, and many times in other streams a half dozen or more present. They are not currently declining and do well not only in typical Pinelands streams and impoundments, but also in the very low oxygen and low pH ditches and bogs of abandoned cranberry farms. These abandoned ditches and bogs provide a tremendous amount of man-made habitat for mud sunfish, and coupled with impoundments, have likely increased the amount of habitat for this species over time. Protections for aquatic and wetland systems in the Pinelands are the most stringent in the state. As long as these protections remain in place, I maintain my original opinion that the mud sunfish is stable.
-I still think this species needs the "Special Concern" status so that it might be on the watch list. However, numbers especially in the coastal plain currently appear to be stable, so I will go with the broader consensus….for now.
-I agree with earlier comments that it is widespread, though in low abundance, in a number of areas, including in many areas with protection. Its decrease from the inner Coastal Plain is similar to that of Enneacanthus; all still find a large Pine Barrens refuge. At the moment, threat from Snakehead is hypothetical, and snakehead may affect a number of other species for which its effect hasn't been considered. Continued monitoring may be appropriate. I assume that can be done without an SC rating.
-The extirpation from PA isn't really relevant, since PA occurrences of it, as well as other Coastal Plain species, were limited to the small sliver of CP habitat in Bucks and Philadelphia Counties. That habitat has been degraded. Equating NJ and PA occurrence is misleading.

Special Concern

-I think SC best describes the Mud Sunfish in NJ for the following reasons:
1. I can agree that this species currently warrants the classification of stable in the Pinelands, however, their effective range in NJ has shrunken in all physiographic provinces except the Outer Coastal Plain.
2. One could argue the primary vs secondary threats, but this range reduction corresponds with a demonstrated "intolerance."
3. Although Pinelands are better protected from threats than other habitat types, the spread of an invasive species such as Snakeheads or Flatheads may trump the regulatory based protections this area is afforded. (Note: The Snakehead is more than a theoretical threat, as it is becoming very abundant and spreading rather quickly in close proximity to the Pinelands.)
4. Although found in 45% of Pinelands streams, its range within the Pinelands only represents half of its previously documented range (Arndt, Rudolf G. 2004. Annotated Checklist and Distribution of New Jersey Freshwater Fishes, With Comments on Abundance).
-The comment above ("Common in the Pinelands and has been collected throughout the Inner Coastal Plain…") is very misleading. Extensive sampling has been conducted in the areas of the Inner Coastal Plan with minimal or no findings within the Inner coastal Plain from Salem to Mercer Counties. Data provided indicate occurrences in the northern 25% of the Inner Coastal Plain.
-Some have commented that MS is fairly common in the Pinelands and due to high level of protection the area receives this species will persist. But what concerns me are comments about vulnerability, particularly low abundance (low number per sample), displacement from previous occurrences, and potential for impacts from non-native species. I still believe MS warrants SC because of (1) habitat specificity and (2) because its range in NJ appears to have shrunk and may continue to do so in the Pinelands periphery where human-related land disturbance occur. Designating Pumpkinseed as Stable was not a difficult decision for me. They are widely distributed statewide, individual populations large, hence the current 25/day harvest regulation. I just don't consider MS to be in the same "category" as Pumpkinseed. Am I misinterpreting/misapplying the status definitions? Have to wonder since I seem to be in the minority (in Round 2 only 2 for SC and 7 for S). Also, no one has noted that in 2010 the NJ fishing regulations were changed for certain sunfish species (Banded, Blackbanded, Mud, and Bluespotted Sunfish) from harvest of 25/day to no harvest allowed, & this was done because of concerns for these species. If the consensus for MS is stable then perhaps the "no harvest" regulation was not necessary/appropriate for this species (playing devil's advocate here, because concerned about public perception i.e. "If you say the population is stable yet there's no "special concern", then why can't I collect 25/day for my aquarium"). I have a problem with saying a species is Stable because Pinelands are protected so they will persist. Shouldn't our thinking be more along these lines: If this species historically occupied habitats outside the protected Pinelands, but because of human activity it's been impacted and its range is shrinking such that more & more it's being relegated to protected Pinelands, then isn't this all the more reason it warrants SC rather than S? I am saying all this for Mud Sunfish, but I apply this rationale to other Pinelands species (just that MS is the 1st one on this list, hence I elaborate here).

Round 4:

Stable

-I have no additional comments.
-I still feel this species deserves an SC rating given its meager distribution and extremely low abundances. However, if the general consensus by the broader panel is to place this species in the "S" category than I am reluctantly willing to go with that as long as there is some acknowledgement by NJ that this species warrants re-categorization if either it's habitat or distribution is further constrained.
-I think the species is currently stable within the state and so rated it. However, as others have noted, there are potential threats from invasive species, so occurrence of predators and Mud Sunfish should be monitored. I think you could support lowering fish catch for the species even under an S rating, if nothing else to avoid misidentification of *Enneacanthus* as Mud Sunfish.

Special Concern

-I believe the Mud Sunfish should remain SC for similar reasons to the Blackbanded Sunfish, Banded Sunfish, and possibly Bluespotted Sunfish. In regards to the comment in which the collection of this species (along with the other three sunfishes) was prohibited in 2008, the collection and possession of these species for scientific and educational purposes can still be provided for, in limited quantities, through the issuance of Scientific Collecting permits. Previously there was no protection by any size or possession limits in New Jersey. Although not typically encountered using rod and line as the manner and means for angling, their colorful markings have made them recent targets for hobbyists and aquarium suppliers that may use alternative collection instruments such as seines and minnow traps.

Blackbanded sunfish (*Enneacanthus chaetodon*) **No Consensus**

Status	# of People	Confidence Level
E		
T		
SC	3	5.7
S	6	6.0
U		
NO		
NA		

Round 1:
Secure/Stable
-Populations should remain stable with the protection of the Pinelands.
-Often found in Pinelands streams and abundant in impoundments in some Pinelands watersheds.
-Though probably reduced from historical range, Pine Barrens protections probably make it secure.
-An acid tolerant sunfish species that appears to be common in the pinelands when suitable habitat is available – i.e., slow moving high-quality Pineland streams with abundant aquatic vegetation.

Special Concern
-Though fairly abundant in south Jersey, NJ appears to be the northern limit for the species range; habitat specificity (?).
-Vulnerable to habitat degradation and loss of wetlands.
-Range has decreased. The majority of sampling events throughout the state are on wadeable streams/rivers. Blackbanded sunfish reside in slow moving bogs/wetlands and ponds, which are ecosystems not typically targeted by biological monitoring programs. NJ has one of the most stable populations in the mid-Atlantic. MD endangered.

Threatened
-Intolerant species. Extirpated from Pennsylvania. Common and apparently stable in the Pinelands, but rare outside of the Pinelands where a combination of factors such as landuse changes, degradation of water quality, and non-native species have reduced their range. Apparently displaced from inner coastal plain region. Found in XXXX (Middlesex Co.) and XXXX (Mercer Co.) in the 1950's but not when resampled in 2000's. Pinelands is the range-wide stronghold for this species. Vulnerable to water quality changes such as eutrophication, increase in pH, etc., which contributes to establishment of non-native centrarchids and increased predation. Concerned with potential impacts of snakehead (which can tolerate acidic and low dissolved oxygen conditions) if/when it expands its range into the Pinelands.

Round 2:
Special Concern
-Below is a summary of data provided at Blackbanded Sunfish symposium (2010).

State	Heritage Program Current Status	State Listing Current Status	Historic	Current Surveys
NJ	S4 – apparently secure	Regional Priority	coastal plain	Widespread within Pinelands
PA	SX – presumed extirpated	Extirpated	A few sites in Bucks Co.	Presumed Extirpated
MD	S1 – critically imperiled	Endangered	19 sites Chesapeake Watershed	6 sites in Chesapeake Watershed
DE	S2 – imperiled	Proposed Endangered	More than 20 locations	Many declined or extirpated, near complete loss at stronghold
VA	S1 – critically imperiled	Endangered		
NC	S3 – vulnerable	no listing		
SC	SNR - not ranked	no listing	23 of 28 coastal plain counties	4 of 145 sites
GA	S1 – critically imperiled	Endangered		Unsuccessful - 1 site
FL	S3 – vulnerable	Threatened		Unsuccessful - 2 sites

Based on data presented and conversations with others studying the Blackbanded Sunfish, NJ stands alone in the number of sites and abundance per site in which they are currently found, which elevates NJ's role in conservation of this species. The decline of this species throughout its national range (including demonstrated losses in Inner Coastal Plain waters in PA and central and southern NJ), coupled with new threats such as the expansion of the range of the snakehead, and eutrophication of Pinelands waters, justify either SC or T status.

Stable
-My perspective on this species remains unchanged -- as long as Pinelands waters where this species thrives continue to be protected, population numbers should remain stable
-For Round 2, see the distribution map with summary statistics and relative abundance graphs for the blackbanded sunfish for streams and impoundments surveyed in the Pinelands. This species should be listed as stable in NJ because:
1. The distribution map shows that the blackbanded sunfish is fairly well distributed in the Pinelands, and, based on other maps provided, is also found at other stream sites outside the Pinelands.
2. It was found at 40% of the streams and impoundments surveyed in the Pinelands, including 60% of the sites sampled in the Mullica River watershed.
3. The abundance graphs show that it is much more abundant in impoundments than streams. Except for the Great Egg Harbor watershed, blackbanded sunfish is the second most abundant native fish species found in impoundments.
4. Most of the streams that support blackbanded sunfish drain land that is permanently protected or designated by Pinelands rules as either Preservation Area District (most protective category), Forest Area (second most protective category), or Special Agricultural Area (areas reserved mostly for growing cranberries and blueberries). These four types of land are shaded green on the map.

Round 3:
Stable
-I'm not sure why the status of blackbanded sunfish in other states is relevant, especially states where there are no potential interactions with NJ populations. Protections for aquatic and wetland systems in the Pinelands are the most stringent in the state. As other commenters have said, as long as these protections remain in place, the blackbanded sunfish will remain stable.
-Arguments above indicate that it doesn't meet criteria for SC. However, the status in other Coastal Plain states is sobering (although PA status isn't really relevant). It is clearly a responsibility species for the state, although I don't know if regulations make any provision for such species.

Special Concern
-I think SC best describes the Blackbanded Sunfish in NJ for the following reasons:
1. I can agree that this species currently warrants the classification of stable in the Pinelands, however, their effective range in NJ has been mostly if not completely extirpated from the Inner Coastal Plain.
2. One could argue the primary vs secondary threats, but this range reduction corresponds with a demonstrated "intolerance."
3. Although Pinelands are better protected from threats than other habitat types, the spread of an invasive species such as Snakeheads or Flatheads may trump the regulatory based protections this area is afforded. (Note: The Snakehead is more than a theoretical threat, as it is becoming very abundant and spreading rather quickly in close proximity to the Pinelands.)
4. Although found in 40% of Pinelands waters, its range within the Pinelands only represents approximately half of its previously documented range (Arndt, Rudolf G. 2004. Annotated Checklist and Distribution of New Jersey Freshwater Fishes, With Comments on Abundance.)
5. NJ has a great responsibility for the survival of this species, therefore I recommend we error on the side of caution in regards to its conservation.
Even though this species appears to be abundant in Pineland streams, alarm bells should be going off based on its restricted distribution in other coastal areas in NJ and in peripheral states. SC is easily justifiable for this species just as it is for the Mud Sunfish.
-Although NJ seems to be a stronghold for this species shouldn't we acknowledge/consider that it is declining elsewhere and that NJ should have (as a reviewer pointed out) a conservation role? My concerns & arguments for SC for this species are similar to the detailed comments I presented in Round 3 for Mud Sunfish.

Round 4:
Stable
-I have no additional comments.
-Same argument as Mud Sunfish, except Blackbanded Sunfish is clearly more common. Its current status warrants an S rating. One or two of the *Enneacanthus* and Mud Sunfish could be considered responsibility species for the state. The current ranking system doesn't allow designation or management of responsibility species. Perhaps such a designation would help for situations like this.

Special Concern
-My concerns for the long-term survival of this species remain unchanged and I strongly agree with the round 3 panelist that stated that we should err on the side of caution regarding the protection and conservation of the Blackbanded sunfish.
-The status of Blackbanded Sunfish in other states is relevant because it demonstrates its inherent vulnerability". "Protection of aquatic and wetland systems" from what?..landuse changes, development, etc. If so, that does not represent the full suite of threats. Biological interactions, Climate change, etc. are not accounted for. Special Concern is a reasonable status for this species. The chart presented during Round 2 which was provided at a Blackbanded Sunfish symposium (2010) clearly points to a conservation need for this species across its range. It is understood that NJ probably has the most stable Blackbanded Sunfish habitat / population of any state within its range, however the panel should not fail to recognize that this emphasizes our regional responsibility to this species. Its demise in other states (and to some degree NJ beyond the Pinelands) demonstrates inherent vulnerability (as defined in Special Concern definition). I would like to compare some aspects of the status (Threatened) and distribution (disjunct, range reduction, similar regulatory protections, etc.) this species to that of the Pine Snake which is listed as Threatened. This comparison may apply to additional Pinelands fishes as well, but for now the focus is on Blackbanded Sunfish. Full report can be found at http://www.njfishandwildlife.com/ensp/pdf/pine_snake_assessment09.pdf

Bluespotted sunfish (*Enneacanthus gloriosus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC	1	5
S	8	6.6
U		
NO		
NA		

Round 1:

Secure/Stable

-Commonly found in Pinelands streams and impoundments, abundant in impoundments in some watersheds, and seems to do well with non-native fish.
-One of the most common sunfish species in Pineland streams. Are rather abundant in systems that have not been invaded by non-native sunfish species.

Special Concern

-Intolerant species. Common in Coastal Plain of NJ and found in many well-vegetated lakes in northern portion of State. Still found in inner coastal plain region. Found in 50 of 88 statewide lake surveys conducted during 1950-1952. Recent sampling of 20 lakes that had bluespotted sunfish in the 1950's surveys, but only found in found in 13 of the 20. Vulnerable to water quality changes such as eutrophication, increase in pH, etc., which contributes to establishment of non-native centrarchids and increased predation. Concerned with potential impacts of snakehead (which can tolerate acidic and low dissolved oxygen conditions) if/when it expands its range into the Pinelands.

Banded sunfish (*Enneacanthus obesus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC	1	6
S	8	6.0
U		
NO		
NA		

Round 1:

Secure/Stable

-Populations should remain stable with the protection of the Pinelands.
-Often found in Pinelands streams, abundant in impoundments in some watersheds, and abundant in streams draining active and abandoned cranberry farms.
-Range within the Inner Coastal Plain has declined. PA endangered; NY threatened.
-Slightly less common than the Bluespotted sunfish, but it is still well distributed throughout interior Pineland streams.

Special Concern

-Pop's limited to south Jersey, suggests narrow habitat preference; species range appears to be coastal, ME - FL.

Threatened

-Listed as Threatened in New York. Listed as Endangered in Pennsylvania. Intolerant species. Common and apparently stable in the Pinelands, but rare outside of the Pinelands where a combination of factors such as landuse changes, degradation of water quality, and non-native species have reduced their range. Apparently displaced from inner coastal plain region. Vulnerable to water quality changes such as eutrophication, increase in pH, etc., which contributes to establishment of non-native centrarchids and increased predation. Concerned with potential impacts of snakehead (which can tolerate acidic and low dissolved oxygen conditions) if/when it expands its range into the Pinelands.

Round 2:

Special Concern

-Endangered in PA. S2 Impaired in DE & MD. SC in CT & NH. T in NY. Displaced from inner coastal plain region in PA and NJ.

Stable

-This species is common a quite abundant in Pineland streams and as long as interior Pineland streams continue to be protected, the population numbers of this species should remain relatively stable in NJ.
-For Round 2, see the distribution map with summary statistics and relative abundance graphs for the banded sunfish for streams and impoundments surveyed in the Pinelands. This species should be listed as stable in NJ because:
1. It is widely distributed throughout the Pinelands and, based on other maps provided, is found in several other NJ stream systems outside the Pinelands.
2. It was present in 68% of the stream and impoundment sites surveyed in the Pinelands, including 86% of the Mullica River sites and 73% of the Barnegat Bay sites.
3. The abundance graphs show that, except for the Great Egg Harbor watershed, it was one of the most abundant native fish species in Pinelands streams. It was by far the most abundant native fish species found in Pinelands impoundments of all four watersheds.
4. Most of the streams that support banded sunfish drain land that is permanently protected or designated by Pinelands rules as either Preservation Area District (most protective category), Forest Area (second most protective category), or Special Agricultural Area (areas reserved mostly for growing cranberries and blueberries). These four types of land are shaded green on the map.

5. The banded sunfish was also the most abundant fish species found in streams that drained active-cranberry farms and abandoned-cranberry farms and, of the six native species compared, displayed the greatest contribution to biomass in active-cranberry streams (Fish chapter in: Zampella and others 2006. Monitoring the ecological integrity of Pinelands wetlands: A comparison of wetland landscapes, hydrology, and stream communities in Pinelands watersheds draining active-cranberry bogs, abandoned-cranberry bogs, and forest land. Final report submitted to the U.S. Environmental Protection Agency. Pinelands Commission, New Lisbon, New Jersey, USA).

Redbreast sunfish (*Lepomis auritus*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.3
U		
NO		
NA		

Round 1:
Secure/Stable
-Widely distributed in the state and present in Pinelands streams and impoundments with elevated pH and upstream development and upland agriculture.
-Broadly distributed.

Pumpkinseed (*Lepomis gibbosus)* **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.9
U		
NO		
NA		

Round 1:
Secure/Stable
-Widely distributed in the state, often found in Pinelands streams and impoundments with elevated pH and upstream development and upland agriculture, and stocked for mosquito control.
-Broadly distributed.

Swamp darter (*Etheostoma fusiforme*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC	1	6
S	8	5.9
U		
NO		
NA		

Round 1:
Secure/Stable
-Populations should remain stable with the protection of the Pinelands.
-Common in Pinelands streams and impoundments.
-Like the other Pine Barrens species, this species has a relatively restricted range, but that range has decent problems.
-Rarely collected in the Inner Coastal Plain and typically low in abundance. A small benthic fish which can easily be missed when sampling in deeper blackwater or turbid streams. NY threatened.
-Broadly distributed throughout its native range.

Special Concern
-Distribution limited to south Jersey.

Threatened
-Listed as Threatened in New York. Extirpated from Pennsylvania. Intolerant Species. Common and apparently stable in the Pinelands, but rare outside of the Pinelands where a combination of factors such as landuse changes, degradation of water quality, and non-native species have reduced their range. Apparently displaced from inner coastal plain region.

Round 2:
Special Concern

-S2 (Impaired) in MD. T in ME & NY. E in PA. Displaced from inner coastal plain region in PA and NJ.

Stable
-Even though the Swamp darter is considered to be an intolerant species and the distribution of this species is limited to south Jersey -- in the Pinelands it is quite abundant and the population should remain stable with the continued protection of Pineland waters.
-For Round 2, see the distribution map with summary statistics and relative abundance graphs for the swamp darter for streams and impoundments surveyed in the Pinelands. This species should be listed as stable in NJ because:
1. It is widely distributed throughout the Pinelands and, based on other maps provided, is found in several other NJ stream systems outside the Pinelands.
2. The swamp darter was the second most frequently occurring native fish species, which was found at 72% of the stream and impoundment sites surveyed in the Pinelands. The only native fish that was found more frequently than the swamp darter was the chain pickerel.
3. The abundance graphs show that it was the most abundant or the second most abundant native fish species in Pinelands streams, and one of the top five most abundant native fish species in Pinelands impoundments.
4. Most of the streams that support the swamp darter drain land that is permanently protected or designated by Pinelands rules as either Preservation Area District (most protective category), Forest Area (second most protective category), or Special Agricultural Area (areas reserved mostly for growing cranberries and blueberries). These four types of land are shaded green on the map.

Tessellated darter (*Etheostoma olmstedi*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.8
U		
NO		
NA		

Round 1:
Secure/Stable
-Widely distributed in the state and found in Pinelands streams with elevated pH and upstream development and upland agriculture
-Broadly distributed throughout NJ and fairly tolerant of degraded waters.

Yellow perch (*Perca flavescens*) **Consensus: Secure/Stable**

Status	# of People	Confidence Level
E		
T		
SC		
S	9	7.4
U		
NO		
NA		

Round 1:
Secure/Stable
-Widely distributed in the state and found at a few Pinelands streams and impoundments with elevated pH and upstream development and upland agriculture.
-I don't know if there are anadromous populations in the state. These may not do as well as other populations.
-Broadly distributed throughout NJ and fairly tolerant of degraded waters.

Shield darter (*Percina peltata*) **Consensus: Special Concern**

Status	# of People	Confidence Level
E		
T		
SC	7	5.1
S	1	6
U		
NO	1	
NA		

Round 1:
Secure/Stable
-This species is common in the main stem Delaware River.
-Distribution is patchy but has not changed over time.

Special Concern
-Limited in distribution, tends to require high gradient well oxygenated streams. Definitely a species to keep an eye on as it is highly likely its numbers will continue to decline as water quality and habitat decline.

Threatened
-Intolerant Species. Limited range, few locations, and small numbers when encountered
-Species range appears to be limited to Atlantic slope drainages, NY – VA and NJ is on the fringe of the species' range; when species has been encountered the number of individuals is always low.

No Opinion
-Don't know much about this species, but have found it in the South Branch of the Raritan and XXXX, which is a tributary of the XXXX.

Round 2:
Stable
-Reviewers note limited distribution and likely sensitivity, but I've seen no evidence of decline.
-The Shield darter is an Atlantic coast species that ranges from the Hudson in NY to the Neuse in NC (Smith 1985). It appears to be fairly abundant in the Delaware and Susquehanna drainages in NY & NJ and NY & PA, respectfully so it is probably not threatened from a conservation perspective. In NJ, other than the mainstem Delaware, the populations appear to be limited to a few areas in the upper Raritan River and some Delaware tributaries including XXXX. Relic populations in tributaries of upper Raritan (e.g., XXXX and XXXX) suggest that historically this species was probably found throughout the Raritan basin, but have become a casualty of anthropogenic degradation of habitat and water quality. Without further protection, it is likely that this relatively intolerant species will continue to decline in the Raritan and ultimately, it could even be extirpated as continued development and increasing human and agricultural demand for water supersedes ecological needs. Given these constraints, at a minimum, the broader Delphi group might want to consider giving this species an "SC" status.

Special Concern
-S1 Critically Impaired in DE and S3 Watch list Rare to uncommon in MD. Typically few individuals when encountered. Found in moderate to larger rivers, (less or not wadeable). Additional sampling in these waters may produce additional sites for this species, for example they were discovered for first time in Millstone River by DFW in 2013 (not indicated on maps). Special Concern due to small population size and few locations.

Round 3:
Stable
-Common in the mainstem Delaware River and in at least two tributaries (XXXX and XXXX). NYSDEC fish atlas shows the species common in the Susquehanna and Delaware drainages and describes the species as secure. Shield darter populations in the Raritan drainage are certainly more patching, but don't appear to have changed much over time.

Special Concern
-Very few river miles of known locations (outside of the Delaware River). This species is typically found in the larger river systems and given that the majority of sampling in NJ is in the smaller end of the wadeable rivers, there is room to target the larger sections of rivers to better understand extent of their distribution. Acknowledging that point, I still recommend SC. A conservation concern is voiced in 3 other states. I would be curious to get a better handle on their status and distribution in Pennsylvania.
-Based on previous comments and the maps provided, this species appears to be somewhat limited in NJ and found in low numbers when present. It also appears that there may be some inherent vulnerabilities to degradation. Since new sites are still being discovered, it also appears that not enough is known about this species. These factors add up to a status of special concern.
-My perspective on this species remains unchanged.
-The apparent small population sizes of Shield Darter could reflect sampling. I did a project in the Delaware near XXXX where moderately intense sampling found only a few individuals. I then snorkeled and sitting on top of one boulder were more individuals than I'd caught in the entire survey. It is probably intolerant. Like American Brook Lamprey, status may depend on how many sites and drainages would be considered widespread or restricted. I'm ok with SC, given intolerance and opinions of others.
-Due to its apparent limited distribution in NJ (i.e. few dots on the map) I could not say that this species is "secure" S. Even if it's a little more prevalent than the data sets indicate (due to misidentification & lack of sampling in lower sections of Del River tribs north of Trenton) that would still not be much.

Round 4:
Special Concern
-Shield darter appear to be present at all sites today that were sampled in late 80's and early 90's. They are also common in the main Delaware River and two of the NJ tributaries. With this said the species could still meet special concern status. Outside the Delaware drainage the species is found in only few locations in the Raritan drainage. The shield darter has a spotty distribution and I believe there is little understanding of their current population size.
-I have no additional comments.
-The inherent vulnerability of this species to further anthropogenic degradation (i.e. "environmental deterioration or habitat modification") makes it a poster child for an "SC" rating.
-Based on what we know, Special Concern is the most appropriate status. Similar to the Comely Shiner, the Shield Darter seems to be associated with larger streams and rivers, which are typically under-represented in statewide data collection efforts. I would like to see a concerted effort to fill data gaps in our larger river systems in subsequent years.
-I don't think I'll change 6 people's opinion after 4 rounds and have changed my status to SC.
A question was raised about its status in PA. We've caught it in moderate abundance (>15/100 m) in a number of tributaries as well as in the main stem Delaware. It occurs in tributaries of the Delaware (XXXX, XXXX, XXXX, XXXX, and XXXX) in PA, NJ (XXXX and XXXX) and NY (XXXX, XXXX, XXXX and XXXX). It occurs in a number of Schuylkill River tributaries as well (XXXX, XXXX, XXXX, XXXX, XXXX, and XXXX); these are generally relatively high quality. It is absent from many lower quality streams. This information could support either an S ranking (it is not regionally in trouble) or an SC (it seems to be found in more tributaries on the PA side than the NJ side).

APPENDIX III
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Appendix IV. Division of Fish and Wildlife recommendations for five non-consensus spp., with additional concerns for one species with a consensus of two.*

Scientific Name	Primary Common Name	SWAP Status	Current Status	Consensus Status/ vote count	Final Round	DFW REC	BFF Notes on Recommended Status	ENSAC REC
Amia calva	Bowfin	NA	None	None 2S/1NO/ 6NA	4	NA	Literature submitted for review indicates it is non-native to NJ. Majority vote for NA.	NA
Acantharchus pomotis	Mud Sunfish	Focal	None	None 2SC/7S	4	SC	Significant range reduction in NJ and often found in low numbers. Listed in four neighboring states, and NJ has high regional responsibility for the survival of this species.	SC
Enneacanthus chaetodon	Blackbanded Sunfish	Focal	None	None 3SC/6S	4	SC	Significant range reduction in NJ, AFS listed as "vulnerable" (ie. SC), listed or doing poorly in all other states within its range. Pinelands land use regulations insufficient to prevent further loss. NJ has high regional responsibility and is critical for long-term sustainability of species.	SC
Lampetra appendix	American Brook Lamprey	Upper Tier	None	None 5SC/2S/ 2NO	4	SC	Intolerant to environmental degradation. Disjunct populations. Listed in 8 neighboring states. The majority of panel in favor of SC.	SC
Notropis bifrenatus	Bridle Shiner	Focal	None	None 7E/2T	4	E	Universal concern for this species, declined throughout native range, listed in neighboring states E (DE, MD, PA), T (NH), SC (CT, MA, ME). The majority of panel in favor of E.	E
Bureau of Freshwater Fisheries recommends the following species as Undetermined, as consensus was reached among only two participants.								
Gambusia holbrooki	Eastern Mosquitofish	None	None	SC* 2SC/7NO	2	U	Insufficient information to make informed decision. Identification difficulty with widely introduced Western Mosquitofish (*G. affinis*). Additional data needed on historic distribution in NJ. The 80% consensus was reached by just 2 panelists offering opinions. The lack of opinion on the panel suggests Uncertain/Unknown is the correct status.	U